

June 15, 2010

Proposed Actions to Further Reduce Diesel Particulate Matter at High Priority California Railyards

June 2010

California Environmental Protection Agency

 **Air Resources Board**

June 15, 2010

This Page Intentionally Left Blank

PREFACE

A Commitment to Cleaner Railyards

This Staff Report outlines the origin, development, and details of proposed commitments by railroad companies to deliver substantial additional reductions in diesel particulate matter (diesel PM) emissions at four Southern California railyards over a ten-year period.¹ Coupled with recent Air Resources Board (ARB) regulatory measures and agreements, and U.S. Environmental Protection Agency (U.S. EPA) regulations, these new commitments will cut diesel soot emissions at the four railyards by a cumulative 130 tons over the next ten years compared to today's emission levels. By 2020, the new commitments alone will cut emissions and related health risks at these railyards by an additional one-third to one-half, even as container and goods movement operations grow again.

This achievement is historic not only for the extent of its reductions, but also because its benefits are to be achieved through a mix of regulatory measures and binding voluntary commitments. This is partly the result of a specific regulatory anomaly; namely, that regulating the emissions of late-model or remanufactured locomotives falls under the authority of the federal government.² This means that ARB can only regulate the oldest locomotives, which do not regularly operate in these high priority railyards. Therefore, there are virtually no benefits in these high priority railyards to be achieved if ARB were to depend solely on its regulatory authority for locomotives.

These new commitments are the result of a stated desire by both the railroad companies and ARB to focus on the absolute goal of achieving historic levels of diesel PM reductions at the railyards in a measurable and cost-effective manner, and well beyond levels that are possible under an ARB regulatory framework alone.

Voluntary does not mean optional, however. The reductions set out in this document must be achieved, and achieved within specific timeframes. As with other pollution reduction measures, there are recordkeeping, reporting, and enforcement provisions associated with the commitments. These include ongoing technical reviews of the data, monitoring of the locomotive activity, railyard inspections, field surveys, and specified actions if the commitments are not met.

These commitments, if approved, represent the region's best hope of significantly reducing railyard emissions and health risk at a rate above and beyond what would otherwise occur over the next ten years.

¹ The four railyards are BNSF San Bernardino, BNSF Hobart, UP Commerce, and UP ICTF/Dolores.

² The U.S. EPA establishes standards for locomotives. The Board would have the authority to establish regulations for locomotives that primarily operate in California and that were manufactured prior to 1973 or that exceed 133 percent of their useful life since original manufacture or last remanufacture, whichever is later.

If approved for the four high priority railyards, these commitments will:

- Cut emissions by nearly 10-20 percent more in 2015 than with existing regulations and agreements alone, and 30-50 percent more by 2020. The net effect is to reduce the health risk from diesel PM 85 percent between 2005 and 2020 at each railyard.
- Ensure that emissions will continue to decline *regardless of growth or increased activity*.
- Establish a schedule for ARB to prepare biennial estimates of future health risks at each high priority railyard through 2020.
- Provide for independent ARB verification of railyard activity to ensure that all relevant railroad obligations are met.
- Lead to installation and operation of a new air quality monitor in the community near the San Bernardino railyard and another near the Commerce/Hobart railyards.
- Create a process for ongoing public participation for the duration of the commitments.

If the Board approves the proposed commitments, formal letters will be signed by the railroads concurring with each set of railyard-specific commitments. Actions can begin immediately.

ARB's list of proposed railyard commitments complements ARB's extensive work to reduce diesel emissions from a wide variety of sources that affect railyard-adjacent communities. ARB has adopted measures for port trucks, cargo handling equipment, transport refrigeration units, and cleaner fuel for intrastate and interstate locomotives that are already showing major air quality benefits. These and other regulations are the outcome of the Board's adoption in 2000 of the landmark Diesel Risk Reduction Plan, an ambitious effort to reduce toxic emissions from diesel sources throughout the State.

Additional details regarding the proposed commitments and contact information can be found at: <http://www.arb.ca.gov/railyard/commitments/commitments.htm>.

**State of California
California Environmental Protection Agency
AIR RESOURCES BOARD
Stationary Source Division**

**Proposed Actions to Further Reduce
Diesel Particulate Matter at
High Priority California Railyards**

Board Consideration: June 24, 2010

DOCUMENT AVAILABILITY

Electronic copies of this document and related materials can be found at the website listed below. Alternatively, paper copies may be obtained from the Air Resources Board's Public Information Office, 1001 I Street, First Floor, Visitors and Environmental Services Center, Sacramento, California 95814.

If you need this document in an alternative format (i.e., Braille, large print) or another language, please contact Mr. Val Montoya at (916) 324-0428 or vmontoya@arb.ca.gov. TTY/TDD/Speech to Speech users may dial 711 for the California Relay Service.

CONTACTS

Railyard Risk Reduction Program
Stationary Source Division
Air Resources Board
P.O. Box 2815
Sacramento, California 95812

Website: <http://www.arb.ca.gov/railyard/commitments/commitments.htm>

Contact: Harold Holmes
Phone: (916) 324-8029
Email: hholmes@arb.ca.gov

DISCLAIMER

This report has been reviewed by the staff of the Air Resources Board and approved for publication. Approval does not signify that the contents necessarily reflect the views and policies of the Air Resources Board, nor does mention of trade names or commercial products constitute endorsement or recommendation for use.

Acknowledgements

We acknowledge with appreciation the input we have received from many impacted residents, community advocates, local elected officials, and researchers interested in further reducing the emissions and public health risk from California's railyards. We would also like to acknowledge the assistance that we received from representatives of BNSF Railway and Union Pacific Railroad in this effort.

In addition, the following individuals from the Air Resources Board contributed to the development of this report:

Stationary Source Division

Richard Corey, Division Chief
Cynthia Marvin, Assistant Division Chief
Harold Holmes, Manager Engineering Evaluation Section
Ambreen Afshan
Hector Castaneda
Stephen Cutts
Eugene Yang

Office of Legal Affairs

Ellen Peter, Chief Counsel
Michael Terris, Senior Staff Counsel

Executive Office

Bob Fletcher, Deputy Executive Officer

Table of Contents

A. Introduction	1
1. Background	1
2. Public Input on the Draft Documents	2
3. Summary of the Staff Proposal	2
B. Basis for the Commitments	6
1. Evaluate Railyard-Specific Data Emission Sources	6
2. Project Emissions with the Existing Program	6
3. Identify Possible Paths to Further Reduce Emissions	7
4. Establish the Performance Standards	8
5. Evaluate Alternatives	8
C. Major Commitments for the Railroads	8
1. Achieve Specified Emission Reduction Targets	9
2. Prepare Emissions Inventories, Modeling, and Emission Reduction Plans	9
3. Evaluate Operational Changes	10
4. Support Research and Demonstration of Advanced Technology	11
5. Identify and Report on Non-Preempted Locomotive Activity	11
6. Meet and Confer on Opportunities for Additional Reductions	12
D. Major Commitments for ARB	12
1. Review Submitted Information and Monitor Compliance	12
2. Prepare Health Risk Assessments	13
3. Determine Compliance with the Commitments	14
4. Install and Operate Ambient Air Monitors	15
5. Analyze Health Risk Associated with Plans and Operational Measures	15
6. Initiate Specific Actions upon Final Determination of Non-Compliance	15
E. Process for Determining Non-Compliance	16
1. Commitments that are Subject to a Non-Compliance Determination	16
2. Determination of Non-Compliance	16
3. Dispute Resolution Process	17
4. Public Input to the Appeals Panel	17
F. Impacts of the Commitments	17
1. Emission Reductions	18
2. Health Risk Reductions	19
3. Community Benefits	19
G. Other Actions	20
1. Participate in Local Collaborative Efforts upon ARB Request	20
2. Develop Emission Inventories for Three Other Priority Railyards	20
H. Recommendation	20

APPENDICES

Appendix A – BNSF San Bernardino Railyard

- A1. Basis for the Proposed Commitments to Reduce A1-1
Diesel Particulate Matter at the BNSF San Bernardino Railyard**
- A2. Proposed Commitments for the BNSF San Bernardino Railyard..... A2-1**

Appendix B – BNSF Hobart Railyard

- B1. Basis for the Proposed Commitments to Reduce B1-1
Diesel Particulate Matter at the BNSF Hobart Railyard**
- B2. Proposed Commitments for the BNSF Hobart Railyard..... B2-1**

Appendix C – UP Commerce Railyard

- C1. Basis for the Proposed Commitments to Reduce C1-1
Diesel Particulate Matter at the UP Commerce Railyard**
- C2. Proposed Commitments for the UP Commerce Railyard C2-1**

Appendix D – UP ICTF/Dolores Railyard

- D1. Basis for the Proposed Commitments to Reduce D1-1
Diesel Particulate Matter at the UP ICTF/Dolores Railyard**
- D2. Proposed Commitments for the UP ICTF/Dolores Railyard..... D2-1**

Proposed Actions to Further Reduce Diesel Particulate Matter at High Priority California Railyards

A. INTRODUCTION

1. Background

Railyards are significant sources of emissions and pose public health risks to nearby residents primarily due to the emissions of diesel particulate matter (diesel PM). Over the last several years, the Air Resources Board (ARB or Board) staff has evaluated a number of measures to further reduce the emissions from locomotives and railyards.^{3 4} After considering the information and testimony presented at the September 2009 Board hearing, the Board directed the staff to:

- Develop an approach for railroads to prepare and implement risk reduction plans for each high priority railyard;
- Use San Bernardino railyard as a template;
- Investigate potential enforcement provisions that would trigger ARB regulatory action;
- Coordinate with stakeholders; and
- Report back to the Board with recommendations.

After consulting with representatives from BNSF Railway (BNSF) and Union Pacific Railroad (UP) and other stakeholders, ARB staff returned to the Board in February 2010 with specific recommendations on an approach.⁵ In summary, the staff recommended the following approach:

- Obtain a commitment from railroads to reduce emissions and risks from high priority railyards;
- Work with interested stakeholders to establish specific provisions for the railroad commitment; and
- Implement the commitments through the exchange of letters between ARB and the railroads through a public consultation process.

After considering the testimony and staff's proposal, the Board directed staff to proceed expeditiously to pursue the voluntary approach, but ensure that it is railyard-specific, measurable, and enforceable, and that it include provisions for a regulatory backstop should the commitments not be met. The staff proposal meets these objectives.

³ "Technical Options to Achieve Additional Emissions and Risk Reductions from California Locomotives and Railyards," ARB, August 2009. This report is available at <http://www.arb.ca.gov/railyard/ted/ted.htm>.

⁴ "Recommendations to Implement Further Locomotive and Railyard Emission Reductions," ARB, September 2009. This report is available at <http://www.arb.ca.gov/railyard/ted/ted.htm>.

⁵ Staff Presentation entitled "Update on Efforts to Reduce Emissions and Risks at High Risk Railyards," February 25, 2010. The presentation is available at <http://www.arb.ca.gov/board/books/2010/022510/10-2-5pres.pdf>.

2. Public Input on the Draft Documents

As part of the process for developing the proposal, ARB staff considered public testimony provided at the September 2009 and February 2010 Board hearings, consulted with several stakeholders including community representatives, and held public consultation meetings on the draft commitments in both the Cities of Commerce and San Bernardino. Many of the comments on the draft commitments focused on the need to get more reductions sooner. Some commenters suggested requirements for specific technologies rather than performance targets based on declining emissions, while others advocated for regulations over a commitment-based approach. Others emphasized the need to evaluate the viability and effectiveness of operational changes (e.g., moving railyard truck gates) to reduce diesel PM emissions and/or risks.

In addition, during the public consultation meetings, some stakeholders raised concerns about non-air quality issues near the railyards including lights, noise, and vibrations. Many of the comments provided were similar to those made during the Board hearings mentioned above.

Based on stakeholder input, staff made revisions to the proposal that moved up the timetable for emission reductions as well as the assessment of operational measures. As indicated above, the focus of the staff proposal is on reducing emissions and risks associated with diesel PM at the high priority railyards. However, Section G includes a discussion of a collaborative approach for considering non-air quality concerns outside the railyards as well.

3. Summary of the Staff Proposal

ARB proposes to request commitments from BNSF and UP to further reduce emissions of diesel PM at four high priority railyards in Southern California. The purpose is to decrease the health risk from diesel PM at these railyards to protect nearby communities. The high priority railyards are the San Bernardino and Hobart railyards operated by BNSF and the Commerce and ICTF/Dolores railyards operated by UP. These four railyards were selected for the commitment process because they have the greatest emissions of diesel PM and associated health risks to neighboring residents. The staff is proposing a separate set of commitments for each of these four high-priority railyards. In addition, each set of commitments is supported by an analysis that provides the basis for the commitments. These documents are presented as appendices to this Staff Report.

Upon Board approval of the proposed commitments, the ARB Executive Officer will send an individual letter for each affected railyard to the appropriate railroad, together with the railyard-specific commitments. Assuming each railroad approves the commitments, they will send a return letter agreeing to the commitments. Upon acceptance by the Executive Officer, the commitments will be effective.

Overall, the design of the commitment approach is centered on establishing enforceable specific percent-emission reduction targets from a 2005 baseline for a set of milestone years – 2011, 2013, 2015, 2017, and 2020. These emission reduction targets are based on a performance standard approach and are established for each railyard based on ARB staff's assessment of the feasible and cost-effective measures that are expected to be available within the timeframe of the commitments. Since the targets are based on a performance standard, the railroads may choose any combination of measures necessary to achieve these targets. The "Basis for the Commitments" documents included as appendices outline the types of feasible measures considered in developing the emissions reduction targets for each railyard.

Key provisions of the commitments for each high-priority railyard include:

- A declining cap on railyard diesel PM emissions from 2011-2020, irrespective of economic growth and related increases in the number of containers handled.
- Emission reductions of nearly 10-20 percent more in 2015 than with existing measures alone, and 30-50 percent more by 2020.
- An overall 85 percent reduction in emissions in 2020 compared to 2005 levels, due to the combined effect of existing measures and the new commitments.
- Annual preparation and dissemination of emission inventories.
- Routine preparation and dissemination of updated emission reduction plans and health risk assessments in 2010, 2012, 2014, 2016, and 2018.
- Evaluation in 2010-2012 of operational changes (e.g., installation of electric gantry crane or relocating equipment) to reduce railyard emissions and/or health risk.
- Establishment of two new PM air quality monitors -- one in the community near the San Bernardino railyard and one near the Commerce/Hobart railyards.
- Rigorous compliance verification by ARB.
- A clear and prompt trigger for ARB regulatory action within 4 months if ARB determines a railroad has not met the commitments at a railyard.
- A process for ongoing public participation for the duration of the commitments.

Table 1 summarizes the emission reduction targets for each railyard. These emission reduction targets include the benefits of both the existing measures as well as the new commitments. The commitments set a hard cap on railyard emissions in each milestone year, independent of the growth in container traffic or railyard activity. For purposes of this analysis, the staff assumed there would be about a three percent increase in container activity at the railyards each year between 2010 and 2020. If actual growth is higher, the railroads will need to reduce emissions further to meet the cap for that year.

Diesel PM emissions will continue to go down at each of the yards as a direct result of the existing measures and the proposed commitments. These measures include the ARB regulations for cargo handling equipment, drayage trucks, transport refrigeration units, and clean diesel fuel; the 1998 and 2005 ARB/Railroad Agreements; the U.S. Environmental Protection Agency (U.S. EPA) locomotive emission standards; and the use of various incentive funds to accelerate locomotive upgrades.

