Summary and Analysis of the 2011 Nonroad Diesel Fuel Pre-Compliance Reports

EPA United States Environmental Protection Agency

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Compliance 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

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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 was required to submit annual pre-compliance reports to the U.S. Environmental Protection Agency (EPA). Reports were due annually by June 1 from 2005 through 2011 under the diesel sulfur regulations. This report summarizes the results of the 2011 nonroad pre-compliance reports, and is the last such report that will be issued under the diesel sulfur regulations.

Refiners' and importers' nonroad pre-compliance reports had to 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 had to contain a projection of how many credits will be generated and/or used by each refinery or importer. The pre-compliance reports had to 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 2011 nonroad pre-compliance reports showed that:

- 112 refineries are planning to produce 15 ppm diesel fuel by June 1, 2014
- 28 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 (20 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 decreased compared to the 2010 nonroad pre-compliance reports

This data represents estimates made by refiners, some of whose compliance plans may change. While the reported information is subject to change, the results provide the clearest snapshot of refiners' aggregate nonroad diesel sulfur compliance plans available as of June 1, 2011. They represent the assessment of those who have first-hand knowledge of the unique situation faced by each refinery.

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 allowed approved small refiners an additional 3 years to comply with the 500 ppm sulfur standard for NRLM diesel fuel. Small refiners had 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 could 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 was 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 15 ppm 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 was available to small refiners that elected 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 had to meet the 15 ppm sulfur standard by June 1, 2006. Annual average production of 15 ppm NRLM diesel fuel at the refinery had to 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 could 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 could 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 had to 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 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 were provided with additional flexibility to comply with the diesel sulfur standards. Transmix processors could choose to continue to produce all of their highway diesel fuel to meet the 500 ppm sulfur standard until June 1, 2010. They could 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 required that any refiner or importer planning to produce or import 15 ppm NRLM diesel fuel after June 1, 2010 had to submit annual pre-compliance reports to EPA. The first nonroad pre-compliance report was due on June 1, 2005 and subsequent reports were due annually through 2011.

The pre-compliance reports had to 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, 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 2011 pre-compliance reports for 130 refineries, all of which produced high and/or low sulfur diesel fuel in 2003, including reports for 4 refineries that were shut down in 2009 or 2010. 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 they have made decisions for most of their refineries whether or not to produce 15 ppm NRLM diesel fuel. Table 1 shows that a total of 118 refineries reported they produced 15 and/or 500 ppm diesel fuel beginning June 1, 2010. The remaining 8 operational refineries that sent pre-compliance reports said that after June 1, 2010, they either plan to produce only high sulfur distillate for the heating oil

market, or may sell their high sulfur distillate fuel to other refineries that can desulfurize it.

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	118	118	117	116	114	112
# refineries at 100% 15 ppm	92	93	95	104	105	112
# refineries at 100% 500 ppm	6	7	5	4	2	0
# refineries with 15/500 ppm mix	20	18	17	8	7	0

The 2011 nonroad pre-compliance reports indicated that production of 15 ppm and 500 ppm total diesel fuel beginning June 1, 2010 was 3.82 million bbls/day, as shown in Table 2 below. Table 2 and Figure 1 also illustrate that national production of 15 ppm diesel fuel is projected to increase by 498,000 bbls/day from 2010 to 2014, from 3.66 million to 4.15 million bbls/day. However, this projected increase is offset by a projected decrease in 500 ppm NRLM diesel fuel production of 160,000 bbls/day from 2010 to 2014. Production of 500 ppm NRLM diesel fuel decreases from 160,000 bbls/day in 2010 to 100,000 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 2011 pre-compliance reports has decreased compared to the 2010 pre-compliance reports, projected total production is still greater than projected total diesel fuel demand from EIA's Annual Energy Outlook (AEO) 2011. Total diesel fuel demand calculated from AEO 2011 is 3.86 million bbls/day in 2015, compared to projected total diesel fuel production of 4.15 million bbls/day in 2014.[3]

As mentioned previously, 140 refineries reported to EIA that they produced low and/or high sulfur distillate fuel in 2003. Eighteen 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 2011. In 2003, these 28 refineries produced a total of 124,000 bbls/day of diesel fuel containing less than 500 ppm sulfur,

[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.

