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REQUEST TO LIST IN THE COMPENDIUM OF CANDIDATE GLOBAL TECHNICAL
REGULATIONS (COMPENDIUM OF CANDIDATES) THE UNITED STATES OF AMERICA
ENVIRONMENTAL PROTECTION AGENCY PROGRAMME FOR CLEANER NON-ROAD
ENGINE AND NON-ROAD DIESEL FUEL SULPHUR CONTROL
(CLEAN AIR NON-ROAD DIESEL PROGRAMME)

Transmitted by the representative of the United States of America

Note: The document reproduced below is submitted by the United States of America to the Executive Committee (AC.3) for consideration. It contains a request to include in the Compendium of Candidates the Clean Air Non-road Diesel Programme. The document is based on informal document No. WP.29-134-20 (TRANS/WP.29/1037, paras. 111 and 113). In order to be considered by AC.3, this request shall be completed with a copy of the regulations mentioned (see Article 5, paras. 5.2.1., 5.2.1.1. and 5.2.2. of the 1998 Agreement).

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<http://www.unece.org/trans/main/welcwp29.htm>

United States of America Environmental Protection Agency Programme for Cleaner Non-road Engine and Non-road Diesel Fuel Sulphur Control (Clean Air Non-road Diesel Programme)

On 11 May 2004, the United States of America Environmental Protection Agency (EPA) established a comprehensive national control programme that will reduce emissions from non-road diesel engines by integrating engine and fuel controls as a system to gain the greatest emission reductions. Engine manufacturers will produce engines with advanced emission-control technologies similar to those planned for 2007 and later highway diesel trucks and buses. Exhaust emissions from these engines will decrease by more than 90 per cent.

Closely linked to these engine provisions are new fuel requirements that will decrease the allowable levels of sulphur in fuel used in non-road diesel engines, locomotives, and marine vessels by more than 99 per cent. These fuel improvements will create immediate and significant environmental and public health benefits and will enable the use of new, high-efficiency emission-control devices on non-road engines.

By greatly reducing diesel emissions, this rule will result in significant benefits to public health. These benefits include about 12,000 fewer premature deaths and hundreds of thousands fewer incidences of respiratory problems. The overall benefits of the programme in dollars significantly outweigh the costs by a factor of about 40 to 1 (\$80 billion annual benefits versus \$2 billion in costs) when the programme is fully implemented.

This rule culminates a multi-year collaborative process to reduce non-road diesel emissions. EPA worked closely with stakeholders from industry, States and local governments, environmental and public health organizations, international organizations, and others in the design of this programme.

Background

The new emission standards apply to diesel engines used in most construction, agricultural, industrial, and airport equipment. The standards will take effect for new engines beginning in 2008 and be fully phased-in for most engines by 2014. Larger mobile engines (greater than 750 horsepower) have one year of additional flexibility to meet their emission standards.

Non-road diesel engines contribute greatly to air pollution in many cities and towns across the United States. Non-road engines currently meet relatively modest emission requirements and therefore continue to emit large amounts of nitrogen oxides (NO_x) and particulate matter (PM), both of which contribute to serious public health problems.

New Standards for Non-road Diesel Engines

It is expected that engine manufacturers will use advanced exhaust after treatment technologies (catalyzed particulate filters and NO_x absorber catalysts) to meet the new standards. This programme also sets emission standards for different sizes of non-road engines. It includes new provisions to help ensure that emission-control systems perform as well when operating in actual use as they do in the laboratory. The standards are phased in over several years to provide adequate lead time to engine and equipment manufacturers. Table 1 shows the new emission standards.

Table 1: Final Emission Standards in grams per horsepower-hr (g/hp-hr)

Rated Power	First Year that Standards Apply	PM	NOx
hp < 25	2008	0.30	-
25 ≤ hp < 75	2013	0.02	3.5*
75 ≤ hp < 175	2012-2013	0.01	0.30
175 ≤ hp < 750	2011-2013	0.01	0.30
hp ≥ 750	2011-2014	0.075	2.6/0.50***
	2015	0.02/0.03**	0.50****

* The 3.5 g/hp-hr standard includes both NOx and nonmethane hydrocarbons.

** The 0.50 g/hp-hr standard applies to gensets over 1200 hp.

*** The 0.02 g/hp-hr standard applies to gensets; the 0.03 g/hp-hr standard applies to other engines.

**** Applies to gensets only.

New Standards for Diesel Fuel

Just as lead was phased out of gasoline to prevent damage to catalytic converters, decreasing sulphur levels in non-road diesel fuel will prevent damage to the emission control systems. In addition, reducing sulphur levels will provide immediate public health benefits by reducing particulate matter from engines in the existing fleet of non-road equipment, while reducing engine maintenance cost. This rule will reduce current sulphur levels from about 3,000 parts per million (ppm) to 15 ppm when fully implemented (a reduction of greater than 99 per cent).