Table 1
Proposed Diesel PM Emission Reduction Levels and Schedules
for Four High Priority Railyards in Southern California

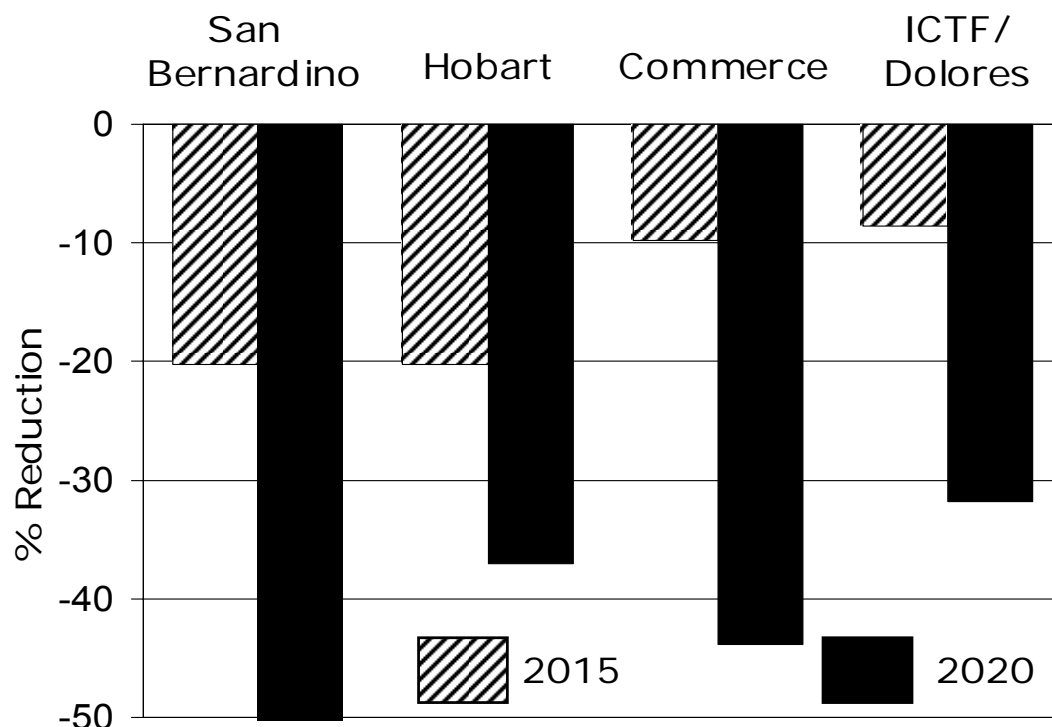
Railyard	Percent Emission Reductions from 2005 Baseline by December 31 st Compliance Date				
	2011	2013	2015	2017	2020
BNSF San Bernardino	45	50	68	73	85
BNSF Hobart	55	65	76	78	85
UP Commerce	50	55	69	70	85
UP ICTF/Dolores	60	65	74	75	85

ARB staff chose emission reductions as the compliance metric because they can be validated through detailed, source-specific emission inventories. After a thorough review, ARB staff will use the emissions inventory and other information to routinely evaluate the public health risks for each of the affected railyards. This will provide the type of information necessary to inform the public of the advances that are being made at each railyard to reduce the public health risks.

Health risk is dependent upon both the amount of emissions and the location of those emissions. The ARB 2005 Health Risk Assessments for these yards considered both of these factors. Since the location of emission sources within the railyard does not vary significantly with day-to-day operations, future emissions are a reasonable surrogate for projecting the future public health risk. ARB will routinely reassess how the actions taken and proposed by the railroads under these commitments are affecting the health risk from each yard.

Figure 1 shows the benefits directly attributable to the new commitments. These reductions are shown for the years 2015 and 2020 and represent the additional percentage of emission reductions that would occur under the proposed commitments. As the figure indicates, these reductions are about 30 – 50 percent greater than what would have otherwise occurred in 2020 with the existing measures alone. It is important to note that, for these four railyards, there would be virtually no emission reductions through the ARB adoption of a regulation for non-preempted locomotives as these oldest locomotives are not currently operating on a routine basis in these yards.

Figure 1
% Diesel PM Emission Reductions^a Attributable to Proposed New Commitments
for Four High Priority Railyards in Southern California



^a Measured as a percent reduction from the emissions baseline established with existing measures in each year. For example, the emissions in 2020 at the San Bernardino Yard are estimated to be 7.0 tons per year. With the new commitments, the emissions would be reduced to 3.4 tons per year. Therefore, the emission reduction due to the new commitments is 3.6 tons per year, equating to about a 50 percent reduction.

In addition to the emission reduction targets, the commitments contain three major areas of additional provisions for both the railroads and ARB.

- a. The first is a requirement to evaluate specific operational measures for each railyard that could be taken to further reduce emissions and risks. These operational measures specifically address the feasibility of actions that could be taken to reduce risk by relocating sources of emissions, without necessarily reducing those emissions. ARB's identification of railyard-specific operational changes to be evaluated is based on input from the local communities.
- b. The second area includes requirements for the routine preparation of emissions inventories, health risk assessments, and emission reduction plans; periodic community meetings; installation and operation of an ambient air monitor in the community near the San Bernardino railyard and near the Commerce railyards.

- c. The third area covers procedures for determining compliance, and specified actions ARB staff will take if the railroads do not meet the commitments.

All of these provisions are summarized in the following sections.

B. BASIS FOR THE COMMITMENTS

This section briefly discusses the general approach and basis for establishing the emission reduction targets. These targets reflect the application of feasible and cost-effective measures through 2020. Details for each railyard are presented in the appendices.

1. Evaluate Railyard-Specific Data Emission Sources

The first step in the analysis was to evaluate the number, activity, and control level of the specific emission sources operating at each railyard. This includes locomotives, cargo handling equipment, drayage trucks, and diesel-powered transport refrigeration units operating on drayage trucks or railcars in the railyard.

To project railyard emissions in the future years, we considered the level of equipment activity and emission controls, together with anticipated growth. As discussed above, ARB staff used an approximate three percent annual growth rate, based on historic growth rates over the last 12 years.

2. Project Emissions with the Existing Program

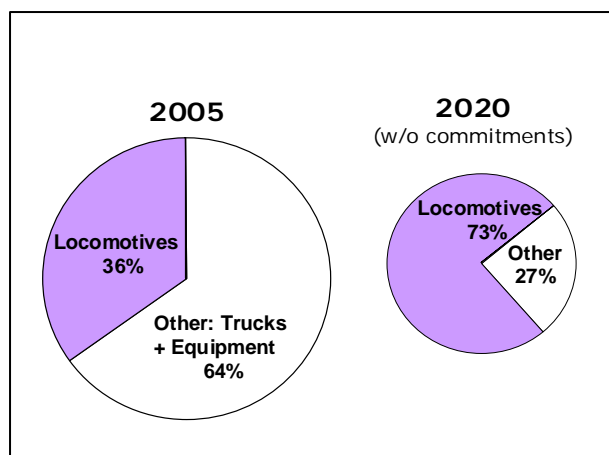
ARB staff then evaluated how the existing suite of regulations and agreements affects the kinds of equipment that will be operating and the emissions from that equipment. In general, the existing measures included in the analysis are:

- a. Adopted ARB regulations for drayage trucks, cargo equipment, transport refrigeration units, and cleaner fuel for intrastate locomotives.
- b. The 1998 ARB/Railroads Agreement to reduce fleet average emissions of nitrogen oxides (NOx) from locomotives in the South Coast Air Basin to Tier 2 levels by 2010. The actions taken by the railroads to comply with these NOx levels are providing additional PM reductions not mandated by the Agreement.
- c. The 2005 ARB/Railroads Agreement to reduce diesel PM emissions near railyards through the use of idle reduction devices and cleaner fuels, as well as prevention of excess smoke from locomotives.
- d. The 2008 U.S. EPA rulemaking establishing emission standards for new and remanufactured locomotives.

These existing measures result in significant reductions in emissions and health risks from the railyards. The appendices present the details on the contribution of each emission source to the overall emissions, from 2005 through 2020.

Figure 2 shows that as the existing measures reduce the total railyard emissions from all sources by 2020, locomotives become the dominant contributor.

Figure 2
Diesel PM Sources in the Yard
(Average for the 4 Railyards)



3. Identify Possible Paths to Further Reduce Emissions

Once the future emissions inventories were established, ARB staff evaluated possible paths to further reduce emissions. Trucks and railyard-specific equipment are already subject to ARB regulations, with requirements for significant PM reductions through the use of feasible and cost-effective technology. As a result, locomotives account for the majority of the residual emissions and risk at the railyards. Therefore, ARB staff focused on pathways to further reduce the emissions from the various types of locomotives operating in the railyards, including locomotives that ARB does not have the authority to regulate. ARB staff identified the actions below as a feasible path that the railroads could follow:

- a. Between 2010 and 2015, upgrade switch and medium horsepower locomotives operating primarily within the railyard with cleaner Tier 3/generator-set (gen-set) technology or equivalent. Then retrofit those gen-set locomotives with diesel PM filters or replace them with Tier 4 locomotives that have the most effective PM control once that technology is available.
- b. Between 2013 and 2020, upgrade the fleet of line-haul locomotives to Tier 3 emission levels on average (based on a combination of increasingly cleaner locomotives).
- c. By 2020, incorporate Tier 4 line haul locomotives into the fleet serving the railyard.

ARB staff recognizes that the railroads may elect to use a different combination of technology and operational changes to meet the commitments.

4. Establish the Performance Standards

For each railyard, the benefits of incorporating the above measures were quantified, resulting in railyard-specific performance standards for multiple years. The performance standard is expressed as the percent emission reduction from 2005 levels to be achieved by each compliance deadline. As noted above, the railroads would have the discretion to select the most efficient combination of measures to meet the performance standard. The details of the railyard-specific standards are in the appendices.

5. Evaluate Alternatives

For each railyard, ARB staff also evaluated alternative options for expeditiously reducing diesel PM emissions. In general, ARB staff evaluated the emission reductions, cost, and cost-effectiveness associated with two alternatives. First, replacing any older, non-preempted locomotives at each railyard. In general, these (non-preempted) locomotives represent the very oldest locomotives for which there are no U.S. EPA emission standards, or for which the locomotives have already exceeded their useful life. And second, electrifying various types of cargo handling equipment. The analyses show that these alternatives would not result in significant additional emission reductions compared to the commitments, or are not cost-effective. The detailed analysis for each yard is presented in the appendices.

C. MAJOR COMMITMENTS FOR THE RAILROADS

This section summarizes the major commitments for the railroads. The text of the railyard-specific commitments is presented in the appendices.

1. Achieve Specified Emission Reduction Target

The proposed commitments present specific emission reduction performance standards for each railyard. These standards are presented in Table 1 above. As mentioned, the standards must be met independent of changes in activity at the yards. The railroads may use any combination of technology and/or operational changes to meet the standards.

The proposed commitments recognize the ability of the railroads to use public incentive monies, if available, to co-fund the accelerated transition to cleaner technology and achieve the emission reduction targets. This includes funds under the Proposition 1B Goods Movement Emission Reduction Program to upgrade locomotives that operate at the four high priority railyards. These types of incentive projects are directly responsive to the mandate for the Proposition 1B monies – to quickly reduce the health risk from diesel PM in the communities with the highest health risks from goods movement

operations. However, the railroads obligation to achieve the performance standards under the commitments is not conditioned on receipt of public incentive funding.

ARB must independently verify the data submitted by the railroads and determine if the railroads have met the emission reduction performance standard at each railyard following each milestone year. After any final determination that a railroad has failed to comply with the standard, ARB will initiate the rulemaking process.

2. Prepare Emissions Inventories, Modeling, and Emission Reduction Plans

The proposed commitments require the railroads to prepare and submit railyard diesel PM emissions inventories, air dispersion modeling analyses, and draft and final emission reduction plans according to a specified schedule. The schedule is identical for each railyard and is shown in Table 2.

The emissions inventories are used to determine compliance with the performance standards in specified years. In addition, the inventories are used as a basis for developing the air modeling analyses that are necessary to prepare health risk assessments and the emission reduction plans that are used to demonstrate how future standards will be achieved. The emission reduction plans will describe changes in source category activities, identify existing and future actions to reduce emissions, and provide specific implementation schedules for these actions. Submittal dates for draft and final emission reduction plans are listed to ensure that the public has an opportunity to comment.

There are two types of emissions inventories that will be prepared.

- a. The first type is a comprehensive emissions inventory. This inventory will include, to the extent that data are reasonably available, detailed activity information such as locomotive event recorder data, hours of operation of cargo handling equipment and transport refrigeration units, and drayage truck time in operation within the railyard. This inventory will also identify activity and growth projections through 2020, and the basis for those projections. The schedule lists comprehensive inventories with a (C). The comprehensive inventories are developed for the railyard operations year for which there is a performance standard (i.e., an emission reduction target as specified in Table 1).
- b. The second type of emissions inventory is referred to as an interim inventory. The interim emissions inventories, noted with an (I) in Table 2, will identify and utilize updates on locomotive usage, other equipment changes, and activity levels to quantify changes to the last comprehensive inventory. ARB staff will use these interim inventories to assess potential issues with the railroads' progress in meeting the performance standards.

Table 2
Schedule for Railroads' Submittal of Documents
Emission Inventories, Air Dispersion Modeling, and Emission Reduction Plans

Railyard Operations Year	Dates that Railroads Must Submit Documents to ARB			
	Emissions Inventory	Air Dispersion Modeling	Draft Emission Reduction Plan	Final Emission Reduction Plan
2009	Sep 30, 2010 (I)		Oct 15, 2010	Dec 31, 2010
2010	Apr 1, 2011 (I)			
2011	Apr 1, 2012 (C)	Jun 1, 2012	Sep 1, 2012	Dec 31, 2012
2012	Apr 1, 2013 (I)			
2013	Apr 1, 2014 (C)	Jun 1, 2014	Sep 1, 2014	Dec 31, 2014
2014	Apr 1, 2015 (I)			
2015	Apr 1, 2016 (C)	Jun 1, 2016	Sep 1, 2016	Dec 31, 2016
2016	Apr 1, 2017 (I)			
2017	Apr 1, 2018 (C)	Jun 1, 2018	Sep 1, 2018	Dec 31, 2018
2018	Apr 1, 2019 (I)			
2019	Apr 1, 2020 (I)			
2020	Apr 1, 2021 (C)			

(C) = Comprehensive Emission Inventory. (I) = Interim Emission Inventory.

Failure to submit the documents specified in Table 2 triggers the process for determining non-compliance. In addition, if ARB staff determines that the plans are not adequate to meet the upcoming performance standard, the non-compliance process is triggered.

3. Evaluate Operational Changes

During the consultative process, the public expressed interest in ensuring that the railroads consider operational changes. These changes may reduce risk through direct emission reductions from specific sources, increasing the distance between the emission sources and nearby residents, or both. As a result, the proposed commitments include requirements that the railroads evaluate various railyard-specific operational changes and make recommendations as to the appropriateness of implementing those changes. All of the evaluations will be posted on the ARB website.

Example changes include the relocation of truck gates, installation and operation of electric infrastructure to support rail-mounted gantry cranes and stationary refrigeration transport units, relocation of yard tractor and transport refrigeration unit operation, relocation of locomotive maintenance and service facilities, and the installation of stationary collection systems to reduce locomotive maintenance and service-related emissions. The railyard-specific measures to be evaluated and the schedules are presented in the appendices.