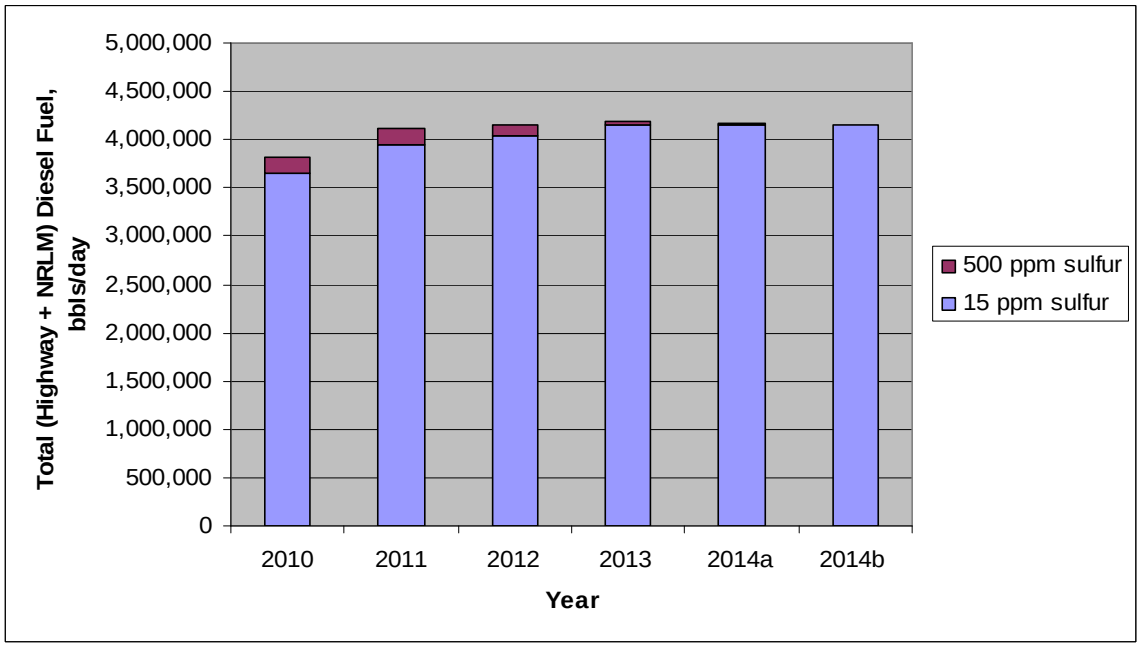
[3] AEO 2011 projected a total distillate fuel oil demand of 4.13 million bbls/day in 2015 (see Table A11 in http://www.eia.doe.gov/oiaf/aeo/pdf/appa.pdf). This total includes 266,000 bbls/day of distillate fuel oil (heating oil) for residential energy consumption (see Table A2 at previous link). EPA 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.

and 190,000 bbls/day of distillate fuel containing more than 500 ppm sulfur.[4] 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 high sulfur distillate 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	3,656,561	3,952,808	4,044,563	4,145,313	4,144,082	4,154,886
Total 500 ppm NRLM, bbls/day	159,897	159,566	99,921	36,130	28,206	0
Total 15 ppm and 500 ppm (highway + NRLM), bbls/day	3,816,458	4,112,374	4,144,483	4,181,443	4,172,288	4,154,886

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



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 2,006 million high sulfur credits (1 credit = 1 gallon early-compliant

[4] 2003 EIA data has been used as a baseline for comparison in all summary reports published since 2003.

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 generated high sulfur credits after May 31, 2007. Nine refineries indicated they used a total of 1,820 million high sulfur credits from June 1, 2007 through May 31, 2010.

Twenty four refineries indicated they plan to generate a total of 2,546 million 500 ppm credits, mostly during the early credit generation period from June 1, 2009 through May 31, 2010, including 2 refineries owned by small refiners who plan to continue generating 500 ppm credits after May 31, 2010. Seven refineries indicated they planned to use a total of 1,959 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	128	117	34	2,006
High sulfur credit usage, millions			563	777	464	16	1,820
Year	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**total**
# refineries generating 500 ppm credits	24	24	2	1	1		
# refineries using 500 ppm credits		5	5	7	6	3	
500 ppm credit generation, millions	1,217	1,018	111	95	106		2,546
500 ppm credit usage, millions		367	319	818	407	47	1,959

