Summary and Analysis of the 2010 Nonroad Diesel Fuel Pre-Compliance Reports

EPA United States Environmental Protection Agency

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Compliance and Innovative Strategies Division
Office of Transportation and Air Quality
U.S. Environmental Protection Agency

NOTICE

This technical report does not necessarily represent final EPA decisions or positions. It is intended to present technical analysis of issues using data that are currently available. The purpose in the release of such reports is to facilitate the exchange of technical information and to inform the public of technical developments.

EPA United States Environmental Protection Agency

EPA-420-R-10-028
December 2010

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I. Executive Summary

Any refiner or importer planning to produce or import nonroad, locomotive, or marine (NRLM) diesel fuel containing 15 parts per million (ppm) sulfur or less after June 1, 2010 is required to submit annual pre-compliance reports to the U.S. Environmental Protection Agency (EPA). Reports are due annually by June 1 from 2005 through 2011 under the diesel sulfur regulations. This report summarizes the results of the 2010 nonroad pre-compliance reports.

Refiners' and importers' nonroad pre-compliance reports must contain estimates of the volume of diesel fuel containing 15 ppm sulfur or less ("15 ppm diesel fuel") and diesel fuel containing 500 ppm sulfur or less ("500 ppm diesel fuel") produced or imported from June 1, 2010 through December 31, 2014. For those refiners and importers planning on participating in the credit trading program, the reports must contain a projection of how many credits will be generated and/or used by each refinery or importer. The pre-compliance reports must also contain information outlining each refinery's timeline for complying with the 15 ppm sulfur standard and provide information regarding engineering plans (e.g., design and construction), and capital commitments for making the necessary modifications to produce 15 ppm NRLM diesel fuel.

The 2010 nonroad pre-compliance reports showed that:

- 115 refineries are planning to produce 15 ppm diesel fuel by June 1, 2014
- 25 refineries are either undecided as to their plans, or are choosing to stop producing NRLM diesel fuel by June 1, 2014
- refiners are taking advantage of the flexibilities offered by the regulations (19 refineries said they generated high sulfur credits in 2006 and 2007, 24 refineries said they generated 500 ppm credits in 2009 and 2010, small refiners are utilizing all of the options available to them)
- total highway and NRLM diesel fuel ("total diesel fuel") production and importation is projected to grow from 2010 through 2014
- total diesel fuel production and importation beginning June 1, 2010 is projected to decrease compared to the 2009 nonroad pre-compliance reports

Many refiners have developed firmer plans to produce 15 ppm NRLM diesel fuel than what they indicated in their 2009 pre-compliance reports, although these plans are still subject to change. EPA expects that next year's nonroad pre-compliance reports will contain more definite information on refiners' plans to produce 15 ppm NRLM diesel fuel.

II. Nonroad Diesel Program Overview

The Nonroad Diesel final rule (69 FR 38958, June 29, 2004) contains a 3-step approach to reducing the sulfur content of nonroad, locomotive, and marine (NRLM) diesel fuel from uncontrolled levels down to 15 ppm or less. Beginning June 1, 2007, refiners and importers were required to produce or import NRLM diesel fuel with a maximum sulfur content of 500 ppm. Beginning June 1, 2010, refiners and importers were required to produce or import nonroad (NR) diesel fuel with a maximum sulfur content of 15 ppm. Beginning June 1, 2012, refiners and importers are required to produce or import locomotive and marine (LM) diesel fuel with a maximum sulfur content of 15 ppm.

The rule includes provisions for refiners and importers to generate credits for early efforts to reduce NRLM diesel sulfur. "High sulfur" credits could be generated for early production of 500 ppm NRLM diesel fuel between June 1, 2006 and June 1, 2007. Similarly, "500 ppm" credits could be generated for early production of 15 ppm NRLM diesel fuel between June 1, 2009 and June 1, 2010. "High sulfur" credits could be used to comply with the 500 ppm sulfur standard for NRLM diesel fuel beginning June 1, 2007, while "500 ppm" credits could be used to comply with the 15 ppm sulfur standard for NR diesel fuel beginning June 1, 2010 and the 15 ppm sulfur standard for LM diesel fuel beginning June 1, 2012. For both high sulfur credits and 500 ppm credits, one credit is equivalent to one gallon of diesel fuel that meets the respective standard earlier than required. In addition, "high sulfur" credits can be converted into "500 ppm" credits for use after June 1, 2010. NRLM diesel sulfur credits may be transferred nationwide. No credit trading area restrictions exist such as those in the Highway Diesel rulemaking.

Small Refiner Flexibilities

Additional compliance flexibilities are provided for small refiners in the nonroad diesel sulfur regulations. The criteria for qualification as an NRLM small refiner are similar to those under the Gasoline Sulfur and Highway Diesel rules. To qualify as "small", a refiner must: 1) process NRLM diesel fuel from crude oil; 2) employ no more than 1,500 people corporate-wide, based on the average number of employees for all pay periods from January 1, 2002 to January 1, 2003; and, 3) have a corporate crude oil capacity less than or equal to 155,000 barrels per calendar day (bpcd) for 2002.

The small refiner relief options provide additional time for compliance and, for small refiners that choose to comply earlier than required with the NRLM requirements, the option of either generating diesel fuel sulfur credits or receiving a limited relaxation of their gasoline sulfur standards. These small refiner options are described in more detail below.

Option 1 – Delay production of 500 ppm NRLM diesel fuel

This option allows approved small refiners an additional 3 years to comply with the 500 ppm sulfur standard for NRLM diesel fuel. Small refiners have a 500 ppm NRLM compliance date of June 1, 2010, compared to a compliance date of June 1, 2007 for non-small refiners. Small refiners may continue to produce high sulfur (greater than 500 ppm) NRLM diesel fuel until June 1, 2010. However, production of high sulfur NRLM diesel fuel from a small refiner's refinery between June 1, 2007 and June 1, 2010 is limited to 105 percent of the refinery's average NRLM diesel fuel production from 2003 through 2005.