The operational review is to consider, but is not limited to, potential diesel PM emissions reductions, technical feasibility, operational and safety impacts on the railyards, availability of land access, costs and cost-effectiveness of such actions, and any other railyard-specific factors. ARB staff moved up the due dates for these evaluations in response to community comments. The reviews will begin in 2010 or 2011, and all of them must be completed no later than December 31, 2012.

Failure to submit the operational evaluations on the defined schedule triggers the determination of non-compliance process.

4. Support Research and Demonstration of Advanced Technology

There is a clear need to advance the design, testing, and availability of cleaner technology. To foster the development of these advanced, lower-emitting technologies, the railroads would each commit to work collaboratively with ARB to develop and implement a formal demonstration program for advanced locomotive engines, aftertreatment devices for locomotives, or other advanced technology demonstrations. The objective of the demonstration program would be to support separate, but potentially parallel, efforts to achieve ARB verification of one or more advanced locomotive engines or aftertreatment devices, or to establish the feasibility of other advanced technology equipment.

In addition, each railroad would commit to loan two existing gen-set or medium horsepower locomotives annually from 2011 through 2015, and to provide any necessary technical assistance as in-kind contribution to the demonstration programs.

5. Identify and Report on Non-Preempted Locomotive Activity

ARB has the authority under the Clean Air Act to adopt regulations for non-preempted locomotives that are otherwise not regulated by U.S. EPA. About 25 percent of the locomotives in the national fleet operated by BNSF and UP are non-preempted.

ARB staff does not believe that adopting regulations for these non-preempted locomotives will result in any meaningful reductions at these four railyards as there are few to none that routinely operate at these railyards. However, to ensure that the operation of such locomotives is not significant, the proposed commitments include provisions that require the railroads to identify any non-preempted switch or medium horsepower locomotive that operates more than five consecutive days within the

railyard and subsequently report the information to ARB as part of the annual reports required by the 1998 ARB/Railroad Agreement.

6. Meet and Confer on Opportunities for Additional Reductions

The proposed commitments include a provision whereby the railroads agree to meet and confer with ARB by 2018 to evaluate and explore opportunities for further diesel PM emissions reductions by 2020 and beyond. Nothing in the proposed commitments precludes earlier meet and confer actions.

The proposed commitments also contain a provision that specifically states that nothing in the commitments precludes ARB from developing regulations within its authority as required to achieve the goals of the State Implementation Plan and Climate Change Scoping Plan.

D. MAJOR COMMITMENTS FOR ARB

This section summarizes the major commitments for ARB, which are detailed in the appendices.

1. Review Submitted Information and Monitor Compliance

As mentioned above, the railroads will provide information on the emissions inventory and air dispersion modeling, as well as the emission reduction plans. Under the proposed commitments, ARB staff will post this information pursuant to a defined schedule. This schedule is presented in Table 3. In general, documents will be posted within two weeks of receipt.

In addition and in accordance with a specified schedule, ARB staff will review the documents for completeness and accuracy and notify the railroads of the findings. If ARB finds that the submission is not complete or accurate or, for the emission reduction plans, cannot reasonably achieve the diesel PM reductions required by the next compliance deadline, ARB staff will trigger the process to determine non-compliance.

ARB staff will validate the inventory information through a thorough technical review of the data. To verify ongoing compliance, ARB staff will also conduct semi-annual railyard inspections. These inspections will be augmented by ARB photographic tracking and field surveys of railyard switch and medium horsepower locomotives, annual submittals under the 1998 ARB/Railroads Agreement to verify the number and tier of interstate line haul locomotives operating with the South Coast Air Basin, and random surveys of interstate line haul locomotives entering and exiting the Basin.

Table 3
Schedule for ARB Release of Documents
Emission Inventories, Air Dispersion Modeling,
ARB Health Risk Assessments, and Emission Reduction Plans

Railyard Operations Year	Dates that ARB Will Make Documents Publicly Available				
	Railroad Emissions Inventory	Railroad Air Dispersion Modeling	ARB Health Risk Assessment	Railroad Draft Emission Reduction Plan	Railroad Final Emission Reduction Plan
2009	Oct 15, 2010 (I)		Nov 1/15, 2010	Nov 1, 2010	Jan 15, 2011
2010	Apr 15, 2011 (I)				
2011	Apr 15, 2012 (C)	Jun 15, 2012	Oct 1, 2012	Oct 1, 2012	Jan 15, 2013
2012	Apr 15, 2013 (I)				
2013	Apr 15, 2014 (C)	Jun 15, 2014	Oct 1, 2014	Oct 1, 2014	Jan 15, 2015
2014	Apr 15, 2015 (I)				
2015	Apr 15, 2016 (C)	Jun 15, 2016	Oct 1, 2016	Oct 1, 2016	Jan 15, 2017
2016	Apr 15, 2017 (I)				
2017	Apr 15, 2018 (C)	Jun 15, 2018	Oct 1, 2018	Oct 1, 2018	Jan 15, 2019
2018	Apr 15, 2019 (I)				
2019	Apr 15, 2020 (I)				
2020	Apr 15, 2021 (C)				

2. Prepare Health Risk Assessments

Under the proposed commitments, ARB staff would prepare health risk assessments using the comprehensive diesel PM emission inventories and air dispersion modeling results provided by the railroads. The risk assessments would be prepared in accordance with *ARB Health Risk Assessment Guidance for Railyard and Intermodal Facilities*⁶ (2006) or its subsequent revisions. The updated risk assessments will provide detailed information comparing excess cancer risks and non-cancer health effects with the estimates in the 2005 Health Risk Assessment.

⁶ “*ARB Health Risk Assessment Guidance for Railyard and Intermodal Facilities* (2006).” This report is available at <http://www.arb.ca.gov/railyard/hra/hra.htm>.

ARB staff will compare 2005 railyard emissions and associated health effects with risk assessment results for later years using the same or similar methodology, and also include a separate analysis for any subsequent changes in future year methodologies. ARB staff will complete the health risk assessment reports for the railyard according to the schedule provided in Table 3. ARB would also commit to prepare periodic estimates of future health risks, through 2020, concurrent with the railroads' submittal of draft and final emission reduction plans.

3. Determine Compliance with the Commitments

ARB is responsible for evaluating compliance with the commitments in a prescribed process with specified deadlines for each step. In summary, within 20-30 calendar days of receipt of documents submitted by a railroad, ARB staff would complete its assessment and notify the railroad of any deficiencies. There is a 15-30 day period for the railroad to remedy any deficiencies. If the submittal is still not sufficient to meet the commitments, the ARB Executive Officer would make a determination of non-compliance. The affected railroad may appeal the Executive Officer's determination to an administrative appeals panel. ARB's written notification to the railroads of any deficiencies will be publicly available on the program website. Additional information on the process for assessing compliance is provided in section E.

Under the proposed commitments, ARB staff is responsible for determining compliance with the diesel PM emission reduction levels for each of the years specified in Table 1. The determination is based on the comprehensive emission inventories submitted by the railroads and verified by ARB staff through technical review of the inventories, railyard inspections, unannounced field surveys, and other mechanisms.

In addition, ARB staff will determine whether the railroads' submitted emission inventories, air dispersion modeling, and draft and final emissions reductions plans are complete and accurate. ARB staff must also review the plans to assess whether staff believes that the actions in those plans can reasonably achieve the diesel PM emission reductions required by the next compliance deadline. Finally, ARB staff will track the railroads' evaluations of operational changes at each yard to ensure they are completed on time.

If ARB staff determines that the commitments have not been met, the process for determination of non-compliance is triggered.

4. Install and Operate Ambient Air Monitors

During discussions with ARB staff, community members requested that air monitors be installed near the railyards. In response, ARB staff is proposing to install and operate one ambient particulate matter air monitor in the community near the San Bernardino railyard and one ambient air monitor in the community near the two Commerce railyards. Alternately, ARB staff may secure a commitment from the South Coast Air Quality Management District to install and operate one or both monitors, consistent with a siting and operation protocol supported by ARB.

5. Analyze Health Risks Associated with Plans and Operational Changes

To ensure that there is a health risk assessment component associated with the emission reduction plans and operational measures, the proposed commitments include provisions that require ARB staff to conduct analyses of the projected changes in health risk. These analyses will be presented to the public and help ensure that there is clear communication of the impact that various actions are expected to have on health risk.

6. Initiate Specific Actions upon Final Determination of Non-Compliance

Upon a final determination of railyard non-compliance by the ARB Executive Officer or, if appealed, by the administrative appeals panel, ARB staff would be required under the commitments to submit the following locomotive and railyard rulemakings to the Board within four months:

- A regulation of switch and medium horsepower locomotives that are not preempted under federal law (e.g., locomotives that primarily operate in California and that were manufactured prior to 1973 or that exceed 133 percent of their useful life since original manufacture or last remanufacture, whichever is later); and
- A designated railyard regulation that requires risk reduction audits and plans designed to achieve targeted emission reduction levels.

In addition, the proposed commitments specify that ARB will also consider the following actions:

- Pursue federal legislation to expand ARB authority to adopt regulations for in-use locomotives; and
- Petition U.S. EPA to strengthen existing federal locomotive regulations.

E. PROCESS FOR DETERMINING NON-COMPLIANCE

ARB is designated as the agency responsible for enforcement of the commitments. Specific details and the timeframes for various ARB and railroad actions are provided in the text of the commitment documents in the appendices.

1. Commitments that are Subject to a Non-Compliance Determination

The actions by a railroad that trigger a non-compliance determination include, but are not limited to:

- Failure to comply with the railyard diesel PM emission reduction levels and schedule as specified in Table 1.
- Failure to submit the emissions inventory, air dispersion modeling, or draft and final emissions reduction plans according to the schedule specified in Table 2.
- Failure to submit a final emission reduction plan that ARB staff believes can reasonably achieve the diesel PM reductions by the next compliance deadline.
- Failure to submit the analysis of operational changes on the dates specified.

2. Determination of Non-Compliance

If the ARB staff finds that a railroad has not complied with the specified commitments for a particular railyard, ARB staff would make a preliminary determination of non-compliance and notify the appropriate railroad. The preliminary determination would trigger a meet and confer process for resolving differences. For the Table 1 compliance deadlines, if ARB staff determines that a railroad misses its percentage target by not more than two percent (e.g., reaching a 53 percent compliance level where 55 percent was required), the railroad will be given the opportunity to cure this deficiency by the next calendar year⁷, provided it demonstrates that the railyard has achieved the new compliance level by conducting a full inventory analysis. Failure to conduct the analysis or failure to cure the deficiency in the following calendar year will constitute a failure to meet the appropriate targets in Table 1.

After consultation with the railroad, if ARB staff still finds that the railroad has not complied with the commitments, ARB staff would make a final determination of non-compliance. This final determination shall specifically identify the reasons why ARB has found the railroad not to be in compliance with the commitments.

⁷ With the greater uncertainty about the pace of growth in domestic container traffic at the UP Commerce Railyard, the railroad would have 2 years to cure a deficiency for the 2015 compliance deadline.

3. Dispute Resolution Process

In the event of a dispute concerning an ARB final determination of non-compliance, ARB staff and the railroad would meet and confer. If they cannot reach agreement, they would submit their respective positions to an administrative appeals panel.

The administrative panel will be convened with three members – one member selected by ARB, one member selected by the respective railroad, and a third member selected by the ARB and railroad members from a list of five or more persons that the parties agree to in advance.

The panel members selected by ARB and the railroad will serve as technical advisors. The third panel member will be the presiding member and will be solely responsible for making the final decision on behalf of the panel. The decision would be based on written submissions from ARB and the railroad, as well as any written submissions from the public. If the panel determines a hearing to take oral testimony is necessary, the hearing will be public.

The presiding member will issue his or her final decision on behalf of the panel within 30 calendar days from when the matter is submitted to the panel. Either party receiving an adverse decision from the panel may seek expedited review of the decision in the Superior Court for the County of Sacramento. However, if the panel's decision upholds the ARB Executive Officer's final determination of non-compliance, ARB may immediately commence the rulemaking process outlined in the opening paragraphs of this section. If judicial review is not sought, then the decision of the panel will be binding on the parties. Each party pays its own costs and fees, and splits the costs of employing the third panel member.

4. Public Input to the Appeals Panel

Interested persons may submit written statements and supporting documentation to the panel before the matter(s) are taken under submission. As discussed above, if a hearing is necessary, the hearing shall be public. However, only ARB and UP will be parties to the dispute resolution process.

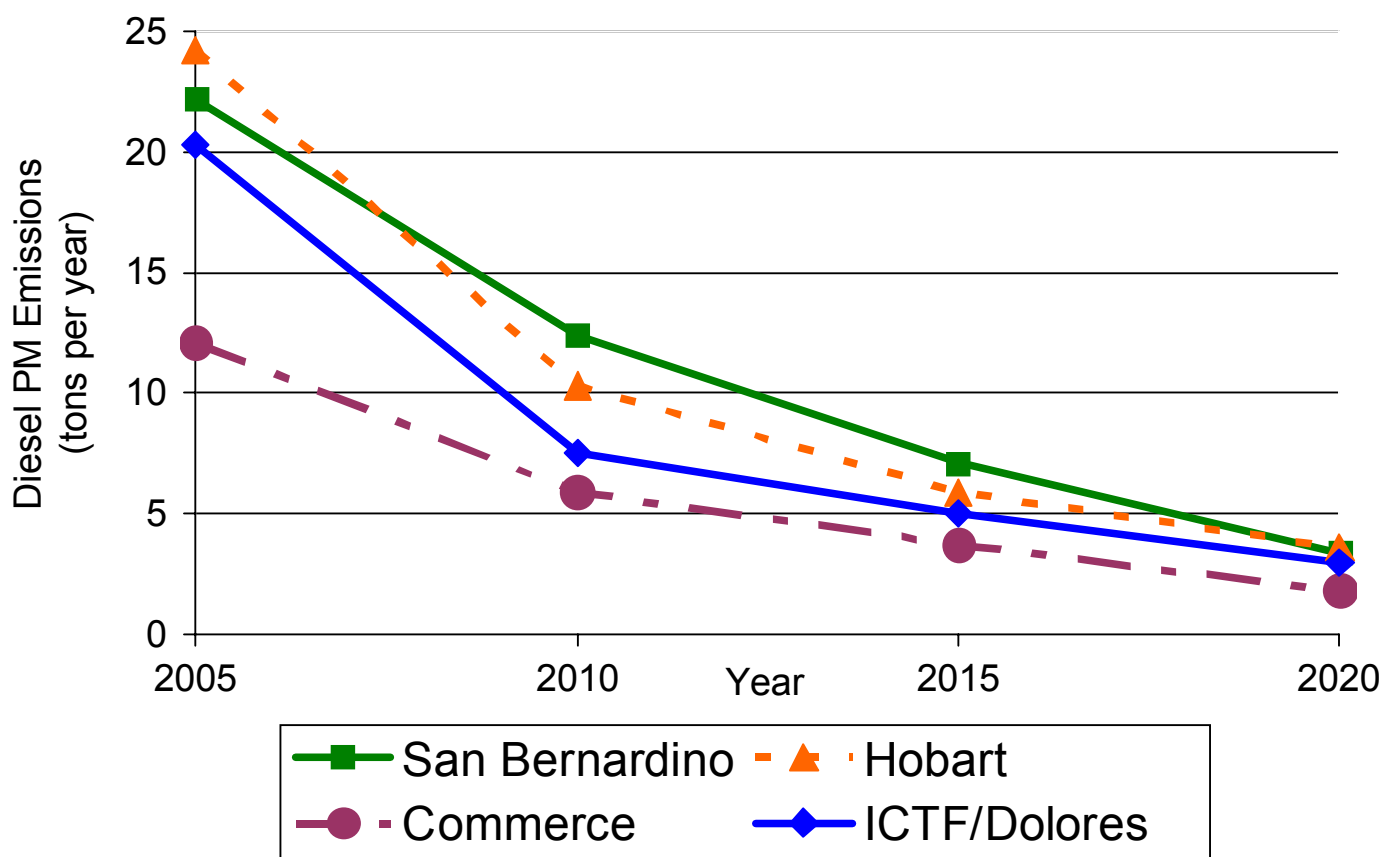
F. IMPACTS OF THE COMMITMENTS

The commitments establish a maximum level of emissions that cannot be exceeded, regardless of growth in railyard activity. The railroads will accelerate the use of cleaner technology and operational improvements to achieve the required emission reductions at each railyard. These actions will help reduce the health risk in communities near the railyards and cut regional air pollution as cleaner locomotives travel well beyond the high-priority railyards.