This rule will reduce non-road diesel fuel sulphur levels in two steps. First, starting in 2007, fuel sulphur levels in non-road diesel will be limited to a maximum of 500 ppm, the same as for current highway diesel fuel. This limit also covers fuels used in locomotive and marine applications (though not to the marine residual fuel used by very large engines on ocean-going vessels).

Second, starting in 2010, fuel sulphur levels in most non-road diesel fuel will be reduced to 15 ppm. This ultra-low sulphur fuel will create immediate public health benefits and will make it possible for engine manufacturers to use advanced emission control systems that will dramatically reduce both PM and NOx emissions. In the case of locomotive and marine diesel fuel, this second step will occur in 2012.

Flexibility to Industry

EPA worked extensively with the engine and equipment industry, the petroleum industry, States, and environmental and public health groups in developing this programme. EPA included several measures in the rule that will ensure flexibility and cost-effectiveness for the non-road diesel engine and equipment manufacturers and petroleum industries. These flexibilities include:

1. establishing a credit system for engine manufacturers which will reward those companies who lead the way in reducing pollution sooner than required;
2. providing significant lead time for industry to plan for development of new compliant products and

3. providing small refiners with extra time to meet the sulphur standards.

Health and Environmental Benefits

The new standards will result in substantial benefits to the public health and welfare through significant annual reductions in emissions of NO_x, PM, NMHC, carbon monoxide, sulphur dioxide, and air toxics. The clean air impact of this programme will be dramatic when fully implemented. These emission reductions will annually prevent 12,000 premature deaths, more than 8,900 hospitalizations, 280,000 cases of respiratory problems in children, and one million work days lost as just some of the quantified benefits.

In dollars, the health benefits of this rule are estimated to \$80 billion annually once essentially all older engines are replaced. Estimated costs for the engine and fuel requirements are many times less, amounting to about \$2 billion in the same time frame. Thus, the benefit-cost ratio of this programme at that time will be approximately 40-to-1.

As a result of this programme, each new non-road diesel engine will be more than 90 per cent cleaner than current United States of America non-road diesel engines. In the United States of America, this programme will achieve a 740,000 ton reduction in NO_x emissions in 2030 when the current non-road diesel equipment fleet is completely replaced with newer engines and equipment that comply with these new standards. By 2030, this programme will also reduce annual emissions of PM by 128,000 tons.

Ozone can aggravate asthma and other respiratory diseases, leading to more asthma attacks, use of additional medication, and more severe symptoms that require a doctor's attention, more visits to the emergency room, and increased hospitalizations. Ozone can inflame and damage the lining of the lungs, which may lead to permanent changes in lung tissue, irreversible reductions in lung function if the inflammation occurs repeatedly over a long period of time and may lead to a lower quality of life. Children, people with heart and lung disease, and the elderly are most at risk.

Fine particulates (PM 2.5) have been associated with an increased risk of premature mortality, hospital admissions for heart and lung disease, and increased respiratory symptoms. Long-term exposure to diesel exhaust is likely to pose a lung cancer hazard. In addition, PM, NO_x, and ozone adversely affect the environment in various ways including visibility impairment, crop damage, and acid rain.

Costs of the Programme

The cost of producing 15 ppm sulphur fuel for this programme is expected to total seven cents per gallon. Because the use of ultra-low sulphur fuel will significantly reduce engine maintenance expenses, it is estimated that this net cost will average about four cents per gallon.

The estimated costs for a non-road equipment manufacturer to comply with this programme vary depending on size and complexity of the equipment. As an example, it is estimated that for a typical 175-horsepower bulldozer, the modifications will cost approximately \$2,600, compared to the overall price of such a bulldozer of approximately \$240,000. The anticipated costs for most categories of non-road diesel equipment are in the range of 1-3 percent of the total purchasing price. The long-term cost-effectiveness of this programme is estimated at approximately \$1,000/ton for NO_x controls and \$10,000 for PM controls.

Preamble and Regulatory Text

The preamble and regulatory text for this programme can be found in the files below. They are also accessible through the web site shown in the "For More Information" section below.

<http://www.epa.gov/fedrgstr/EPA-AIR/2004/June/Day-29/a11293a.htm>

<http://www.epa.gov/fedrgstr/EPA-AIR/2004/June/Day-29/a11293b.htm>

<http://www.epa.gov/fedrgstr/EPA-AIR/2004/June/Day-29/a11293c.htm>

<http://www.epa.gov/fedrgstr/EPA-AIR/2004/June/Day-29/a11293d.htm>

<http://www.epa.gov/fedrgstr/EPA-AIR/2004/June/Day-29/a11293e.htm>

<http://www.epa.gov/fedrgstr/EPA-AIR/2004/June/Day-29/a11293f.htm>

<http://www.epa.gov/fedrgstr/EPA-AIR/2004/June/Day-29/a11293g.htm>

For More Information

The final rule and related documents can be accessed electronically on the Office of Transportation and Air Quality web site at:

<http://www.epa.gov/non-road-diesel/2004fr.htm>

The Clean Air Non-road Diesel programme is part of EPA's overall mobile source control programme. For information about related subjects, such as engine certification requirements, see www.epa.gov/otaq.