Option 2 – Delay production of 15 ppm NRLM diesel fuel

This option allows approved small refiners additional time to comply with the 15 ppm sulfur standard for NRLM diesel fuel. Small refiners have a single 15 ppm NRLM compliance date of June 1, 2014, compared to compliance dates for non-small refiners of June 1, 2010 and June 1, 2012 for NR and LM diesel fuel, respectively. Small refiners may continue to produce 500 ppm NRLM diesel fuel until June 1, 2014. However, production of 500 ppm NRLM diesel fuel from a small refiner's refinery between June 1, 2010 and June 1, 2014 is limited to 105 percent of the refinery's average NRLM diesel fuel production from 2006 through 2008.

Option 3 - NRLM Credit Option

The NRLM Credit Option allows approved small refiners additional time to generate nonroad diesel sulfur credits, compared to non-small refiners. Small refiners could generate "High Sulfur" credits if their refinery's annual average 500 ppm NRLM diesel fuel production between June 1, 2006 and June 1, 2010 exceeded the refinery's annual average NRLM diesel fuel production from 2003 through 2005 (non-small refiners could only generate "High Sulfur" credits between June 1, 2006 and June 1, 2007). Small refiners could also generate "500 ppm" credits if their refinery's annual average 15 ppm NRLM diesel fuel production between June 1, 2009 and December 31, 2013 exceeded the refinery's average annual NRLM diesel fuel production from 2006 through 2008 (non-small refiners could only generate "500 ppm" credits between June 1, 2009 and June 1, 2010). These credits can be banked for future use or sold to another refiner.

Option 4 - NRLM Diesel/Gasoline Compliance Option

This option is available to small refiners that elect not to use Options 1, 2 or 3. Under this option, at least 95 percent of the NRLM diesel fuel produced at a small refiner's refinery must meet the 15 ppm sulfur standard by June 1, 2006. Annual average production of 15 ppm NRLM diesel fuel at the refinery must also be equal to or greater than 85 percent of the refinery's annual average NRLM diesel fuel production from 2003 through 2005. Small refiners who chose this option received a

modest relaxation in their interim refinery gasoline sulfur standards beginning January 1, 2004. Specifically, the applicable refinery annual average and per-gallon cap standards were increased by 20 percent through 2007. A small refiner may elect to further extend the duration of the refinery interim gasoline sulfur standards through 2010 by producing all highway diesel fuel at the refinery containing less than 15 ppm sulfur or less by June 1, 2006. However, in no case may the per-gallon gasoline sulfur cap exceed 450 ppm.

Other Flexibilities

Unlike the Highway Diesel rule, the Nonroad Diesel rule did not provide any specific flexibilities for refineries located in the Geographic Phase-in Area (GPA). Refiners located in the Rocky Mountain States (ID, MT, ND, WY, UT, CO and NM) must comply with the 500 ppm and 15 ppm sulfur standards by the NRLM compliance dates discussed above. NRLM diesel fuel used in rural areas of Alaska (a GPA state in the gasoline sulfur rulemaking) is exempt from the 500 ppm NRLM diesel fuel sulfur standard beginning June 1, 2007, but must meet the 15 ppm sulfur standard beginning June 1, 2010.[1] This fuel is regulated under a special rule for Alaska which was finalized in June 2006 (71 FR 32450, June 6, 2006).

Transmix processors distill off-specification interface mixtures of petroleum products from pipeline systems into gasoline and distillate fuel and are considered refiners by EPA. Their simple refinery configuration does not make it cost effective for them to install and operate a hydrotreater to reduce distillate fuel sulfur content. As a result, they have been provided with additional flexibility to comply with the diesel sulfur standards. Transmix processors may choose to continue to produce all of their highway diesel fuel to meet the 500 ppm sulfur standard until June 1, 2010. They may further choose to continue to produce all of their NRLM diesel fuel as high sulfur diesel fuel until June 1, 2010, and all of their NRLM diesel fuel to meet the 500 ppm sulfur standard until June 1, 2014.

III. Nonroad Pre-Compliance Reporting Requirements

The diesel sulfur regulations require that any refiner or importer planning to produce or import 15 ppm NRLM diesel fuel after June 1, 2010 must submit annual pre-compliance reports to EPA. The first nonroad pre-compliance report was due on June 1, 2005 and subsequent reports are due annually through 2011, or until the refiner or importer begins producing or importing 15 ppm NR or NRLM diesel fuel.

The pre-compliance reports must contain the following information:

1. Any changes in the refiner's or importer's basic company or facility information since registration.

[1] Rural areas are defined as areas of Alaska not served by the federal aid highway system (FAHS)

2. Estimates of the average daily volumes of each sulfur grade of highway and NRLM diesel fuel produced at each refinery or imported at each import facility. The volume estimates must include both fuel produced from crude oil and other sources for the periods of June 1, 2010 through December 31, 2010, calendar years 2011-2013, January 1, 2014 through May 31, 2014, and June 1, 2014 through December 31, 2014.
3. For refiners or importers expecting to participate in the NRLM credit program, estimates of the number of credits generated and/or used during the periods above.
4. Information on project schedule by known or projected completion date (by quarter) for each stage of the project (strategic planning, front-end engineering, detailed engineering and permitting, procurement and construction, and commissioning and startup).
5. Basic information regarding the selected technology pathway for compliance (e.g. conventional hydrotreating versus other technologies, revamp versus grassroots, etc.).
6. Whether capital investments have been made or are projected to be made.
7. An update of the progress in each of these areas.

We recognize that the pre-compliance reports contain preliminary information and that final decisions on desulfurization plans may not have been made in all cases as of the reporting deadline. Accordingly, the information in this summary and analysis is based on the best available refinery information as of June 1, 2010. The information presented here will be updated with more current information from the annual pre-compliance reports submitted in 2011.