1. Emission Reductions

Figure 3 illustrates the sharp decline in emissions already achieved between 2005 and 2010 due to ARB's rules for drayage trucks, cargo handling equipment, transport refrigeration units; the PM benefits of the existing ARB/Railroad Agreements; and the recession. From 2010 to 2020, we assumed a three percent annual growth in containers at each yard based on the last 12 years of data. The emission reductions after 2010 are attributable to the combination of the new commitments, plus the existing ARB and U.S. EPA measures. Figure 1 presented earlier in this document illustrates the benefits attributable to the proposed new commitments alone.

Figure 3
Reduction in Diesel PM Emissions with the Commitments
for Four High Priority Railyards in Southern California



2. Health Risk Reductions

Table 4 shows the significant reduction in the projected maximum excess cancer risk after implementation of the new commitments, plus already adopted ARB and U.S. EPA regulations and agreements. In 2020, implementing the commitments would cut the remaining risk in half, compared to the risk under the existing program in the same year.

Table 4
Reduction in Diesel PM Health Risk with the Commitments
at Four High Priority Railyards in Southern California

Railyard	Maximum Excess Cancer Risk for 70-Year Exposure (chances per million)				
	2005	2010	2015	2020	% Change
BNSF San Bernardino	2,500	1,400	800	400	85%
BNSF Hobart	500	215	120	75	85%
UP Commerce	500	240	155	75	85%
UP ICTF/Dolores	800	300	210	120	85%

3. Community Benefits

Community members have raised concerns about new locomotives being introduced at the high priority yards and railroads re-directing the old, dirty units to other railyards in the region, State, or country. This is unlikely given the mechanism the railroads are using to upgrade their fleets. To meet the performance standards under the commitments, we expect the railroads to upgrade many locomotives by repowering or replacing the existing large diesel engine in an existing locomotive with multiple smaller, cleaner engines or a single new engine with advanced controls. This means there is no old, dirty locomotive to route to other communities. With many of the railyard locomotives receiving public incentive funds, those incentive programs typically require a multi-year commitment to keep the locomotive tethered to a particular railyard, or a particular air basin, within California.

ARB staff expects that the railroads will target introduction of the newest, cleanest line-haul locomotives to provide interstate service between California and points east, while the cleanest yard locomotives will be operated at the priority railyards or within the region. We anticipate that communities across the State that are not near the priority railyards would receive about 15 percent of the benefits from the lower-emission locomotives brought in to meet the emission targets at the priority railyards.

G. OTHER ACTIONS

In addition to the proposed commitments, ARB will request that the railroads take certain other actions in support of the effort to reduce emissions and risk from these high priority railyards. These actions are discussed in the following sections.

1. Participate in Local Collaborative Efforts upon ARB Request

As previously indicated, during the consultative process, the public raised non-air quality concerns. Specifically, some community members identified issues near the railyards including lights, noise, and vibrations.

ARB has encouraged all agencies with the authority to address the community concerns both inside and outside the railyards to act. It is anticipated that a collaborative process including community leaders may be established to explore options for addressing such concerns. In the event that railyard-focused collaboratives are established, the railroads commit to participate in the process if requested by ARB.

2. Develop Emission Inventories for Three Other Priority Railyards

In addition to the four high-priority railyards that are the focus here, ARB has identified a second phase of railyards that should be further evaluated for potential action. The emissions of diesel PM and risks at these second-phase railyards are considerably less than the four high-priority yards, but still merit further attention. In response to these proposed commitments, some actions at the high-priority railyards are expected to have positive spillover benefits (e.g., low emission locomotives that travel between railyards will result in lower emissions at multiple facilities throughout the State.

In the cover letters transmitting the commitments for the four high priority yards, ARB will also ask the railroads to develop emission inventories for UP Roseville, UP Oakland, and BNSF Barstow Railyards in 2011. ARB will subsequently prepare health risk assessments that will inform the need for further actions. This information will be disseminated to the public as it becomes available and be used as the basis for determining the need for further action.

H. RECOMMENDATION

The staff proposes that the Board adopt a resolution approving the proposed diesel PM emission reduction commitments to reduce health risk at the high-priority railyards, and directing ARB staff to transmit those commitments to the railroads for acceptance and immediate implementation.

June 15, 2010

Appendix A

June 15, 2010

This Page Intentionally Left Blank

Basis for Proposed Commitments to Reduce Diesel Particulate Matter at the BNSF SAN BERNARDINO RAILYARD

This revised document explains the Air Resources Board (ARB or Board) staff's basis and rationale for the commitments we propose to request from BNSF Railway (Railroad) to further reduce emissions of diesel particulate matter (PM) at the San Bernardino Railyard. The purpose is to decrease the health risk from exposure to diesel PM at this high priority railyard to protect nearby communities, consistent with the Board's direction.

ARB staff independently assessed the potential for feasible emission reductions through the use of cleaner, cost-effective technology that is currently available or that we expect will become available over the next decade. The proposed commitments are based on the level of emission reductions likely to be achievable with the accelerated introduction of this technology. We also present ARB's estimate of the health risk reduction that would result from the Railroad's acceptance and implementation of the commitments.

1. What would the proposed commitments accomplish?

These commitments would require that the Railroad achieve the expected emission reductions from existing regulations and agreements, and that the Railroad take any additional actions needed to meet the diesel PM emission levels, regardless of any increases in activity or growth at the BNSF San Bernardino Railyard.

With these commitments, the remaining diesel PM emissions and health risk in 2015 would be 20 percent lower than under the existing regulations and agreements alone, and 50 percent lower by 2020.

The commitments would establish enforceable requirements, tracking mechanisms, and deadlines for BNSF Railway to reduce diesel PM emissions at the railyard 45 percent by 2011, increasing to a reduction of 85 percent by 2020 (relative to calendar year 2005 levels). In each benchmark year, the remaining emissions could not be exceeded despite any growth or increase in activity at the railyard, including growth in the number of containers moved. The higher the growth, the more actions the Railroad would need to take to reduce emissions.

In most cases, there is a high correlation between reducing diesel PM emissions and reducing health risk. Our analysis links the two to estimate the expected change in health risk in proportion to the change in emissions. This relationship can vary based on the location of the emission sources in relation to the people exposed. ARB will periodically assess and publish the expected changes in health risk in response to past actions implemented by the Railroad and future actions proposed by the Railroad to reduce emissions.

The commitments would provide transparency and require regular public updates on: the equipment operating in the yard, the Railroad's plans to upgrade each type of equipment, and the resulting changes in emissions and health risk.

- The Railroad would develop and submit emission inventories, air dispersion modeling, and emission reduction plans to ARB on a defined schedule.
- ARB staff would use these submittals to periodically update the health risk assessment for the railyard to reflect the new emission reductions and any changes in the location of the emission sources within the facility. ARB would provide updated estimates of the projected health risks through 2020, concurrent with the release of the draft emission reduction plans.
- ARB would publish all of these documents for public review and comment on a defined schedule.
- The Railroad and ARB would hold community meetings to seek public input on the draft emission reduction plans and the updated health risk assessment.

The commitments would provide independent ARB verification of locomotives operating in the railyard to determine the number of units at each emission control level and compare those counts to data submitted by the Railroad.

The commitments would require the Railroad to evaluate the emission reductions associated with operational changes (for example, moving truck gates and equipment operations to alternate locations within the facility). ARB staff would assess the impact of such changes on health risk.

The commitments would also add a new ambient air quality monitor for PM to provide an indication of air quality in the communities near the railyard.

If the Railroad did not deliver the required emission reductions on schedule, the commitments would require ARB staff to bring regulatory proposal(s) to the Board within four months of a final finding of non-compliance.

2. How did ARB staff develop the percent reduction in diesel PM emissions for the proposed commitments? What actions are reflected in the numbers?

Railyard-Specific Data on Emission Sources. We began by evaluating the number, activity, and control level of the specific emission sources operating at the BNSF San Bernardino Railyard, including:

- The interstate line haul locomotive fleet that serves the South Coast Air Basin and the railyard.
- The individual switch locomotives in the railyard.
- The individual cargo handling equipment in the railyard.
- The fleet of drayage trucks serving the railyard.

- The transport refrigeration units operated with drayage trucks or railcars in the railyard.

To project railyard emissions in future years, we used the equipment activity and controls, together with anticipated growth. ARB staff relied on a 1.5 percent per year increase in fuel use, which equates to a roughly 3 percent per year increase in containers, based on historic growth rates over the last 12 years.

Projected Emissions with Existing Program. We then evaluated how the existing program of regulations and agreements affects the kinds of equipment that will be operating and the emissions from that equipment.

We refer to different levels of emissions from locomotives based on emission standards set by the U.S. Environmental Protection Agency (U.S. EPA). The oldest locomotives (Pre-Tier 0) don't have emission controls. Tier 0 locomotives have modest NO_x controls, while Tier 1 locomotives have additional NO_x and PM controls. All new locomotive engines today meet at least Tier 2 emission standards to cut both pollutants. New Tier 3 locomotives will be available in the future with further PM controls, while advanced technology Tier 4 locomotives will significantly reduce NO_x and PM emissions.

The existing program numbers in this document reflect the benefits of the following rules and agreements to reduce diesel PM emissions and health risk from railyard operations:

- Adopted ARB regulations for drayage trucks, cargo equipment, transport refrigeration units, and cleaner fuel for intrastate locomotives.
- The 1998 ARB/Railroads Agreement to reduce fleet average emissions of nitrogen oxides (NO_x) from locomotives in the South Coast Air Basin to Tier 2 levels by 2010. The actions taken by the railroads to comply with these NO_x levels are providing additional PM reductions not mandated by the Agreement.
- The 2005 ARB/Railroads Agreement to reduce diesel PM emissions (which has an associated reduction in health risk) near railyards, through the use of idle reduction devices and cleaner fuels, as well as prevention of excess smoke from locomotives.
- Under the 2008 U.S. EPA rulemaking, when railroads remanufacture locomotives, these locomotives must meet a PM emission standard that is 50 percent lower than the previous level.

Table 1 shows the railyard emissions in 2005, and the declining emissions in 2010, 2015, and 2020 due to the benefits of the existing program. This table also shows the additional reductions attributable to the proposed commitments (beyond the existing program) in 2015 and 2020.

In Table 1 below, the estimated emission reductions for various technologies are preliminary and are subject to revision upon confirmation of actual emissions performance.

Table 1
BNSF San Bernardino Railyard:
Estimated Diesel PM Emissions by Equipment Type
 (tons per year)

Equipment Type	2005	2010	2015	2020
Emissions with Existing Program Only				
Freight Locomotives				
- Line Haul	6.0	4.5	4.2	3.9
- Switch	4.0	3.3	1.9	1.7
- Service/Testing	0.4	0.3	0.3	0.2
<i>Subtotal for Locomotives</i>	<i>10.4</i>	<i>8.1</i>	<i>6.4</i>	<i>5.8</i>
Cargo Equipment	3.0	1.5	0.6	0.3
Drayage Trucks	5.4	1.0	0.8	0.5
Transport Refrigeration Units	3.3	1.7	1.0	0.3
Maintenance/Stationary	0.1	0.1	0.1	0.1
<i>Subtotal for Other Equipment</i>	<i>11.8</i>	<i>4.3</i>	<i>2.5</i>	<i>1.2</i>
Total Tons	22.2	12.4	8.9	7.0
Reduction (%) from 2005		45%	60%	68%
Emissions with Existing Program Plus Proposed Commitments (Table 2 shows the potential sources of the additional emission reductions noted below)				
Additional Emission Reductions with Commitments			-1.8	-3.6
Tons Remaining	22.2	12.4	7.1	3.4
Reduction (%) from 2005	N/A	45%	68%	85%
Additional Reduction (%) Attributable to the Commitments in Future Years				
			20%	50%

Possible Paths to Further Reduce Emissions. Locomotives account for the majority of the remaining emissions after implementation of the existing program. In response, we focused our evaluation of the additional actions to further reduce emissions on locomotives. We believe the following accelerated upgrades and other actions could be implemented to achieve additional emission reductions:

- a. Between 2010 and 2015, replace switch and medium horsepower locomotives operating primarily within the railyard with cleaner Tier 3/generator-set (gen-set) technology or equivalent. BNSF has lined up federal and State co-funding for seven of these upgrades, with the units being introduced over the next two years.
- b. Between 2013 and 2020, upgrade the fleet of line-haul locomotives to Tier 3 emission levels on average (based on a combination of increasingly cleaner locomotives).
- c. Between 2014 and 2020, retrofit Tier 3 switch and medium-horsepower locomotives with diesel PM filters or equivalent technology, or replace them with Tier 4 locomotives, once those technologies become commercially available, or begin implementing operational changes.
- d. By 2020, incorporate 100 percent Tier 4 line haul locomotives into the fleet serving the Railyard, install electric infrastructure to support rail mounted gantry cranes and stationary transport refrigeration units. Also, implement operational changes that result in the relocation of yard tractors and the relocation or reduction in the hours of operation of transport refrigeration units.

ARB recognizes that there are other pathways than those noted above for the railroad to further reduce emissions.

Establishing the Performance Standard for Emission Reductions. We quantified the additional benefits of implementing the path described above, as shown in Table 2, and used the results to set the performance standards for the proposed commitments. As shown in Table 3, the performance standards are expressed as the percent emission reduction from 2005 levels to be achieved by each compliance deadline.

The Railroad would have to meet the emission reduction levels in Table 3, but would have the discretion to select the most efficient combination of actions and path to do so. The Railroad would define its detailed strategy to upgrade equipment and implement any operational changes in each emission reduction plan.

Table 2
BNSF San Bernardino Railyard:
Diesel PM Emission Reductions from Potential Actions Identified by ARB Staff
 (tons per year)

Potential Actions*	2015	2020
(a) Replace switch or medium horsepower locomotives with cleaner Tier 3/gen-set technology	-0.9	-0.6
(b) Upgrade line-haul locomotives to Tier 3 emission levels on average (included in existing program)	N/A	N/A
(c) Retrofit or replace Tier 3 switch and medium-horsepower locomotives with diesel PM filters or equivalent technology or begin implementing operational changes	-0.7	-0.7
(d) Incorporate 100 percent Tier 4 line haul locomotives, electrify cranes and transport refrigeration units, and implement operational changes	-0.2	-2.3
Total Additional Emission Reductions with Commitment	-1.8	-3.6

* Specific actions to be detailed by BNSF in the Railyard Emission Reduction Plan.