Figures 2 and 3 below 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

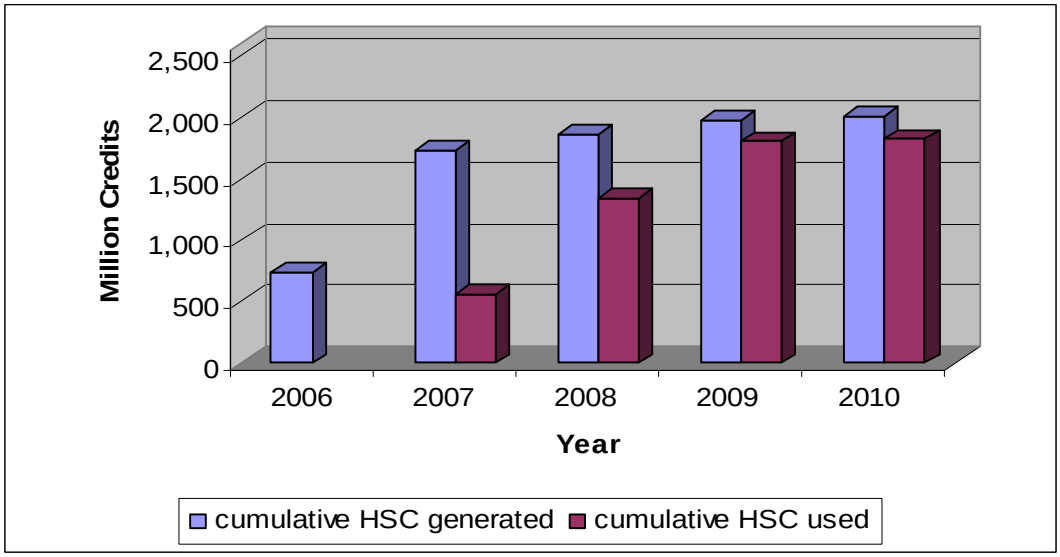
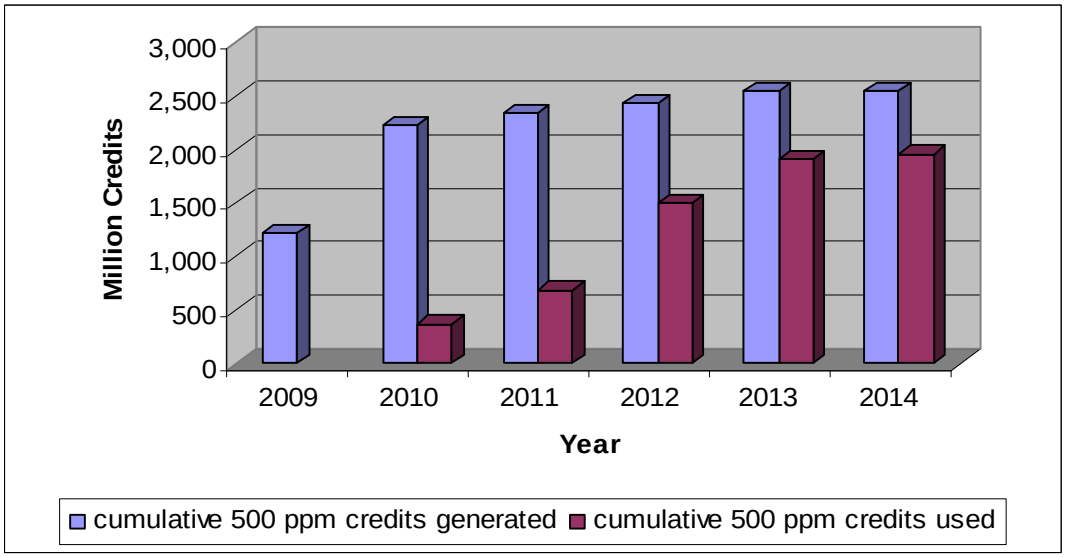


Figure 3. Total U.S. 500 ppm Credits



3. Project Scope and Timing

In addition to providing projections of diesel fuel production and credit generation/usage, refiners had to 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 2010 nonroad pre-compliance reports, most refiners indicated they were generally in the final stages of their projects to produce 15 ppm NRLM diesel fuel, or did not plan to produce any more 15 ppm diesel fuel than indicated in their highway pre-compliance reports. Most were well into the procurement and construction stage, and some had completed the commissioning and start-up stage.

In the 2011 NRLM pre-compliance reports, refiners indicated they have plans to install new desulfurization capacity at 20 refineries specifically to produce 15 ppm NRLM diesel fuel. Most of these refineries have completed and started up their desulfurization units, and a few expect to start their desulfurization units up in 2011 or 2012.