IV. NRLM Summary Data

A. Nationwide Analysis

1. Refineries and Importers – Numbers and Production

According to the Energy Information Administration (EIA), 140 refineries reported producing either high or low sulfur (or both) distillate fuels in 2003. This reported production includes data from 4 refiner/importers that are located outside of the continental United States (in the U.S. Virgin Islands, Aruba, and Eastern Canada) whose production is targeted to the U.S. market. We received 2010 pre-compliance reports for 130 refineries, all of which produced high and/or low sulfur diesel fuel in 2003, including reports for 3 refineries that have been shut down since refiners submitted their 2009 pre-compliance reports. The 10 refineries which did not send pre-compliance reports may be planning to produce high sulfur distillate fuel for the heating oil market, or may be planning to sell their high sulfur distillate fuel to other refineries that can desulfurize it.

Refiners indicated that, for most of their refineries, they have made decisions whether or not to produce 15 ppm NRLM diesel fuel. Table 1 shows that a total of 119 refineries reported they anticipate producing 15 and/or 500 ppm diesel fuel beginning

June 1, 2010. The remaining 8 operational refineries that sent pre-compliance reports said they either plan to produce only high sulfur distillate for the heating oil market, or are still deciding whether to produce 15 ppm NRLM diesel fuel.

Table 1.
U.S. Aggregated Report Information
Highway and NRLM Diesel Fuel Refinery Data 2010-2014

Year	2010	2011	2012	2013	2014a[2]	2014b
# refineries producing diesel fuel	119	120	119	118	118	115
# refineries at 100% 15 ppm	92	94	95	107	109	115
# refineries at 100% 500 ppm	8	8	5	4	3	0
# refineries with 15/500 ppm mix	19	18	19	7	6	0

The 2010 nonroad pre-compliance reports indicated that production of 15 ppm and 500 ppm total diesel fuel beginning June 1, 2010 is projected to be 3.93 million bbls/day, as shown in Table 2 below. The reported information does not allow for any distinction between highway and NRLM production. However, from EIA's weekly supply estimates (http://tonto.eia.doe.gov/dnav/pet/pet_sum_sndw_dcus_nus_w.htm), production and importation of 15 ppm and 500 ppm diesel fuel for the fourth annual compliance period in the highway diesel program (July 1, 2009 through May 31, 2010) averaged approximately 3.65 million bbls/day. This average production and importation includes all highway diesel fuel and nearly all NRLM diesel fuel produced in or imported into the U.S. during the compliance period.[3] Thus, by comparing total production and importation from the 2010 reports with average production and importation from the fourth annual compliance period, refiners and importers are planning to produce and import approximately 280,000 bbls/day additional 15 ppm and 500 ppm total diesel fuel beginning June 1, 2010.

Table 2 and Figure 1 also illustrate that national production of 15 ppm diesel fuel is projected to increase by 546,000 bbls/day from 2010 to 2014, from 3.75 to 4.29 million bbls/day. However, this projected increase is offset by a projected decrease in 500 ppm NRLM diesel fuel production of 179,000 bbls/day from 2010 to 2014. Production of 500 ppm NRLM diesel fuel decreases from 179,000 bbls/day in 2010 to 92,000 bbls/day in 2012, as some refiners begin producing 15 ppm LM diesel fuel by June 1, 2012. Production of 500 ppm NRLM diesel fuel ends completely by May 31, 2014, when the flexibilities for small refiners and NRLM credit use end.

Projected total diesel fuel production should be sufficient to meet future diesel fuel demand. Although projected total production from the 2010 pre-compliance reports

[2] Data from the pre-compliance reports is divided into two sections for 2014 throughout this summary and analysis. In all tables and figures, data for the first five months of 2014 is labeled 2014a, and data for the last seven months of 2014 is labeled 2014b.

[3] The average does not include a relatively small amount of high sulfur NRLM diesel fuel produced by small refiners and hardship refiners.

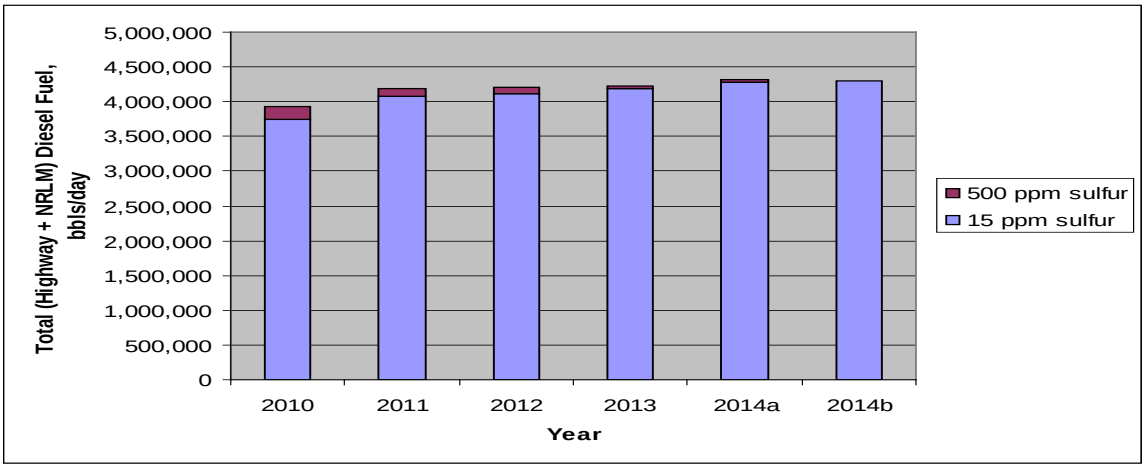
has decreased compared to the 2009 pre-compliance reports, projected total diesel fuel demand from EIA's Annual Energy Outlook (AEO) 2010 has also decreased compared to projected demand from AEO 2009. Total diesel fuel demand calculated from AEO 2010 is 3.80 million bbls/day in 2015, compared to projected total diesel fuel production of 4.29 million bbls/day in 2014.[4]

As mentioned previously, 140 refineries reported to EIA that they produced low and/or high sulfur distillate fuel in 2003. Fifteen of these refineries reported that they have no plans at present to produce 15 ppm diesel fuel by June 1, 2014, and 10 refineries did not send an NRLM pre-compliance report to EPA in 2010. In 2003, these 25 refineries produced a total of 137,000 bbls/day of diesel fuel containing less than 500 ppm sulfur, and 169,000 bbls/day of distillate fuel containing more than 500 ppm sulfur.[5] We cannot tell at this time if or when these refineries might choose to produce 15 ppm diesel fuel, or whether they will simply choose to produce heating oil indefinitely.