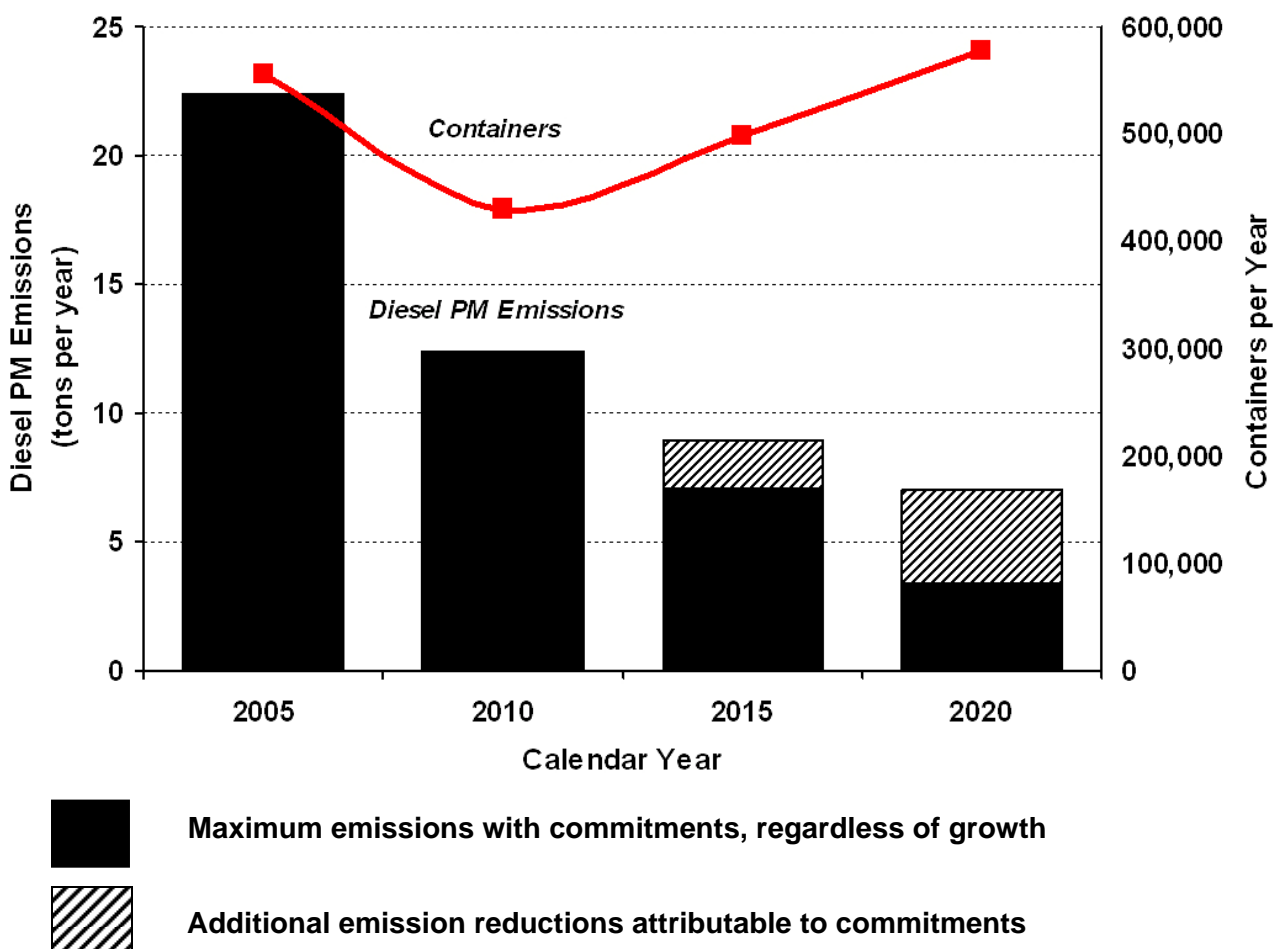
Table 3
BNSF San Bernardino Railyard:
Proposed Commitments to Reduce Diesel PM Emissions

Diesel PM Reductions from 2005 Baseline	Compliance Deadline
45 percent	December 31, 2011
50 percent	December 31, 2013
68 percent	December 31, 2015
73 percent	December 31, 2017
85 percent	December 31, 2020

3. How would growth affect the emissions levels to be achieved under the commitments?

The commitments would require that emissions be reduced to specific levels, regardless of growth. The greater the growth, the greater the reductions that the Railroad must achieve to meet those fixed levels. Figure 1 illustrates the decline in diesel PM emissions that would result under the existing program plus the commitments, while cargo grows up to the railyard's capacity of nearly 600,000 container lifts by 2020.

Figure 1
BNSF San Bernardino Railyard:
Projected Cargo Growth and Diesel PM Emissions
with Existing Program Plus Proposed Commitments



This cargo forecast is based on historical container lift volumes at the railyard, correlated with UP and BNSF national locomotive diesel fuel consumption. The container projections after 2010 rely on a three percent per year container growth rate for this yard, and the emissions estimates assume a corresponding 1.5 percent per year growth in fuel use.

4. How much would the proposed commitments reduce the potential diesel PM health risks near the railyard?

Compared to 2005 numbers, ARB staff estimates that the emission reductions required under the commitments would cut the maximum individual cancer risk 45 percent by 2010, rising to 85 percent by 2020, as shown in Table 4. The reductions would also significantly decrease the number of people exposed to an excess cancer risk above 10 in a million in 2010, as shown in Table 5.

Table 4
BNSF San Bernardino Railyard:
Estimated Maximum Individual Cancer Risk
(Excess Cancer Risk in a Million)

	Excess Cancer Risk			
	2005	2010	2015	2020
Existing Program	2,500	1,400	1,000	800
Existing Program + Commitments	N/A	1,400	800	400
Total Reduction (%) from 2005 Due to Existing Program + Commitments	N/A	45%	68%	85%

Table 5
BNSF San Bernardino Railyard:
Estimated Population Exposure to
Excess Cancer Risk Greater than 10 in a Million

	Number of People Exposed			
	2005	2010	2015	2020
Existing Program	350,000	240,000	150,000	135,000
Existing Program + Commitments	N/A	240,000	135,000	70,000
Total Reduction (%) from 2005 Due to Existing Program + Commitments	N/A	30%	61%	80%

5. How would ARB staff verify that the Railroad is achieving the diesel PM emission reductions required under the commitments?

To monitor compliance, ARB staff would thoroughly review the comprehensive inventories of equipment, activity, and emissions provided by the Railroad. We will also independently develop our own information sources to verify the data provided by the Railroad. ARB staff plans to: (1) conduct semi-annual railyard emission source inspections through 2015, (2) track locomotive activity through photographic databases, and (3) conduct unannounced field surveys outside the railyard to count the number, type, and emissions level of operating locomotives.

We will also cross-check the Railroad's inventory with data submitted to comply with ARB regulations for cargo equipment, drayage trucks, and transport refrigeration units; as well as the 1998 Locomotive NOx Fleet Average Agreement.

6. What alternatives to the proposed commitments did ARB staff evaluate?

Staff evaluated two primary alternatives to the proposed commitments -- ARB regulations for non-preempted locomotives and electrification of cargo equipment at the railyard. We are convinced that the proposed commitments would ensure significantly greater and faster reductions in diesel PM emissions and health risk than the regulatory alternatives described below.

ARB Regulation of Non-Preempted Locomotives

To evaluate the effectiveness of this approach in reducing emissions from locomotives at the BNSF San Bernardino Railyard, we considered the number of units that could be regulated. For the reasons described below, there are virtually no non-preempted locomotives that currently operate on a continuous basis at the San Bernardino Railyard or in the South Coast Air Basin. Thus, a regulation to reduce diesel PM emissions from non-preempted locomotives would yield little to no air quality benefits in this region.

Under the Federal Clean Air Act and U.S. EPA regulation, states are expressly preempted from regulating the emissions of newly built or remanufactured locomotives. U.S. EPA did suggest (Preamble to 2008 rulemaking) that states may have the authority to regulate locomotives that have exceeded their "useful lives," defined as 133 percent of the time to the first remanufacture. This would make line haul locomotives eligible for state regulation when they are roughly ten years old. Switch and medium horsepower locomotives typically last longer until the first full remanufacture (defined by U.S. EPA), making them eligible for state regulation when they are about 15 years old.

In response to the requirements of the 1998 Locomotive NOx Fleet Average Agreement in the South Coast Air Basin, BNSF has replaced non-preempted switch locomotives within the railyard with Tier 0 or better switch or medium horsepower locomotives. To

comply, BNSF is also using nearly all Tier 0, 1, and 2 interstate line haul locomotives (rather than non-preempted locomotives) for operations in the South Coast Air Basin.

ARB Regulation to Require Electrification of Cargo Handling Equipment

A second alternative would be an ARB regulation to require the electrification infrastructure needed to reduce railyard cargo handling equipment diesel PM emissions to near zero. ARB may have authority under state law to require electrification of railyard equipment. As discussed below, these emission reductions are technically feasible for several railyard applications, but are not cost-effective today, especially in comparison with reductions from locomotives.

At this time, staff believes it is more effective to focus limited resources on providing reductions of locomotive emissions, rather than diverting significant resources to the smaller remaining cargo handling equipment emissions. However, an investment in electrification infrastructure could provide cleaner power for transport refrigeration units operating at the railyard.

An existing ARB regulation for diesel cargo handling equipment used at ports and intermodal railyards requires this equipment to achieve the most stringent Tier 4 PM emissions standards by about 2015. Based on staff's analysis, the existing regulation will require railyard equipment to be about 90 percent cleaner than the equipment used in 2005.

By 2020, the diesel PM emissions from cargo handling equipment at the BNSF San Bernardino Railyard will be reduced to about 0.3 tons per year. The capital costs to install 26 electrified rail mounted gantry cranes would be \$5 million or more per unit (about \$150 million for all), plus electrification infrastructure costs (\$100 million), for a total cost of about \$250 million. The total electrification capital costs, divided by the remaining diesel crane and yard hostler NOx and diesel PM emissions within the railyard, would result in a cost-effectiveness of about \$400 per pound of emissions reduced.

The capital costs to replace 57 diesel yard hostlers with electric yard hostlers is about \$200,000 per unit (about \$11.5 million for all). The total electric yard tractor capital costs, divided by the remaining diesel yard tractor NOx and diesel PM emissions within the railyard, would result in a cost-effectiveness of about \$175 per pound of emissions reduced.

Locomotives are the largest remaining diesel PM emissions source within the railyard after 2015, representing up to 85 percent of remaining railyard diesel PM emissions. Locomotive NOx and PM emission reductions have a cost-effectiveness range of \$1 to \$10 per pound of NOx and PM emissions reduced.

ARB rulemakings must consider the cost and cost-effectiveness of new technologies over time, as well as the benefits. Accelerating or increasing the reductions that will be

achieved under the existing ARB regulation for cargo handling equipment by mandating electric equipment would provide a small increment of additional reductions at a high cost. We do not expect that ARB staff could recommend a regulatory action to mandate electrification of cargo handling equipment at this time due to the very poor cost-effectiveness.

Commitments for BNSF San Bernardino Railyard

The Air Resources Board (ARB) requests additional commitments from BNSF Railway (BNSF) to further reduce diesel particulate matter (PM) emissions at the BNSF San Bernardino Railyard between 2010 and 2020.

If BNSF fails to 1) achieve the Table 1 diesel PM emission reduction levels in 2011, 2013, 2015, 2017, or 2020; or 2) provide comprehensive or interim diesel PM emission inventories, air dispersion modeling, or emission reduction plans in compliance with the schedule in Table 2; ARB will initiate rulemakings as specified in Section 9. The commitments, and ARB oversight, will ensure that the BNSF San Bernardino Railyard diesel PM emission levels are achieved, verifiable, and enforceable.

Summary of Commitments for the BNSF San Bernardino Railyard

BNSF commits to do the following at this railyard:

- Reduce 2005 diesel PM emissions from railyard operations by at least 45 percent by 2011, increasing the reductions to at least 85 percent by 2020, with intermediate commitments for emission reductions in calendar years 2013, 2015, and 2017 to ensure steady progress. BNSF is implementing existing U.S. Environmental Protection Agency (U.S. EPA) and ARB regulations and agreements and commits to initiate any additional actions needed to meet the diesel PM emission reduction levels on the stated schedule. This commitment shall be met irrespective of any increase in activity or growth at the BNSF San Bernardino Railyard through 2020.
- As of 2005, BNSF had 14 older switch and medium horsepower locomotives assigned to the BNSF San Bernardino Railyard. Between acceptance of this commitment and December 31, 2015, BNSF plans to complete the replacement or repower of existing older switch and medium horsepower locomotives such that all switch and medium horsepower locomotives that operate within the railyard (more than 25 percent of annual hours or 25 percent of annual miles traveled or 25 percent of annual diesel fuel consumption) meet emission levels of 3.0 g/bhp-hr oxides of nitrogen (NOx) or less and emissions of 0.1 g/bhp-hr PM or less (over the U.S. EPA line-haul duty cycle).
- By December 31, 2011 and December 31, 2012, evaluate and provide recommendations, if any, for implementation of those changes in railyard operations that BNSF believes may significantly reduce railyard diesel PM emissions, or changes in the location of the railyard emission sources that ARB believes may reduce health risk, and that meet all other specified criteria articulated in Section 6.
- Beginning one month after BNSF's acceptance of these commitments, identify any non-preempted switch or medium horsepower locomotive that operates more

than five consecutive calendar days within the railyard and subsequently report this information to ARB with BNSF's annual reports pursuant to the 1998 Locomotive NOx Fleet Average Agreement.

- Prepare and submit railyard diesel PM emission inventories, air dispersion modeling analyses, and emission reduction plans in each year specified in Table 2.
- Work collaboratively with ARB to provide ongoing communication of railyard diesel PM emission reduction progress to the public through local community meetings and fact sheets.

As part of a broader initiative, BNSF commits to:

- Between 2011 and December 31, 2015, work collaboratively with ARB to develop and implement a formal demonstration program for advanced locomotive engines or aftertreatment devices, or other mutually agreed upon technologies to reduce emissions within the railyard. The objective of the locomotive demonstration program will be to support separate, but potentially parallel, efforts to achieve ARB verification of one or more advanced locomotive engines or aftertreatment devices for ultra low emitting switch and medium horsepower locomotives to achieve emission levels that are equal to or less than U.S. EPA Tier 4 NOx and/or PM emission standards.
- Loan two existing gen-set switch or medium horsepower locomotives annually through 2015 and provide any necessary technical assistance as BNSF's in-kind contribution to support the demonstration program. If the demonstration program is completed prior to 2015, BNSF's obligation to make these locomotives available would be satisfied as of the completion date.

ARB commits to:

- Install and operate one particulate matter (PM_{2.5}) ambient air quality monitor to provide an indication of air quality in the communities near the BNSF San Bernardino Railyard, or to secure a commitment from the South Coast Air Quality Management District to do so, consistent with a siting and operation protocol supported by ARB.
- Prepare periodic health risk assessments (HRAs) as indicated in Table 3 for the railyard using the comprehensive railyard diesel PM emission inventories and air dispersion modeling analyses submitted by BNSF. Also to prepare periodic estimates of future health risks, through 2020, following BNSF's submittal of draft and final emission reduction plans.