All 20 refineries are either revamping existing hydrotreating or hydrocracking units, or installing new hydrotreating or hydrocracking units. Of these 20 refineries, 7 are planning to install a new desulfurization unit, 8 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 allowed 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 could choose both Options 1 and 2)

Option 3 allowed 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 allowed a small refiner the ability to increase their refinery gasoline sulfur standards by 20 percent, provided they began 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 was 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 6 from 2010 to 2014. In 2010, 26 refineries were 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, or will have exited the diesel fuel market.

Tables 7 and 8 show, by PADD, 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 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 all PADDs.

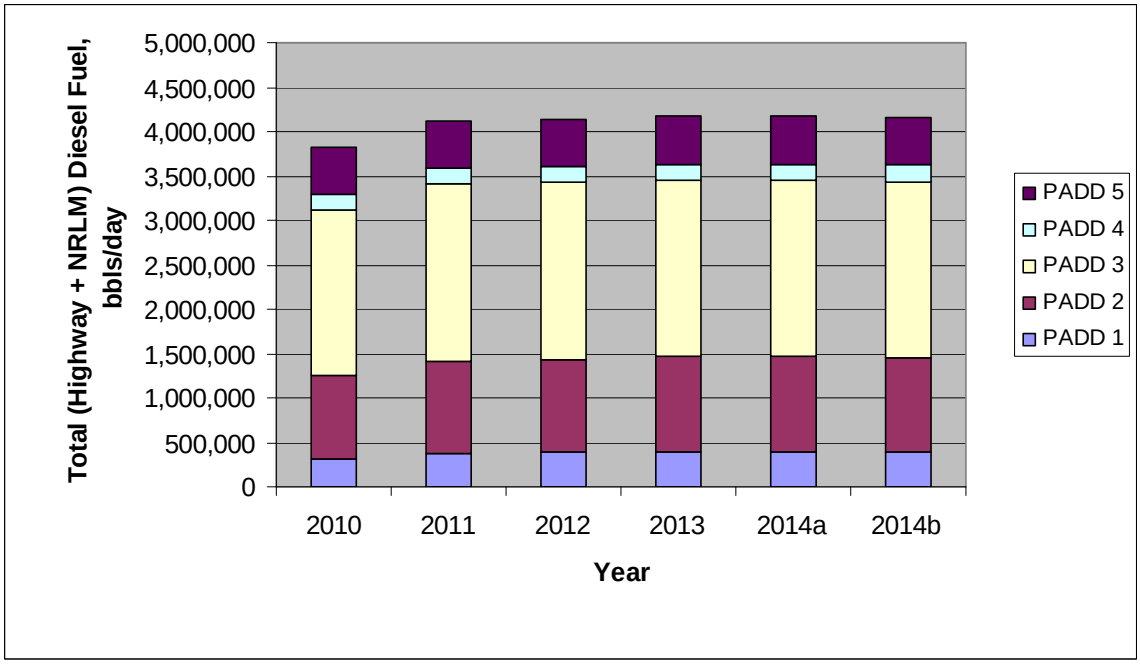
Table 5. Projected Number of Highway and NRLM Diesel Fuel Refineries by PADD for 2010						
PADD	**1**	**2**	**3**	**4**	**5**	**Total U.S.**
# refineries producing diesel fuel	11	24	43	15	25	118
# refineries at 100% 15 ppm	9	20	33	10	20	92
# refineries at 100% 500 ppm	0	0	3	1	2	6
# refineries with 15/500 ppm mix	2	4	7	4	3	20

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	24	40	14	23	112
# refineries at 100% 15 ppm	11	24	40	14	23	112
# refineries at 100% 500 ppm	0	0	0	0	0	0
# refineries with 15/500 ppm mix	0	0	0	0	0	0

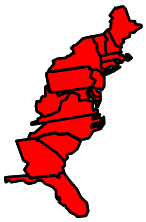
Table 7. Projected Production of (Highway + NRLM) Diesel Fuel by PADD for 2010						
PADD	**1**	**2**	**3**	**4**	**5**	**Total U.S.**
Total 15 ppm (highway + NRLM), bbls/day	308,667	903,856	1,773,032	176,460	494,545	3,656,561
Total 500 ppm (highway + NRLM), bbls/day	5,326	29,387	91,692	9,437	24,056	159,897
Total 15 ppm and 500 ppm total (highway + NRLM), bbls/day	313,993	933,243	1,864,724	185,897	518,600	3,816,458

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	391,300	1,067,790	1,974,322	186,996	534,477	4,154,886
Total 500 ppm (highway + NRLM), bbls/day	0	0	0	0	0	0
Total 15 ppm and 500 ppm total (highway + NRLM), bbls/day	391,300	1,067,790	1,974,322	186,996	534,477	4,154,886

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.