Table 2.
U.S. Aggregated Report Information
Diesel Fuel Production 2010-2014

Year	2010	2011	2012	2013	2014a	2014b
Total 15 ppm (highway + NRLM), bbls/day	3,747,684	4,076,849	4,115,018	4,188,946	4,282,377	4,294,205
Total 500 ppm NRLM, bbls/day	178,602	111,727	91,657	34,454	26,291	0
Total 15 ppm and 500 ppm (highway + NRLM), bbls/day	3,926,286	4,188,575	4,206,675	4,223,400	4,308,669	4,294,205

Figure 1. Projected (Highway + NRLM) Diesel Fuel Production by Type, 2010-2014



[4] AEO 2010 projected a total distillate fuel oil demand of 4.08 million bbls/day in 2015 (see Table A11 in http://www.eia.doe.gov/oiaf/aeo/pdf/appa.pdf). This total includes 280,000 bbls/day of distillate fuel oil (heating oil) for residential energy consumption (see Table A2 at previous link). EPA does not require heating oil to meet either a 15 ppm or 500 ppm sulfur standard, so total demand for 15 ppm and 500 ppm diesel fuel was calculated by subtracting heating oil demand from total distillate fuel oil demand.

[5] 2003 EIA data has been used as a baseline for comparison in all summary reports published since 2003.

2. Projected Credit Generation and Use

Table 3 shows total reported nonroad diesel sulfur credits generated and used for each year of the nonroad diesel sulfur credit program. High sulfur credits are shown for the last 7 months of 2006 (refiners could not begin generating high sulfur NRLM credits until June 1, 2006), the full calendar years 2007 through 2009, and the first 5 months of 2010. 500 ppm credits are shown for the last 7 months of 2009, the full calendar years 2010 through 2013, and the first 5 months of 2014. Twenty refineries indicated they generated a total of 1,998 million high sulfur credits (1 credit = 1 gallon diesel fuel), mostly during the early credit generation period from June 1, 2006 through May 31, 2007, including 4 refineries owned by small refiners who planned to continue generating high sulfur credits after May 31, 2007. Nine refineries indicated they planned to use a total of 1,844 million high sulfur credits from June 1, 2007 through May 31, 2010.

Twenty four refineries indicated they plan to generate a total of 2,295 million 500 ppm credits, mostly during the early credit generation period from June 1, 2009 through May 31, 2010, including 3 refineries owned by small refiners who plan to continue generating 500 ppm credits after May 31, 2010. Five refineries indicated they planned to use a total of 1,525 million 500 ppm credits from June 1, 2010 through May 31, 2014.

Table 3.
U.S. Aggregated Report Information
Nonroad Diesel Fuel Credits 2006-2014

Year		**2006**	**2007**	**2008**	**2009**	**2010**	**total**
# refineries generating high sulfur credits		19	20	4	4	2	
# refineries using high sulfur credits			9	8	7	2	
High sulfur credit generation, millions		742	984	131	106	34	1,998
High sulfur credit usage, millions			563	777	466	39	1,844
Year	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**total**
# refineries generating 500 ppm credits	24	24	3	2	2		
# refineries using 500 ppm credits		5	4	5	5	2	
500 ppm credit generation, millions	1,048	862	136	120	131		2,295
500 ppm credit usage, millions		461	141	423	394	106	1,525

Figures 2 and 3 illustrate cumulative projected generation and usage of high sulfur credits and 500 ppm credits by year. Both figures show that based on current plans, refiners should generate more than enough of each type of credit to meet the demand for each type of credit.