- Review the emission inventories, air dispersion modeling, and emission reduction plans submitted by BNSF to determine the sufficiency of the information provided and notify BNSF of any deficiencies.
- Determine compliance with the diesel PM emission reduction levels for each of the years specified in Table 1, based on the comprehensive inventories submitted by BNSF and independent ARB verification through inspections, field surveys, and other mechanisms.
- Monitor BNSF's compliance with the commitments in this document, determine if BNSF has met its obligations, and if BNSF has failed to meet the commitments in specified sections, submit rulemakings for locomotives and railyards to the Board within four months from the date of any final determination of non-compliance, as specified in Section 9.
- Support BNSF's efforts to evaluate options for operational changes with technical assistance to evaluate the potential impacts of such changes on health risk for the railyard.

1. What are the commitments to reduce diesel PM emissions?

BNSF shall meet the diesel PM emission reduction levels at the BNSF San Bernardino railyard by the specified compliance deadlines as set forth in Table 1 irrespective of receipt of public incentive funds. BNSF may, however, use incentive funds, if available, to achieve the emission reduction levels. This includes funds under Proposition 1B to replace, repower, or retrofit locomotives. To meet the 85 percent reduction level, ARB staff estimates that the railyard diesel PM emissions of 22.2 tons per year in 2005 will need to be reduced to about 3.4 tons per year by 2020.

Typical emission sources within the railyard affected by the diesel PM emission reduction levels in Table 1 include interstate line haul locomotives, switch and medium horsepower locomotives, drayage trucks, cargo handling equipment such as cranes and yard hostlers, transport refrigeration units operated with drayage trucks or railcars, and stationary engines and maintenance equipment. Passenger locomotive emissions are excluded from the calculation of railyard diesel PM emissions and reductions used to determine compliance with Table 1.

Table 1
Diesel PM Emission Reduction Levels and Schedule
For BNSF San Bernardino Railyard

Diesel PM Reductions from 2005 Baseline*	Compliance Deadline
45 percent	December 31, 2011
50 percent	December 31, 2013
68 percent	December 31, 2015
73 percent	December 31, 2017
85 percent	December 31, 2020

* If, after the effective date of this program, ARB reduces the stringency or extends the effective date of ARB regulations affecting non-locomotive diesel PM emission sources at railyards, or U.S. EPA reduces the stringency or extends the effective date of its locomotive PM emission standards, the diesel PM emission reduction levels will be adjusted by ARB accordingly.

ARB staff will use the emissions inventory reported in the 2005 Health Risk Assessment as the 2005 baseline, together with the comprehensive emission inventory submittals for subsequent years, to determine compliance with the Table 1 emission reduction levels. ARB staff will validate the inventory information through a thorough technical review of the data, ongoing ARB railyard inspections, ARB field surveys, and ARB tracking of locomotive and railyard operations.

2. Does growth change the commitments to reduce diesel PM emissions?

No. BNSF commits to reducing diesel PM emissions from the BNSF San Bernardino Railyard by at least 85 percent by 2020 and meeting the intermediate levels in Table 1, regardless of the potential increases in railyard activity levels, such as the number of container lifts.

3. How can BNSF reduce railyard diesel PM emissions 85 percent by 2020?

ARB's supporting analysis for feasible emission reductions at the BNSF San Bernardino Railyard is located in a separate document entitled, *Basis for Proposed Commitments to Reduce Diesel Particulate Matter at the BNSF San Bernardino Railyard (Basis for Proposed Commitments: June 2010)*. This *Basis for Proposed Commitments* document describes possible options that could be implemented to achieve the Table 1 diesel PM emission reduction levels.

In 2005, the railyard generated an estimated 22.2 tons per year of diesel PM emissions from freight operations. ARB staff estimates that existing U.S. EPA and ARB regulations and agreements will reduce diesel PM emissions at the railyard down to 7.0 tons per year by 2020 (a 68 percent reduction). ARB staff estimates that BNSF can

further cut the railyard diesel PM emissions by 3.6 tons per year by 2020 (achieving an 85 percent reduction compared to 2005 levels).

4. What are the railroad commitments to prepare and submit emission inventories, air dispersion modeling, and emission reduction plans? What are the ARB commitments to publicly release the railroad documents and health risk assessments?

Table 2 shows the schedule for BNSF to submit the railyard diesel PM emission inventories, air dispersion modeling, and draft and final emission reduction plans. Table 3 identifies the dates by which ARB shall release the railyard diesel PM emission inventories, air dispersion modeling, health risk assessments, and the emission reduction plans for public review.

**Table 2
BNSF San Bernardino Railyard
Schedule for BNSF Submittal of Documents:
Emission Inventories, Air Dispersion Modeling,
and Emission Reduction Plans**

Railyard Operations Year	Emission Inventory^a	Air Dispersion Modeling	Draft Emission Reduction Plan	Final Emission Reduction Plan
2009	Sep 30, 2010(I)	-----	Oct 15, 2010	Dec 31, 2010
2010	Apr 1, 2011 (I)	-----	-----	-----
2011	Apr 1, 2012 (C)	Jun 1, 2012	Sep 1, 2012	Dec 31, 2012
2012	Apr 1, 2013 (I)	-----	-----	-----
2013	Apr 1, 2014 (C)	Jun 1, 2014	Sep 1, 2014	Dec 31, 2014
2014	Apr 1, 2015 (I)	-----	-----	-----
2015	Apr 1, 2016 (C)	Jun 1, 2016	Sep 1, 2016	Dec 31, 2016
2016	Apr 1, 2017 (I)	-----	-----	-----
2017	Apr 1, 2018 (C)	Jun 1, 2018	Sep 1, 2018	Dec 31, 2018
2018	Apr 1, 2019 (I)	-----	-----	-----
2019	Apr 1, 2020 (I)	-----	-----	-----
2020	Apr 1, 2021 (C)	-----	-----	-----

^a (C) = Comprehensive Emission Inventory. (I) = Interim Emission Inventory.

Table 3
Schedule for ARB Release of Documents:
Emission Inventories, Air Dispersion Modeling,
ARB Health Risk Assessments, and Emission Reduction Plans

Railyard Operations Year	Railroad Emission Inventory^a	Railroad Air Dispersion Modeling	ARB Health Risk Assessment	Railroad Draft Emission Reduction Plan^b	Railroad Final Emission Reduction Plan^b
2009	Oct 15, 2010 (I)	-----	Nov 15, 2010 ^c	Nov 1, 2010	Jan 15, 2011
2010	Apr 15, 2011(I)	-----	-----	-----	-----
2011	Apr 15, 2012 (C)	Jun 15, 2012	Oct 1, 2012	Oct 1, 2012	Jan 15, 2013
2012	Apr 15, 2013 (I)	-----	-----	-----	-----
2013	Apr 15, 2014 (C)	Jun 15, 2014	Oct 1, 2014	Oct 1, 2014	Jan 15, 2015
2014	Apr 15, 2015 (I)	-----	-----	-----	-----
2015	Apr 15, 2016 (C)	Jun 15, 2016	Oct 1, 2016	Oct 1, 2016	Jan 15, 2017
2016	Apr 15, 2017 (I)	-----	-----	-----	-----
2017	Apr 15, 2018 (C)	Jun 15, 2018	Oct 1, 2018	Oct 1, 2018	Jan 15, 2019
2018	Apr 15, 2019 (I)	-----	-----	-----	-----
2019	Apr 15, 2020 (I)	-----	-----	-----	-----
2020	Apr 15, 2021 (C)	-----	-----	-----	-----

^a (C) = Comprehensive Emission Inventory. (I) = Interim Emission Inventory.

^b Following submittal of the draft and final emission reduction plans, ARB staff will provide a brief supplemental document that estimates the associated health risk for future compliance years.

^c ARB will estimate the health risk for the 2009 calendar year based on the 2009 interim inventory and the 2005 Health Risk Assessment data.

a. Railyard Diesel PM Emission Inventories**i. Comprehensive Diesel PM Emission Inventories**

BNSF commits to prepare the comprehensive diesel PM emission inventories for calendar years 2011, 2013, 2015, 2017, and 2020. BNSF shall prepare each comprehensive diesel PM emission inventory for the railyard in accordance with *ARB Railyard Emission Inventory Methodology* (2006) or its subsequent revisions, using data for the whole of the preceding calendar year. The comprehensive diesel PM emission inventories will include, to the extent reasonably available, detailed activity information such as locomotive event recorder data, hours of operation for cargo handling equipment and transport refrigeration units, and drayage truck time in operation within the railyard. The comprehensive inventory will also identify activity and growth projections through 2020, and the basis for those projections.

ii. Interim Diesel PM Emission Inventories

BNSF commits to prepare interim diesel PM emission inventories for the railyard for calendar years 2009, 2010, 2012, 2014, 2016, 2018, and 2019, using data for the whole of the calendar year. The interim emission inventories will identify and utilize updates on locomotive usage, other equipment changes, and activity levels (e.g., number of lifts, drayage truck activities, locomotive shop releases, if applicable) to quantify changes to the last comprehensive diesel PM emission inventory. ARB staff will use the interim emission inventories to consider if there are any potential issues with BNSF continuing to make sufficient progress in order to meet the railyard diesel PM emission levels specified in Table 1.

b. Air Dispersion Modeling

BNSF commits to prepare air dispersion modeling based on the schedule in Table 2. Air dispersion modeling is to be performed in accordance with *ARB Health Risk Assessment Guidance for Railyard and Intermodal Facilities* (2006) or its subsequent revisions. BNSF also commits to provide source apportionment data for receptors defined in the air dispersion model and a source contribution analysis. BNSF also commits to analyze the impacts on the modeled air concentrations from significant updates to the modeling methodology, such as the current version of AERMOD model from U.S. EPA, the availability of updated meteorological data, or any other modeling parameters or inputs which could substantively affect the modeling estimations.

c. Health Risk Assessments

ARB staff commits to prepare health risk assessments using the comprehensive diesel PM emission inventories and air dispersion modeling results. The risk assessments are to be prepared in accordance with *ARB Health Risk Assessment Guidance for Railyard and Intermodal Facilities* (2006) or its subsequent revisions. The updated risk assessments will provide detailed information comparing excess cancer risks and non-

cancer health effects with the estimates in the 2005 Health Risk Assessment. ARB staff will compare 2005 railyard emissions and associated health effects with risk assessment results for later years using the same or similar methodology, and also include a separate analysis for any subsequent changes in future year methodologies. ARB staff shall complete the health risk assessment reports for the railyard according to the schedule provided in Table 3.

Following BNSF's submittal of the draft and final emission reduction plans, ARB also commits to provide a brief supplemental document to the public that estimates the associated health risk for future compliance years. If ARB's health risk estimates for the draft emission reduction plan do not project that health risk will continue to be reduced, ARB shall include that information in its written comments to BNSF on BNSF's draft emission reduction plan.

d. Emission Reduction Plans

BNSF commits to submit draft and final emission reduction plans according to the schedule in Table 2. The emission reduction plans are to be based on the most recent railyard diesel PM emission inventories. The purpose of the plans is for BNSF to detail the actions it will take to reduce railyard emissions down to the levels shown in Table 1 for the next compliance deadline, and the range of potential actions it intends to pursue for subsequent compliance deadlines. The emission reductions plans will document existing and projected railyard diesel PM emissions through 2020 (accounting for growth), describe changes in source category activities, identify existing and future actions to cut emissions and provide specific implementation schedules for these actions.

e. ARB Review

i. Diesel PM Emission Inventories and Air Dispersion Modeling

Within 20 calendar days of receipt of a railyard comprehensive or interim diesel PM emission inventory, or air dispersion modeling, ARB shall review the submission for completeness and accuracy and will notify BNSF of its findings. If ARB determines that the submission is not complete and accurate, it will, within the above 20-day time period, notify BNSF in writing of any deficiency and the reasons therefore, and make such written notification publicly available.

Upon receipt of a notice of deficiency from ARB, BNSF will within 15 calendar days correct the deficiencies and resubmit the submission to ARB. Within 10 calendar days, ARB will notify BNSF as to whether the submission is complete and accurate. If not, ARB will make a preliminary determination of non-compliance following the procedures set forth in Section 9.b.ii below.

ii. Emission Reduction Plans

Within 30 calendar days of receipt of a draft railyard emission reduction plan, ARB shall review the plan for completeness and accuracy and shall notify BNSF of its findings. If ARB determines that the draft plan is not complete and accurate, or that the draft plan, in the ARB staff's opinion, cannot reasonably achieve the diesel PM reductions required by the next compliance deadline as set forth in Table 1, ARB shall, within the above 30-day time period, notify BNSF in writing of any deficiency and the reasons therefor, and make such written notification publicly available.

Within 30 calendar days of receipt of the final plan, ARB shall notify BNSF as to whether the plan is complete, accurate, and can reasonably achieve the diesel PM emission reductions required by the next compliance deadline as set forth in Table 1, and make sure such written notification publicly available. If not, ARB shall make a preliminary determination of non-compliance as set forth in Section 9.b.ii below. Subsequently, if the administrative appeals panel fully or partially affirms the finding of ARB staff, BNSF will have 30 calendar days to submit to ARB a revised final plan for the next compliance deadline to cure any deficiencies upheld by the panel. If BNSF fails to submit a revised final plan or if ARB staff determines the revised final plan is still deficient, ARB may immediately commence the rulemaking process outlined in the opening paragraphs of Section 9.

f. Commitment to Follow Through on Final Emission Reduction Plans

BNSF shall take the necessary actions identified in the final emission reduction plan in accordance with the plan's implementation schedules to meet the diesel PM emission reduction levels for the next compliance deadline as set forth in Table 1. If BNSF determines that alternative actions not identified in its most recent plan should be implemented to achieve the emission reduction levels for the next compliance deadline, and the alternative actions materially alter the pathway for achieving the emission reductions in the plan, BNSF will within 15 days of its determination notify ARB of the alternative actions and the reasons for the changes.

5. What is the commitment for public meetings and outreach?

BNSF commits to hold a public meeting no later than December 15 of 2010, 2012, 2014, 2016, and 2018 with members of the surrounding community following the release of the most current ARB health risk assessment and BNSF draft emission reduction plan as specified in the Table 3 schedule. At the public meeting, BNSF and ARB staff will seek public input on the available documents prior to ARB's final determination on the emission reduction plan.

6. What is the commitment to evaluate options for operational changes?

BNSF commits to evaluate and provide recommendations, if any, for the implementation of those changes in railyard operations that BNSF believes may significantly reduce railyard diesel PM emissions or changes in the location of the railyard emission sources that ARB believes may reduce health risk. BNSF shall evaluate potential changes at the BNSF San Bernardino Railyard according to the following schedule, including:

- By December 31, 2011:
 - Electric infrastructure to support operation of rail mounted gantry cranes and stationary transport refrigeration units.
- By December 31, 2012:
 - Relocation of the truck gate (assessment has been prepared as part of the BNSF San Bernardino Railyard mitigation plan process in 2008).
 - Relocation of diesel-fueled yard tractors.
 - Relocation and reduction in hours of operation of diesel-fueled transport refrigeration units.

BNSF will conduct this one-time operational review considering, among other things, the potential diesel PM emissions reductions that could be achieved, the technical feasibility of such actions, the operational impacts on the railyard's throughput velocity and fluidity, safety, the availability of land and access, the costs and cost-effectiveness of such actions, and any railyard-specific factors at the BNSF San Bernardino Railyard. Each operational option shall be analyzed, and recommendations, if any, for implementation will be completed as soon as possible for this railyard, but in any case not later than December 31, 2012. BNSF shall provide the assessment and any recommendations for implementation of operational changes to ARB, and ARB will make them publicly available.