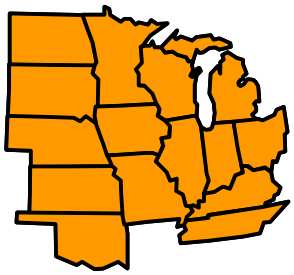


1. PADD 1

Reported totals for all PADD 1 refineries and importers are summarized below in Table 9. Table 9 shows that for 2010, 11 refineries produced approximately 314,000 bbls/day total (15 ppm and 500 ppm sulfur) diesel fuel. Nine refineries reported they produced 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 77,000 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)	308,667	357,181	388,562	390,943	390,943	391,300
Total 500 ppm (bbls/day)	5,326	8,857	3,899	357	357	0
Total 15 ppm and 500 ppm (bbls/day)	313,993	366,038	392,461	391,300	391,300	391,300

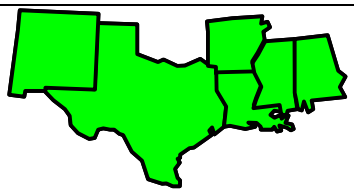


2. PADD 2

The reported totals for all PADD 2 refineries are summarized below in Table 10. Table 10 shows that for 2010, 24 refineries produced approximately 933,000 bbls/day total (15 ppm and 500 ppm sulfur) diesel fuel. Twenty refineries reported they produced all of their diesel fuel containing 15 ppm sulfur or less in 2010, and 4 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 135,000 bbls/day from 2010 through 2014.

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

Year	2010	2011	2012	2013	2014a	2014b
# refineries producing diesel fuel	24	24	24	24	24	24
# refineries at 100% 15 ppm	20	20	20	23	23	24
# refineries at 100% 500 ppm	0	0	0	0	0	0
# refineries with 15/500 ppm mix	4	4	4	1	1	0
Total 15 ppm (bbls/day)	903,856	1,012,800	1,017,086	1,070,671	1,074,937	1,067,790
Total 500 ppm (bbls/day)	29,387	23,963	17,572	4,915	4,752	0
Total 15 ppm and 500 ppm (bbls/day)	933,243	1,036,762	1,034,658	1,075,586	1,079,689	1,067,790

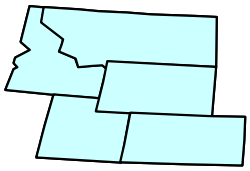


3. PADD 3

Reported totals for all PADD 3 refineries are summarized below in Table 11. Table 11 shows that for 2010, 43 refineries produced 1.86 million bbls/day total (15 ppm and 500 ppm sulfur) diesel fuel. Thirty three refineries reported they produced all of their diesel fuel containing 15 ppm sulfur or less in 2010, and 10 refineries reported they intend to produce some 500 ppm NRLM diesel fuel between 2010 and 2014. Table 11 also shows that total diesel fuel production in PADD 3 is projected to increase by approximately 110,000 bbls/day from 2010 through 2014, even though 2 refineries plan to exit the diesel fuel market by January 1, 2014, and another refinery plans to exit the diesel fuel market by June 1, 2014.

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

Year	2010	2011	2012	2013	2014a	2014b
# refineries producing diesel fuel	43	43	43	43	41	40
# refineries at 100% 15 ppm	33	34	36	38	38	40
# refineries at 100% 500 ppm	3	4	3	3	1	0
# refineries with 15/500 ppm mix	7	5	4	2	2	0
Total 15 ppm (bbls/day)	1,773,032	1,915,927	1,949,210	1,954,247	1,956,822	1,974,322
Total 500 ppm (bbls/day)	91,692	87,168	48,521	20,571	16,381	0
Total 15 ppm and 500 ppm (bbls/day)	1,864,724	2,003,094	1,997,732	1,974,819	1,973,203	1,974,322

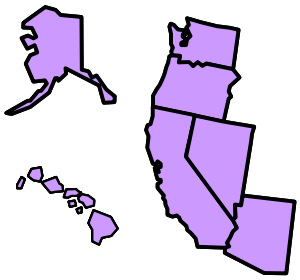


4. PADD 4

Reported totals for all PADD 4 refineries are summarized below in Table 12. Table 12 shows that 15 refineries produced approximately 186,000 bbls/day total (15 ppm and 500 ppm sulfur) diesel fuel in 2010. Ten refineries reported they produced 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 12 also shows that total diesel fuel production in PADD 4 is projected to increase by approximately 1,000 bbls/day from 2010 through 2014, even though one refinery plans to exit the diesel fuel market by January 1, 2012.