Figure 2. Total U.S. High Sulfur Credits

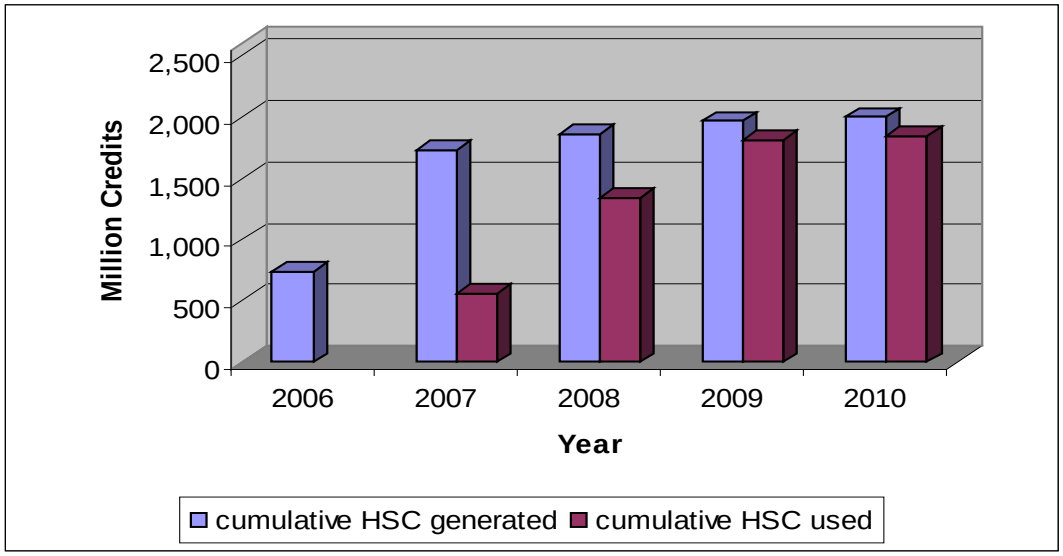
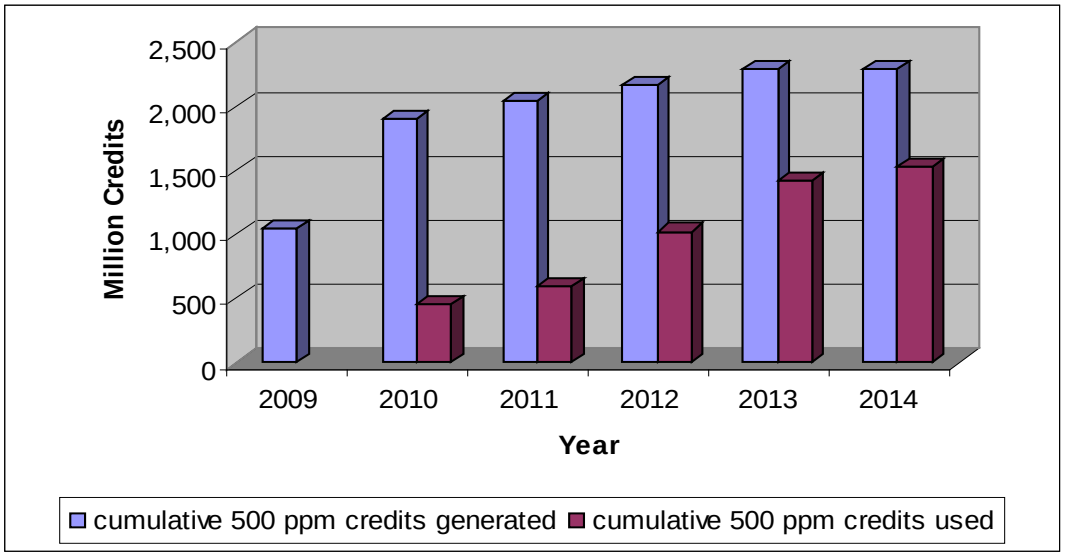


Figure 3. Total U.S. 500 ppm Credits



3. Project Scope and Timing

In addition to providing diesel fuel production and credit projections, refiners must also include information outlining both their timeline for compliance with the 15 ppm sulfur standard for NRLM diesel fuel and their engineering plans (e.g., design and construction) in their pre-compliance reports. We requested that refiners report their progress according to the following five stages: 1) strategic planning, 2) planning and front-end engineering, 3) detailed engineering and permitting, 4) procurement and

construction, and 5) commissioning and start-up. In the 2009 nonroad pre-compliance reports, most refiners indicated they had completed their detailed engineering and were well into the procurement and construction stage, or did not plan to produce any more 15 ppm diesel fuel than indicated in their highway pre-compliance reports.

In the 2010 NRLM pre-compliance reports, refiners indicated they have plans to install new desulfurization capacity at 21 refineries specifically to produce 15 ppm NRLM diesel fuel. Most of these refineries are generally in the final stages of their projects to produce 15 ppm NRLM diesel fuel. Most are well into the procurement and construction stage, and some are into or have completed the commissioning and start-up stage.

All 21 refineries are planning to either revamp existing hydrotreating or hydrocracking units, or install new hydrotreating or hydrocracking units. Of these 21 refineries, 9 are planning to install a new desulfurization unit, 7 are planning to revamp an existing desulfurization unit, and 5 refineries are planning to both install at least one new desulfurization unit and revamp at least one existing desulfurization unit.

4. Small Refiner Options

As discussed previously, the diesel sulfur regulations contain 4 options which provide qualified small refiners with flexibilities regarding production of 500 ppm or 15 ppm NRLM diesel fuel. Option 1 allows a refinery owned by an approved small refiner to delay production of 500 ppm NRLM diesel fuel until June 1, 2010. Refiners chose Option 1 for 9 refineries. These 9 refineries produced 37,000 bbls/day high sulfur distillate fuel in 2003.

Option 2 allows a refinery owned by an approved small refiner to delay production of 15 ppm NRLM diesel fuel until June 1, 2014. Refiners chose Option 2 for 7 refineries. These 7 refineries produced 22,000 bbls/day high sulfur distillate fuel in 2003. (Options 1 and 2 are not mutually exclusive, small refiners may choose both Options 1 and 2)

Option 3 allows a small refiner to generate credits for 500 ppm NRLM diesel fuel produced between June 1, 2006 and May 31, 2010 in excess of their refinery baseline production, and also allows a small refiner to generate credits for 15 ppm NRLM diesel fuel produced between June 1, 2009 and December 31, 2013 in excess of their refinery baseline production. Refiners chose Option 3 for 4 refineries. These 4 refineries produced 9,000 bbls/day high sulfur distillate fuel in 2003.

Lastly, Option 4 allows a small refiner the ability to increase their refinery gasoline sulfur standards by 20 percent, provided they begin producing 15 ppm NRLM diesel fuel by June 1, 2006 at their refinery, and their refinery's annual average 15 ppm NRLM diesel fuel production is at least 85 percent of the refinery's annual average

NRLM diesel fuel production from 2003 through 2005. Refiners chose Option 4 for 5 refineries. These 5 refineries produced 18,000 bbls/day high sulfur distillate fuel in 2003.

The number of refineries owned by small refiners, and the production of high sulfur distillate fuel from these refineries in 2003, are shown below in Table 4 for each option.