ARB commits to support these efforts with technical assistance and to evaluate the impacts of each potential operational change on the maximum individual cancer risk for the railyard. ARB will make the results of this evaluation publicly available.

7. Will BNSF be able to access incentive funding to support these commitments?

BNSF, to the extent feasible, will compete for federal, state, local, and private incentive funding to supplement its capital expenditures, and to accelerate further diesel PM and NOx emission reductions at this railyard.

Consistent with State law and Board policies, ARB staff will support efforts by BNSF to seek a mix of federal, state, and local incentive funding to accelerate BNSF's ability to meet the diesel PM emission reduction levels for the railyard.

8. What are the provisions for BNSF and ARB to meet and confer by 2018?

BNSF agrees to meet and confer with ARB by 2018 to evaluate and explore opportunities for further diesel PM emission reductions by 2020 and beyond.

9. What are the mechanisms for ARB to enforce these commitments? What would trigger ARB to initiate regulatory action?

Upon a final determination of the ARB Executive Officer, or if appealed, of the administrative appeals panel that BNSF has failed to meet its commitments set forth herein at Sections 1, 2, 4, 5, and 6, ARB commits to submit to the Board within four months from the date of the determined failure the following locomotive and railyard rulemakings:

- A regulation of switch and medium horsepower locomotives that are not preempted under federal law (e.g., locomotives that primarily operate in California and that were manufactured prior to 1973 or that exceed 133 percent of their useful life since original manufacture or last remanufacture, whichever is later).
- A designated railyard regulation that requires risk reduction audits and plans to achieve targeted emission reduction levels.

Nothing in this agreement precludes ARB from developing regulations within its authority as required to achieve the goals of the State Implementation Plan and Climate Change Scoping Plan.

ARB will also consider the following actions:

- Pursue federal legislation to expand ARB authority to adopt regulations for in-use locomotives.
- Petition U.S. EPA to strengthen existing federal locomotive regulations.

ARB is designated as the agency responsible for enforcement of the BNSF commitments. The enforcement authorities specified herein may only be exercised by ARB. BNSF may, at any time, initiate informal consultations with ARB to identify and resolve concerns or other issues regarding compliance with its commitments herein.

In determining whether BNSF has met its commitments, the parties agree to the following exclusive process.

a. ARB Verification of Railyard Diesel PM Emission Reduction Levels

To determine whether BNSF has met the BNSF San Bernardino Railyard diesel PM emission reduction levels specified in Table 1, ARB will review the comprehensive emission inventories and interim emission inventories in relation to information collected by ARB staff. ARB will conduct semi-annual railyard inspections, which will also be augmented by ARB photographic tracking and field surveys of railyard switch and

medium horsepower locomotives. In addition, ARB staff will use the annual BNSF locomotive NOx fleet average agreement submittals to verify the number and tier of interstate line haul locomotives operating within the South Coast Air Basin. ARB staff will also randomly conduct inspections of BNSF interstate line haul locomotives entering and exiting the South Coast Air Basin to help assess compliance with the Table 1 diesel PM emission reduction levels.

b. Preliminary Determination of Non-Compliance

i. Failure to Comply with the Railyard Diesel PM Emission Reduction Levels

Within 30 working days of receipt of the comprehensive railyard diesel PM emission inventories, ARB shall make a written preliminary determination notifying BNSF as to whether BNSF met or failed to meet the diesel PM emission reduction levels specified in Table 1 for the previous year. If ARB determines that BNSF has failed to meet its emission reduction levels, ARB shall within the same 30 working days provide BNSF with its written preliminary determination, which will set forth the reasons for its findings. ARB will, with the greatest precision possible based on data submitted by BNSF, calculate the difference between the railyard diesel PM emission reduction level reported by BNSF and the levels required in Table 1. ARB and BNSF shall use their respective best efforts to expedite submission and review of the reports. The time periods provided for ARB to make a preliminary compliance determination may be extended by written agreement between ARB and BNSF.

Within 15 calendar days of receipt of ARB's preliminary determination that BNSF has failed to meet the emission reduction levels, BNSF may request to meet and confer with ARB and/or provide ARB with such information and analysis as BNSF believes appropriate to demonstrate its compliance with the Table 1 diesel PM emission reduction levels. If a meet and confer is requested, the parties shall meet within 10 working days of the request. Within 15 calendar days after receipt of BNSF's response or after meeting and conferring with ARB, ARB shall review and consider the information provided by BNSF and make a final determination, in writing, as to whether BNSF has failed to meet the Table 1 diesel PM emission reduction levels. ARB will make such final written determination publicly available.

For the Table 1 compliance deadlines in 2011, 2013, 2015, 2017, or 2020, if ARB staff determines that BNSF missed its percentage target for the BNSF San Bernardino Railyard by not more than 2 percent (e.g., reaching a 53 percent compliance level where 55 percent was required), BNSF will be given the opportunity to cure this deficiency by the next calendar year, provided it demonstrates the new compliance level by conducting a full inventory analysis. Failure to conduct the analysis or failure to cure the deficiency in the following calendar year shall constitute a failure to meet the appropriate targets in Table 1.

ii. Failure to Comply with Other Railyard Commitments

If ARB makes a preliminary determination that BNSF has failed to meet any other of its commitments set forth herein, ARB shall notify BNSF, in writing, of its findings. Within 15 calendar days, BNSF may request to meet and confer with ARB and/or provide ARB with such information and analysis as BNSF believes appropriate to demonstrate its compliance. If a meet and confer is requested, the parties shall meet within 10 working days of the request.

Within 15 calendar days after receipt of BNSF's response or after meeting and conferring with ARB, ARB will review and consider the information provided by BNSF and make a final determination, in writing, as to whether BNSF has failed to meet any of its non-emission reduction-related commitments. ARB will make such final written determination publicly available.

c. Final Determination by ARB of Non-Compliance

A final determination of non-compliance shall specifically identify the reasons why ARB has found BNSF not to be in compliance with agreed-upon commitments. A final determination of non-compliance for failure to meet the emission reduction levels set forth in Table 1 will provide ARB's final calculations of the emission reduction levels of the BNSF San Bernardino Railyard. Findings of BNSF's failure to meet other commitments shall set forth in detail ARB's determination of why the commitments have not been met. ARB will publicly post its final determination notice of non-compliance on its website and make available such notice on a list serve that will be established for notifying the public about compliance with the railyard emission reduction commitments.

d. Dispute Resolution

In the event of a dispute concerning an ARB final determination of non-compliance or any of the parties' respective commitments, the party asserting the dispute shall provide notice to the other party and set forth the issues underlying the dispute. The parties shall meet and confer regarding the identified issues within 15 working days after receipt of notification, and if they cannot reach agreement within 15 working days after such consultation, shall submit their respective positions to an administrative appeals panel, which shall consider the matter as expeditiously as possible. Except for confidential trade secret information, ARB will publicly post on its website and make available by the aforementioned list serve all documents submitted by the parties' to the administrative hearing panel. ARB will also post and make available a notice that interested persons may submit written statements of position and supporting documentation to the administrative appeals panel that will be made part of the record of the hearing.

i. Composition of Administrative Appeals Panel

The panel shall be comprised of one member selected by ARB, one member selected by BNSF, and a third member selected by the initial two members from a list of five or more persons that the parties shall agree to within 120 calendar days of the parties' exchange of commitment letters. The list shall include persons qualified to hear matters that are likely to be heard by the dispute resolution panel. From the list of five or more persons, the parties shall select the person most readily available to hear the matter within 30 calendar days (or as soon thereafter as possible) from the date that the person is contacted by either the ARB or BNSF panel member. If no person from the previously selected list is available to hear the matter within 45 calendar days of being notified, the ARB and BNSF panel members shall contact an arbitration referral service, identify the matter(s) at issue and accept from the service a list of five persons who are qualified to hear the matter(s) at issue and are readily available. The two panel members selected by the parties may mutually agree on one of the five persons to serve on the panel, but if they cannot agree, each panel member will alternatively strike one person from the list until just one person remains. The two panel members selected by the parties will serve as technical advisors to the third panel member, who shall serve as the presiding member of the panel and who shall be solely responsible for making the final decision on behalf of the panel.

ii. Administrative Appeals Panel Process

Unless otherwise determined that the matter(s) at issue require oral testimony, the panel shall make its decision based upon written submission of the parties. If a hearing to take testimony is determined to be necessary, the hearing shall be public. The panel shall determine the time and place of the hearing, and will set forth the procedures to be followed at the hearing. The panel will take all precautions necessary to preserve the confidentiality of trade secret or other confidential information, and will consider such evidence in a closed meeting.

iii. Public Comments to Administrative Appeals Panel

Interested persons may submit written statements and supporting documentation to the panel regarding the matter(s) at issue before the matter(s) are taken under submission, however, only ARB and BNSF shall be parties to the dispute resolution process.

iv. Final Decision by Administrative Appeals Panel

The panel presiding member shall issue his or her final decision on behalf of the panel within 30 calendar days from the date that the matter is submitted to the panel. While either party receiving an adverse decision from the panel may seek expedited review of the decision in the Superior Court for the County of Sacramento, if the panel's decision upholds the Executive Officer's final determination of non-compliance, ARB may immediately commence the rulemaking process outlined in the opening paragraphs of

this section. If judicial review is not sought, then the decision of the panel will be binding on the parties.

Each party to the proceedings outlined above will bear its own costs and fees, with the exception that the parties agree to split all costs and fees arising from the employment of the third panel member.

June 15, 2010

Appendix B

June 15, 2010

This Page Intentionally Left Blank

**Basis for Proposed Commitments
to Reduce Diesel Particulate Matter at the
BNSF HOBART RAILYARD**

This revised document explains the Air Resources Board (ARB or Board) staff's basis and rationale for the commitments we propose to request from BNSF Railway (Railroad) to further reduce emissions of diesel particulate matter (PM) at the Hobart Railyard. The purpose is to decrease the health risk from exposure to diesel PM at this high priority railyard to protect nearby communities, consistent with the Board's direction.

ARB staff independently assessed the potential for feasible emission reductions through the use of cleaner, cost-effective technology that is currently available or that we expect will become available over the next decade. The proposed commitments are based on the level of emission reductions likely to be achievable with the accelerated introduction of this technology. We also present ARB's estimate of the health risk reduction that would result from the Railroad's acceptance and implementation of the commitments.

1. What would the proposed commitments accomplish?

These commitments would require that the Railroad achieve the expected emission reductions from existing regulations and agreements, and that the Railroad take any additional actions needed to meet the diesel PM emission levels, regardless of any increases in activity or growth at the BNSF Hobart Railyard.

With these commitments, the remaining diesel PM emissions and health risk in 2015 would be 20 percent lower than under the existing regulations and agreements alone, and 37 percent lower by 2020.

The commitments would establish enforceable requirements, tracking mechanisms, and deadlines for BNSF Railroad to reduce diesel PM emissions at the railyard 55 percent by 2011, increasing to a reduction of 85 percent by 2020 (relative to calendar year 2005 levels). In each benchmark year, the remaining emissions could not be exceeded despite any growth or increase in activity at the railyard, including growth in the number of containers moved. The higher the growth, the more actions the Railroad would need to take to reduce emissions.

In most cases, there is a high correlation between reducing diesel PM emissions and reducing health risk. Our analysis links the two to estimate the expected change in health risk in proportion to the change in emissions. This relationship can vary based on the location of the emission sources in relation to the people exposed. ARB will periodically assess and publish the expected changes in health risk in response to past actions implemented by the Railroad and future actions proposed by the Railroad to reduce emissions.

The commitments would provide transparency and require regular public updates on: the equipment operating in the yard, the Railroad's plans to upgrade each type of equipment, and the resulting changes in emissions and health risk.

- The Railroad would develop and submit emission inventories, air dispersion modeling, and emission reduction plans to ARB on a defined schedule.
- ARB staff would use these submittals to periodically update the health risk assessment for the railyard to reflect the new emission reductions and any changes in the location of the emission sources within the facility. ARB would provide updated estimates of the projected health risks through 2020, concurrent with the release of the draft emission reduction plans.
- ARB would publish all of these documents for public review and comment on a defined schedule.
- The Railroad and ARB would hold community meetings to seek public input on the draft emission reduction plans and the updated health risk assessments.

The commitments would provide independent ARB verification of locomotives operating in the railyard to determine the number of units at each emission control level and compare those counts to data submitted by the Railroad.

The commitments would require the Railroad to evaluate the emission reductions associated with operational changes (for example, moving truck gates and equipment operations to alternate locations within the facility). ARB staff would assess the impact of such changes on health risk.

The commitments would also add a new ambient air quality monitor for PM to provide an indication of air quality in the communities near the railyard.

If the Railroad did not deliver the required emission reductions on schedule, the commitments would require ARB staff to bring regulatory proposal(s) to the Board within four months of a final finding of non-compliance.

2. How did ARB staff develop the percent reduction in diesel PM emissions for the proposed commitments? What actions are reflected in the numbers?

Railyard-Specific Data on Emission Sources. We began by evaluating the number, activity, and control level of the specific emission sources operating at the BNSF Hobart Railyard, including:

- The interstate line haul locomotive fleet that serves the South Coast Air Basin and the railyard.
- The individual switch locomotives in the railyard.
- The individual cargo handling equipment in the railyard.
- The fleet of drayage trucks serving the railyard.

- The transport refrigeration units operated with drayage trucks or railcars in the railyard.

To project railyard emissions in future years, we used the equipment activity and controls, together with anticipated growth. ARB staff relied on a 1.5 percent per year increase in fuel use, which equates to a roughly 3 percent per year increase in containers, based on historic growth rates over the last 12 years.

Projected Emissions with Existing Program. We then evaluated how the existing program of regulations and agreements affects the kinds of equipment that will be operating and the emissions from that equipment.

We refer to different levels of emissions from locomotives based on emission standards set by the U.S. Environmental Protection Agency (U.S. EPA). The oldest locomotives (Pre-Tier 0) don't have emission controls. Tier 0 locomotives have modest NO_x controls, while Tier 1 locomotives have additional NO_x and PM controls. All new locomotive engines today meet at least Tier 2 emission standards to cut both pollutants. New Tier 3 locomotives will be available in the future with further PM controls, while advanced technology Tier 4 locomotives will significantly reduce NO_x and PM emissions.

The existing program numbers in this document reflect the benefits of the following rules and agreements to reduce diesel PM emissions and health risk from railyard operations:

- Adopted ARB regulations for drayage trucks, cargo equipment, transport refrigeration units, and cleaner fuel for intrastate locomotives.
- The 1998 ARB/Railroads Agreement to reduce fleet average emissions of nitrogen oxides (NO_x) from locomotives in the South Coast Air Basin to Tier 2 levels by 2010. The actions taken by the railroads to comply with these NO_x levels are providing additional PM reductions not mandated by the Agreement.
- The 2005 ARB/Railroads Agreement to reduce diesel PM emissions, (which has an associated reduction in health risk) near railyards, through the use of idle reduction devices and cleaner fuels, as well as prevention of excess smoke from locomotives.
- Under the 2008 U.S. EPA rulemaking, when railroads remanufacture locomotives, these locomotives must meet a PM emission standard that is 50 percent lower than the previous level.

Table 1 shows the railyard emissions in 2005, and the declining emissions in 2010, 2015, and 2020 due to the benefits of the existing program. This table also shows the additional reductions attributable to the proposed commitments (beyond the existing program) in 2015 and 2020.