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

Year	2010	2011	2012	2013	2014a	2014b
# refineries producing diesel fuel	15	15	14	14	14	14
# refineries at 100% 15 ppm	10	10	10	13	13	14
# refineries at 100% 500 ppm	1	1	0	0	0	0
# refineries with 15/500 ppm mix	4	4	4	1	1	0
Total 15 ppm (bbls/day)	176,460	170,782	175,087	187,238	186,582	186,996
Total 500 ppm (bbls/day)	9,437	13,173	5,903	500	500	0
Total 15 ppm and 500 ppm (bbls/day)	185,897	183,955	180,991	187,738	187,082	186,996



5. PADD 5

Reported totals for all refineries in PADD 5 are summarized below in Table 13.[5] Table 13 shows that for 2010, 25 refineries produced approximately 519,000 bbls/day total (15 ppm and 500 ppm sulfur) diesel fuel. Twenty refineries reported they produced 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 increase by approximately 16,000 bbls/day from 2010 through 2014, even though one refinery plans to exit the diesel fuel market by January 1, 2013, and another refinery plans to exit the market by June 1, 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)	494,545	496,117	514,617	542,213	534,799	534,477
Total 500 ppm (bbls/day)	24,056	26,406	24,025	9,787	6,215	0
Total 15 ppm and 500 ppm (bbls/day)	518,600	522,523	538,642	551,999	541,014	534,477

[5] Alaska refineries are included in this analysis

C. Comparison of 2010 and 2011 NRLM Pre-Compliance Reports

Total reported production of 15 ppm and 500 ppm diesel fuel in the 2011 pre-compliance reports decreased, compared to the 2010 pre-compliance reports. Table 14 shows the production of 15 ppm and 500 ppm diesel fuel from the 2010 and 2011 pre-compliance reports for 2010 (from June 1 to December 31). Total production of diesel fuel from the 2011 reports was approximately 110,000 bbls/day less than total production from the 2010 reports. Reported production decreased in PADDs 1, 2 and 3, while reported production increased in PADDs 4 and 5.

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

PADD	1	2	3	4	5	Total U.S.
2010 NRLM reports						
Total 15 ppm, bbls/day	313,328	922,541	1,857,510	170,443	483,814	3,747,634
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	183,482	516,529	3,926,236
2011 NRLM reports						
Total 15 ppm, bbls/day	308,667	903,856	1,773,032	176,460	494,545	3,656,561
Total 500 ppm, bbls/day	5,326	29,387	91,692	9,437	24,056	159,897
Total 15 ppm and 500 ppm , bbls/day	313,993	933,243	1,864,724	185,897	518,600	3,816,458
Change in reported production, bbls/day	-5,008	-16,132	-93,125	2,415	2,071	-109,779

Table 15 shows the projected production of 15 and 500 ppm diesel fuel from the 2010 and 2011 pre-compliance reports for 2014 (from June 1 to December 31). Total production of diesel fuel from the 2011 reports was approximately 139,000 bbls/day less than the total production from the 2010 reports. Reported production decreased in PADDs 3 and 4, while reported production increased in PADDs 1, 2 and 5. However, projected total diesel fuel production in 2015 is still expected to be sufficient to meet demand. Projected total diesel fuel production in 2014 is 4.15 million bbls/day, compared to projected total diesel fuel demand from AEO 2011 of 3.86 million bbls/day in 2015.

Table 15. Projected Production of (Highway + NRLM) Diesel Fuel by PADD for 2014b						
PADD	**1**	**2**	**3**	**4**	**5**	**Total U.S.**
2010 NRLM reports						
Total 15 ppm, bbls/day	363,277	1,031,688	2,202,372	189,234	507,334	4,293,905
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	189,234	507,334	4,293,905
2011 NRLM reports						
Total 15 ppm, bbls/day	391,300	1,067,790	1,974,322	186,996	534,477	4,154,886
Total 500 ppm, bbls/day	0	0	0	0	0	0
Total 15 ppm and 500 ppm , bbls/day	391,300	1,067,790	1,974,322	186,996	534,477	4,154,886
Change in reported production, bbls/day	28,024	36,103	-228,050	-2,238	27,143	-139,019

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*