Table 4.
Intended Small Refiner Compliance Options by Number of Refineries and High Sulfur Distillate Fuel Production

Option	Description	Number of Refineries	2003 High Sulfur Distillate Fuel Production (thousand bbls/day)
1.	Delay 500 ppm NRLM Production	9	37
2.	Delay 15 ppm NRLM Production	7	22
3.	NRLM Credit Option	4	9
4.	NRLM Diesel/Gasoline Compliance Option	5	18

B. PADD Analysis

This section presents information specific to each PADD. Tables 5 and 6 show, by PADD, the number of refineries producing 15 and/or 500 ppm diesel fuel for 2010 (from June 1 through December 31) and 2014 (from June 1 through December 31). The total number of refineries producing diesel fuel decreases by 4 from 2010 to 2014, as 1 refinery enters the diesel fuel market in 2011, and 5 refineries exit by 2014. In 2010, 27 refineries are using flexibilities in the rules (producing 500 ppm LM diesel fuel, producing 500 ppm NR diesel fuel using NRLM credits, small refiner flexibilities) to produce some or all 500 ppm diesel fuel. However, by June 1, 2014, all of these refineries will only be producing 15 ppm diesel fuel and/or heating oil.

Tables 7 and 8 show, by PADD, anticipated production of 15 ppm and 500 ppm total diesel fuel for 2010 (from June 1 through December 31) and 2014 (from June 1 through December 31), and Figure 4 illustrates the average anticipated production of 15 ppm and 500 ppm total diesel fuel by PADD from June 1, 2010 through December 31, 2014. Tables 7 and 8 show that from 2010 through 2014, projected total diesel fuel production increases in PADDs 1 through 4 and decreases in PADD 5.

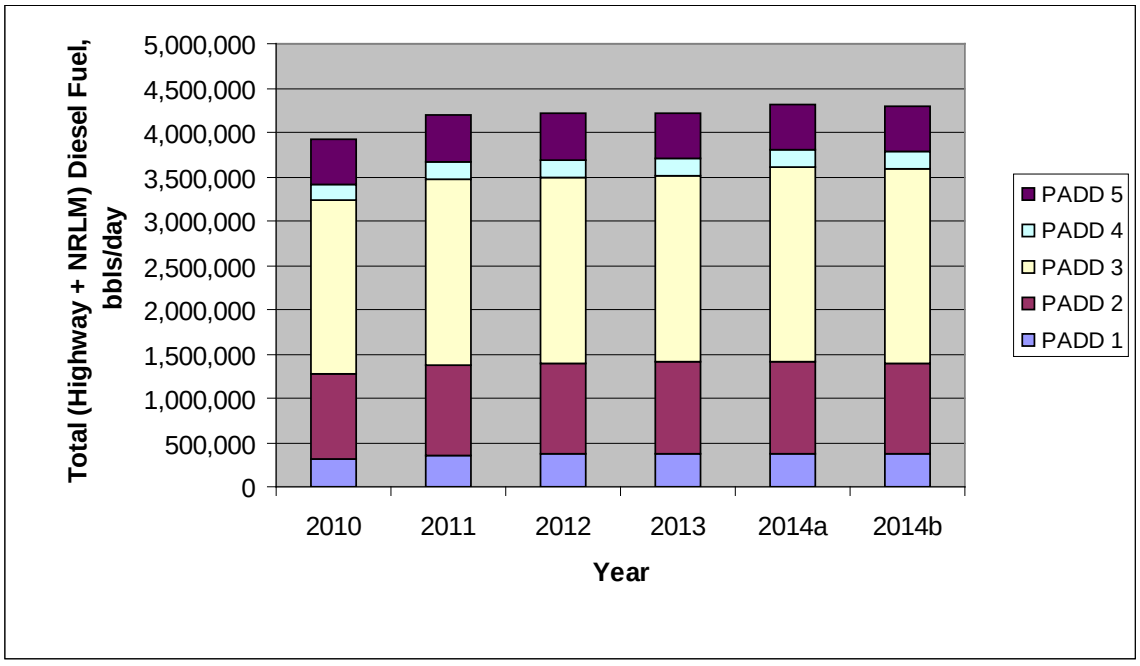
Table 5. Projected Number of Highway and NRLM Diesel Fuel Refineries by PADD for 2010						
PADD	**1**	**2**	**3**	**4**	**5**	**Total U.S.**
# refineries producing diesel fuel	11	25	43	15	25	119
# refineries at 100% 15 ppm	9	20	32	11	20	92
# refineries at 100% 500 ppm	0	1	4	1	2	8
# refineries with 15/500 ppm mix	2	4	7	3	3	19

Table 6. Projected Number of Highway and NRLM Diesel Fuel Refineries by PADD for 2014b						
PADD	**1**	**2**	**3**	**4**	**5**	**Total U.S.**
# refineries producing diesel fuel	11	26	41	14	23	115
# refineries at 100% 15 ppm	11	26	41	14	23	115
# refineries at 100% 500 ppm	0	0	0	0	0	0
# refineries with 15/500 ppm mix	0	0	0	0	0	0

Table 7. Projected Production of (Highway + NRLM) Diesel Fuel by PADD for 2010						
PADD	**1**	**2**	**3**	**4**	**5**	**Total U.S.**
Total 15 ppm (highway + NRLM), bbls/day	313,328	922,541	1,857,510	170,493	483,814	3,747,684
Total 500 ppm (highway + NRLM), bbls/day	5,673	26,834	100,340	13,039	32,715	178,602
Total 15 ppm and 500 ppm total (highway + NRLM), bbls/day	319,000	949,375	1,957,850	183,532	516,529	3,926,286

Table 8. Projected Production of (Highway + NRLM) Diesel Fuel by PADD for 2014b						
PADD	**1**	**2**	**3**	**4**	**5**	**Total U.S.**
Total 15 ppm (highway + NRLM), bbls/day	363,277	1,031,688	2,202,372	189,534	507,334	4,294,205
Total 500 ppm (highway + NRLM), bbls/day	0	0	0	0	0	0
Total 15 ppm and 500 ppm total (highway + NRLM), bbls/day	363,277	1,031,688	2,202,372	189,534	507,334	4,294,205

Figure 4. Projected (Highway+NRLM) Diesel Fuel Production by PADD, 2010-2014



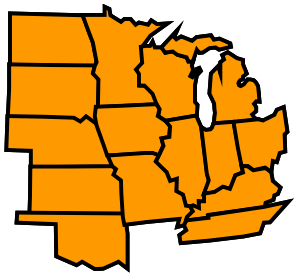
More detailed information for each PADD is shown below in Tables 9 through 13.

1. PADD 1

Reported totals for all PADD 1 refineries and importers are summarized below in Table 9. Table 9 shows that for 2010, 11 refineries anticipate producing approximately 319,000 bbls/day total (15 ppm and 500 ppm sulfur) diesel fuel. Nine refineries reported they intend to produce all of their diesel fuel containing 15 ppm sulfur or less in 2010, and 2 refineries reported they intend to produce some 500 ppm NRLM diesel fuel between 2010 and 2014. Table 9 also shows that total diesel fuel production in PADD 1 is projected to increase by approximately 44,000 bbls/day from 2010 through 2014.

Table 9
PADD 1 Diesel Fuel Data: 2010-2014

Year	2010	2011	2012	2013	2014a	2014b
# refineries producing diesel fuel	11	11	11	11	11	11
# refineries at 100% 15 ppm	9	9	9	10	10	11
# refineries at 100% 500 ppm	0	0	0	0	0	0
# refineries with 15/500 ppm mix	2	2	2	1	1	0
Total 15 ppm (bbls/day)	313,328	350,062	362,562	362,562	362,562	363,277
Total 500 ppm (bbls/day)	5,673	9,214	4,256	714	714	0
Total 15 ppm and 500 ppm (bbls/day)	319,000	359,277	366,818	363,277	363,277	363,277

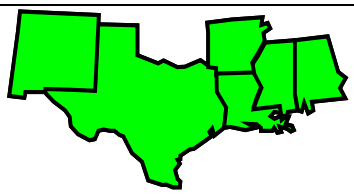


2. PADD 2

The reported totals for all PADD 2 refineries are summarized below in Table 10. Table 10 shows that for 2010, 25 refineries anticipate producing approximately 950,000 bbls/day total (15 ppm and 500 ppm sulfur) diesel fuel. Twenty refineries reported they intend to produce all of their diesel fuel containing 15 ppm sulfur or less in 2010, and 5 refineries reported they intend to produce some 500 ppm NRLM diesel fuel between 2010 and 2014. Table 10 also shows that total diesel fuel production in PADD 2 is projected to increase by approximately 82,000 bbls/day from 2010 through 2014, including production from one refinery which plans to enter the diesel fuel market in 2011.

Table 10.
PADD 2 Diesel Fuel Data: 2010-2014

Year	2010	2011	2012	2013	2014a	2014b
# refineries producing diesel fuel	25	26	26	26	26	26
# refineries at 100% 15 ppm	20	22	22	25	25	26
# refineries at 100% 500 ppm	1	1	0	0	0	0
# refineries with 15/500 ppm mix	4	3	4	1	1	0
Total 15 ppm (bbls/day)	922,541	1,000,045	1,021,745	1,039,474	1,038,834	1,031,688
Total 500 ppm (bbls/day)	26,834	17,598	11,224	4,915	4,752	0
Total 15 ppm and 500 ppm (bbls/day)	949,375	1,017,643	1,032,969	1,044,388	1,043,586	1,031,688



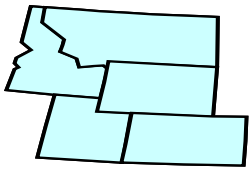
3. PADD 3

Reported totals for all PADD 3 refineries are summarized below in Table 11. Table 11 shows that 43 refineries anticipate producing 1.96 million bbls/day total (15 ppm and 500 ppm sulfur) diesel fuel in 2010. Thirty two refineries reported they intend to produce all of their diesel fuel containing 15 ppm sulfur or less in 2010, and 11 refineries reported they intend to produce some 500 ppm NRLM diesel fuel between 2010 and 2014. One refinery plans to exit the diesel fuel market in 2011, and another refinery plans to exit the diesel fuel market in 2014. Table 11 also shows that total diesel fuel production in PADD 3 is projected to increase by approximately 244,000 bbls/day from 2010 through 2014.

Table 11.
PADD 3 Diesel Fuel Data: 2010-2014

Year	2010	2011	2012	2013	2014a	2014b
# refineries producing diesel fuel	43	43	42	42	42	41
# refineries at 100% 15 ppm	32	33	34	39	40	41
# refineries at 100% 500 ppm	4	4	2	2	1	0
# refineries with 15/500 ppm mix	7	6	6	1	1	0
Total 15 ppm (bbls/day)	1,857,510	2,060,786	2,059,594	2,092,397	2,184,872	2,202,372
Total 500 ppm (bbls/day)	100,340	38,658	37,491	17,000	14,000	0
Total 15 ppm and 500 ppm (bbls/day)	1,957,850	2,099,444	2,097,084	2,109,397	2,198,872	2,202,372

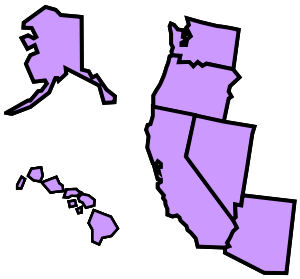
4. PADD 4



Reported totals for all PADD 4 refineries are summarized below in Table 12. Table 12 shows that 15 refineries anticipate producing approximately 189,000 bbls/day total (15 ppm and 500 ppm sulfur) diesel fuel in 2010. Eleven refineries reported they intend to produce all of their diesel fuel containing 15 ppm sulfur or less, and 4 refineries reported they intend to produce some 500 ppm NRLM diesel fuel between 2010 and 2014. One refinery plans to exit the diesel fuel market in 2014. Table 12 also shows that total diesel fuel production in PADD 4 is projected to increase by approximately 6,000 bbls/day from 2010 through 2014.

Table 12.
PADD 4 Diesel Fuel Data: 2010-2014

Year	2010	2011	2012	2013	2014a	2014b
# refineries producing diesel fuel	15	15	15	15	15	14
# refineries at 100% 15 ppm	11	10	10	13	13	14
# refineries at 100% 500 ppm	1	1	1	1	1	0
# refineries with 15/500 ppm mix	3	4	4	1	1	0
Total 15 ppm (bbls/day)	170,493	176,695	183,523	189,776	189,120	189,534
Total 500 ppm (bbls/day)	13,039	13,541	5,971	610	610	0
Total 15 ppm and 500 ppm (bbls/day)	183,532	190,236	189,494	190,386	189,730	189,534



5. PADD 5

Reported totals for all refineries in PADD 5 are summarized below in Table 13.[6] Table 13 shows that 25 refineries anticipate producing approximately 517,000 bbls/day total (15 ppm and 500 ppm sulfur) diesel fuel in 2010. Twenty refineries reported they intend to produce all of their diesel fuel containing 15 ppm sulfur or less in 2010, and 5 refineries reported they intend to produce some 500 ppm NRLM diesel fuel between 2010 and 2014. Table 13 also shows that total diesel fuel production in PADD 5 is projected to decrease by approximately 9,000 bbls/day from 2010 through 2014, as one refinery plans to exit the diesel fuel market in 2012 and another refinery plans to exit the market in 2014.

Table 13.
PADD 5 Diesel Fuel Data: 2010-2014

Year	2010	2011	2012	2013	2014a	2014b
# refineries producing diesel fuel	25	25	25	24	24	23
# refineries at 100% 15 ppm	20	20	20	20	21	23
# refineries at 100% 500 ppm	2	2	2	1	1	0
# refineries with 15/500 ppm mix	3	3	3	3	2	0
Total 15 ppm (bbls/day)	483,814	489,260	487,594	504,736	506,989	507,334
Total 500 ppm (bbls/day)	32,715	32,715	32,715	11,215	6,215	0
Total 15 ppm and 500 ppm (bbls/day)	516,529	521,976	520,309	515,952	513,204	507,334

[6] Alaska refineries are included in this analysis

C. Comparison of 2009 and 2010 NRLM Pre-Compliance Reports

Total reported production of 15 ppm and 500 ppm diesel fuel in the 2010 pre-compliance reports decreased, compared to the 2009 pre-compliance reports. Table 14 shows the projected production of 15 ppm and 500 ppm diesel fuel from the 2009 and 2010 pre-compliance reports for 2010 (from June 1 to December 31). Total production of diesel fuel from the 2010 reports was approximately 247,000 bbls/day less than total production from the 2009 reports. Most of this decrease occurred in PADDs 1 and 3, while reported production in PADDs 2, 4, and 5 showed smaller decreases.

Table 14.
Projected Production of (Highway + NRLM) Diesel Fuel by PADD for 2010

PADD	1	2	3	4	5	Total U.S.
2009 NRLM reports						
Total 15 ppm, bbls/day	363,304	902,942	2,064,882	180,046	499,463	4,010,638
Total 500 ppm, bbls/day	8,310	47,425	68,171	8,500	30,403	162,808
Total 15 ppm and 500 ppm , bbls/day	371,613	950,367	2,133,053	188,546	529,866	4,173,446
2010 NRLM reports						
Total 15 ppm, bbls/day	313,328	922,541	1,857,510	170,493	483,814	3,747,684
Total 500 ppm, bbls/day	5,673	26,834	100,340	13,039	32,715	178,602
Total 15 ppm and 500 ppm , bbls/day	319,000	949,375	1,957,850	183,532	516,529	3,926,286
Change in reported production, bbls/day	-52,613	-992	-175,204	-5,014	-13,337	-247,160

Table 15 shows the projected production of 15 and 500 ppm diesel fuel from the 2009 and 2010 pre-compliance reports for 2014 (from June 1 to December 31). Total production of diesel fuel from the 2010 reports was approximately 118,000 bbls/day less than the total production from the 2009 reports. Most of this decrease occurred in PADDs 1 and 3, while reported production in PADDs 2, 4 and 5 showed slight increases. Projected total diesel fuel demand in 2015 has also decreased so that production is expected to be sufficient to meet demand. Projected total diesel fuel demand from AEO 2009 was 4.16 million bbls/day, while projected total diesel fuel demand from AEO 2010 was only 3.80 million bbls/day, a decrease of 360,000 bbls/day.

Table 15. Projected Production of (Highway + NRLM) Diesel Fuel by PADD for 2014b						
PADD	**1**	**2**	**3**	**4**	**5**	**Total U.S.**
2009 NRLM reports						
Total 15 ppm, bbls/day	424,205	1,023,862	2,277,361	189,165	497,525	4,412,117
Total 500 ppm, bbls/day	0	0	0	0	0	0
Total 15 ppm and 500 ppm , bbls/day	424,205	1,023,862	2,277,361	189,165	497,525	4,412,117
2010 NRLM reports						
Total 15 ppm, bbls/day	363,277	1,031,688	2,202,372	189,534	507,334	4,294,205
Total 500 ppm, bbls/day	0	0	0	0	0	0
Total 15 ppm and 500 ppm , bbls/day	363,277	1,031,688	2,202,372	189,534	507,334	4,294,205
Change in reported production, bbls/day	-60,929	7,826	-74,989	369	9,810	-117,913

Appendix - List of Acronyms

bbls/day	*barrels per day*
bpcd	*barrels per calendar day*
EIA	*Energy Information Administration*
EPA	*U.S. Environmental Protection Agency*
FR	*Federal Register*
LM	*Locomotive and Marine*
NR	*Nonroad*
NRLM	*Nonroad, Locomotive, and Marine*
PADD	*Petroleum Administration for Defense District*
ppm	*Parts per million*
ULSD	*Ultra Low Sulfur Diesel*
AEO	*Annual Energy Outlook*