In Table 1 below, the estimated emission reductions for various technologies are preliminary and are subject to revision upon confirmation of actual emissions performance.

Table 1
BNSF Hobart Railyard:
Diesel PM Emission Reductions by Equipment Type
 (tons per year)

Equipment Type	2005	2010	2015	2020
Emissions with Existing Program Only				
Freight Locomotives				
- Line Haul	3.2	2.4	2.2	2.1
- Switch	2.2	2.2	1.7	1.6
- Service/Testing	0	0	0	0
<i>Subtotal for Locomotives</i>	<i>5.4</i>	<i>4.6</i>	<i>3.9</i>	<i>3.7</i>
Cargo Equipment	5.9	2.5	1.2	0.6
Drayage Trucks	10.7	2.1	1.6	1.1
Transport Refrigeration Units	2.1	1.0	0.6	0.2
Maintenance/Stationary	0.1	0.1	0.1	0.1
<i>Subtotal for Other Equipment</i>	<i>18.8</i>	<i>5.7</i>	<i>3.5</i>	<i>2.0</i>
Total Tons	24.2	10.3	7.4	5.7
Reduction (%) from 2005		57%	70%	76%
Emissions with Existing Program Plus Proposed Commitments (Table 2 shows the potential sources of the additional emission reductions noted below)				
Additional Emission Reductions with Commitments			-1.5	-2.1
Tons Remaining	24.2	10.3	5.9	3.6
Reduction (%) from 2005	N/A	57%	76%	85%
Additional Reduction (%) Attributable to the Commitments in Future Years			20%	37%

Note: BNSF recently shifted all operations at BNSF Commerce Eastern Railyard, which was closed 2008, to the BNSF Hobart Railyard which resulted in a diesel PM emission increase at the Hobart Railyard. BNSF would absorb all incremental diesel PM emission increases resulting from the Commerce Eastern Railyard operational shift.

Possible Paths to Further Reduce Emissions. Locomotives account for the majority of the remaining emissions after implementation of the existing program. In response, we focused our evaluation of the additional actions to further reduce emissions on locomotives. We believe the following accelerated upgrades and other actions could be implemented to achieve additional emission reductions:

- e. Between 2010 and 2015, replace switch and medium horsepower locomotives operating primarily within the railyard with cleaner Tier 3/generator-set (gen-set) technology or equivalent. BNSF has lined up federal and State co-funding for seven of these upgrades, with the units being introduced over the next two years.
- f. Between 2013 and 2020, upgrade the fleet of line-haul locomotives to Tier 3 emission levels on average (based on a combination of increasingly cleaner locomotives).
- g. Between 2014 and 2020, retrofit Tier 3 switch and medium-horsepower locomotives with diesel PM filters or equivalent technology, or replace them with Tier 4 locomotives, once those technologies become commercially available, or begin implementing operational changes.
- h. By 2020, accelerate Tier 4 line haul locomotives into the fleet serving the Railyard, install electric infrastructure to support rail mounted gantry cranes and stationary transport refrigeration units. Also, relocate the truck gate, and/or install an automated gate system, and/or install a bridge to provide access for trucks to the Railyard.

ARB recognizes that there are other pathways than those noted above for the railroad to further reduce emissions.

Establishing the Performance Standard for Emission Reductions. We quantified the additional benefits of implementing the path described above, as shown in Table 2, and used the results to set the performance standards for the proposed commitments. As shown in Table 3, the performance standards are expressed as the percent emission reduction from 2005 levels to be achieved by each compliance deadline.

The Railroad would have to meet the emission reduction levels in Table 3, but would have the discretion to select the most efficient combination of actions and path to do so. The Railroad would define its detailed strategy to upgrade equipment and implement any operational changes in each emission reduction plan.

Table 2
BNSF Hobart Railyard:
Diesel PM Emission Reductions from Potential Actions Identified by ARB Staff
 (tons per year)

Potential Actions*	2015	2020
(a) Replace switch or medium horsepower locomotives with cleaner Tier 3/gen-set technology	-1.1	-1.0
(b) Upgrade line-haul locomotives to Tier 3 emission levels on average (included in existing program)	N/A	N/A
(c) Retrofit or replace Tier 3 switch and medium-horsepower locomotives with diesel PM filters or equivalent technology or begin implementing operational changes	-0.4	-0.4
(d) Accelerate Tier 4 line haul locomotives, and electrify cranes and transport refrigeration units, and implement operational changes	0	-0.7
Additional Emission Reductions with Commitments	-1.5	-2.1

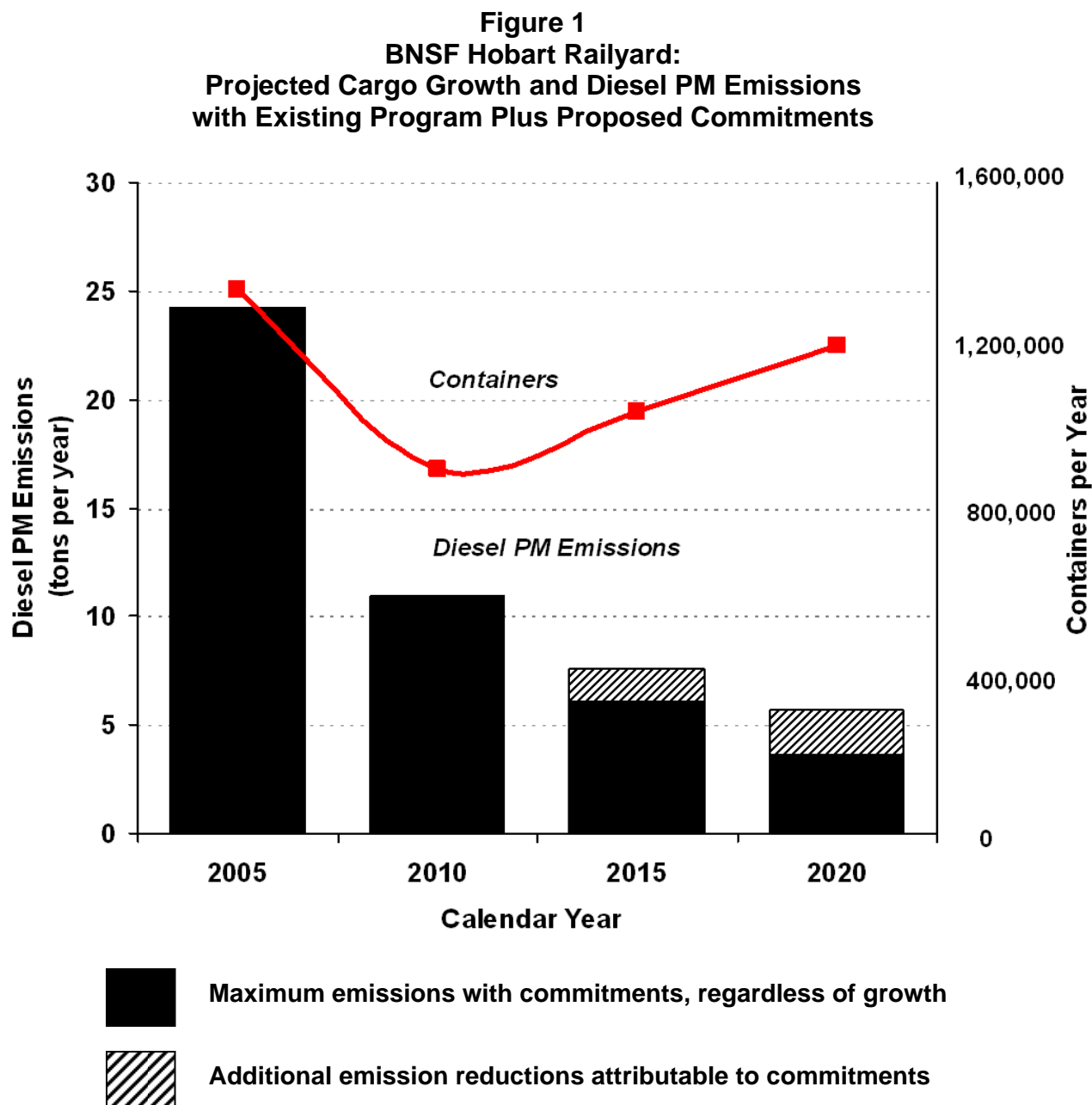
* Specific actions to be detailed by BNSF in the Railyard Emission Reduction Plan.

Table 3
BNSF Hobart Railyard:
Proposed Commitments to Reduce Diesel PM Emissions

Diesel PM Reductions from 2005 Baseline	Compliance Deadline
55 percent	December 31, 2011
65 percent	December 31, 2013
76 percent	December 31, 2015
78 percent	December 31, 2017
85 percent	December 31, 2020

3. How would growth affect the emissions levels to be achieved under the commitments?

The commitments would require that emissions be reduced to specific levels, regardless of growth. The greater the growth, the greater the reductions that the Railroad must achieve to meet those fixed levels. Figure 1 illustrates the decline in diesel PM emissions that would result under the existing program plus the commitments, while cargo grows up to the railyard's capacity of nearly 1.2 million container lifts by 2020.



This cargo forecast is based on historical container lift volumes at the railyard, correlated with UP and BNSF national locomotive diesel fuel consumption. The container projections after 2010 rely on a three percent per year container growth rate for this yard, and the emissions estimates assume a corresponding 1.5 percent per year growth in fuel use.

4. How much would the proposed commitments reduce the potential diesel PM health risks near the railyard?

Compared to 2005 numbers, ARB staff estimates that the emission reductions required under the commitments would cut the maximum individual cancer risk 57 percent by 2010, rising to 85 percent by 2020, as shown in Table 4. The reductions would also significantly decrease the number of people exposed to an excess cancer risk above 10 in a million in 2010, as shown in Table 5.

Table 4
BNSF Hobart Railyard:
Estimated Maximum Individual Cancer Risk
(Excess Cancer Risk in a Million)

	Excess Cancer Risk			
	2005	2010	2015	2020
Existing Program	500	215	150	120
Existing Program + Commitments	N/A	215	120	75
Total % Reduction from 2005 Due to Existing Program + Commitments	N/A	57%	76%	85%

Table 5
BNSF Hobart Railyard:
Estimated Population Exposure to
Excess Cancer Risk Greater than 10 in a Million

	Number of People Exposed			
	2005	2010	2015	2020
Existing Program	848,000	315,000	246,000	190,000
Existing Program + Commitments	N/A	315,000	190,000	109,000
Total % Reduction from 2005 Due to Existing Program + Commitments	N/A	63%	78%	87%

5. How would ARB staff verify that the Railroad is achieving the diesel PM emission reductions required under the commitments?

To monitor compliance, ARB staff would thoroughly review the comprehensive inventories of equipment, activity, and emissions provided by the Railroad. We will also independently develop our own information sources to verify the data provided by the Railroad. ARB staff plans to: (1) conduct semi-annual railyard emission source inspections through 2015, (2) track locomotive activity through photographic databases, and (3) conduct unannounced field surveys outside the railyard to count the number, type, and emissions level of operating locomotives.

We will also cross-check the Railroad's inventory with data submitted to comply with ARB regulations for cargo equipment, drayage trucks, and transport refrigeration units; as well as the 1998 Locomotive NOx Fleet Average Agreement.

6. What alternatives to the proposed commitments did ARB staff evaluate?

Staff evaluated two primary alternatives to the proposed commitments — ARB regulations for non-preempted locomotives and electrification of cargo equipment at the railyard. We are convinced that the proposed commitments would ensure significantly greater and faster reductions in diesel PM emissions and health risk than the regulatory alternatives described below.

ARB Regulation of Non-Preempted Locomotives

To evaluate the effectiveness of this approach in reducing emissions from locomotives at the BNSF Hobart Railyard, we considered the number of units that could be regulated. For the reasons described below, there are virtually no non-preempted locomotives that currently operate on a continuous basis at the Hobart Railyard or in the South Coast Air Basin. Thus, a regulation to reduce diesel PM emissions from non-preempted locomotives would yield little to no air quality benefits in this region.

Under the Federal Clean Air Act and U.S. EPA regulation, states are expressly preempted from regulating the emissions of newly built or remanufactured locomotives. U.S. EPA did suggest (Preamble to 2008 rulemaking) that states may have the authority to regulate locomotives that have exceeded their "useful lives," defined as 133 percent of the time to the first remanufacture. This would make line haul locomotives eligible for state regulation when they are roughly ten years old. Switch and medium horsepower locomotives typically last longer until the first full remanufacture (defined by U.S. EPA), making them eligible for state regulation when they are about 15 years old.

In response to the requirements of the 1998 Locomotive NOx Fleet Average Agreement in the South Coast Air Basin, BNSF has replaced non-preempted switch locomotives within the railyard with Tier 0 or better switch or medium horsepower locomotives. To comply, BNSF is also using nearly all Tier 0, 1, and 2 interstate line haul locomotives (rather than non-preempted locomotives) for operations in the South Coast Air Basin.

ARB Regulation to Require Electrification of Cargo Handling Equipment

A second alternative would be an ARB regulation to require the electrification infrastructure needed to reduce railyard cargo handling equipment diesel PM emissions to near zero. As discussed below, these emission reductions are technically feasible for several railyard applications, but are not cost-effective today, especially in comparison with reductions from locomotives.

At this time, staff believes it is more effective to focus limited resources on providing reductions of locomotive emissions, rather than diverting significant resources to the smaller remaining cargo handling equipment emissions. However, an investment in electrification infrastructure could provide cleaner power for transport refrigeration units operating at the railyard.

An existing ARB regulation for diesel cargo handling equipment used at ports and intermodal railyards requires this equipment to achieve the most stringent Tier 4 PM emissions standards by about 2015. Based on staff's analysis, the existing regulation will require railyard equipment to be about 90 percent cleaner than the equipment used in 2005.

By 2020, the diesel PM emissions from cargo handling equipment at the BNSF Hobart Railyard will be reduced to about 0.6 tons per year. The capital costs to install 54 electrified rail mounted gantry cranes would be \$5 million or more per unit (about \$270 million for all), plus electrification infrastructure costs (\$180 million), for a total cost of about \$450 million. The total electrification capital costs, divided by the remaining diesel crane and yard hostler NOx and diesel PM emissions within the railyard, would result in a cost-effectiveness of about \$438 per pound of emissions reduced.

The capital costs to replace 129 diesel yard tractors (or hostlers) with electric yard tractors is about \$200,000 per unit (about \$26 million for all). The total electric yard tractor capital costs, divided by the remaining diesel yard tractor NOx and diesel PM emissions within the railyard, would result in a cost-effectiveness of about \$213 per pound of emissions reduced.

Locomotives are the largest remaining diesel PM emissions source within the railyard after 2015, representing up to 85 percent of remaining railyard diesel PM emissions. Locomotive NOx and PM emission reductions have a cost-effectiveness range of \$1 to \$10 per pound of NOx and PM emissions reduced.

ARB rulemakings must consider the cost and cost-effectiveness of new technologies over time, as well as the benefits. Accelerating or increasing the reductions that will be achieved under the existing ARB regulation for cargo handling equipment by mandating electric equipment would provide a small increment of additional reductions at a high cost. We do not expect that ARB staff could recommend a regulatory action to mandate electrification of cargo handling equipment at this time due to the very poor cost-effectiveness.

Commitments for BNSF Hobart Railyard

The Air Resources Board (ARB) requests additional commitments from BNSF Railway (BNSF) to further reduce diesel particulate matter (PM) emissions at the BNSF Hobart Railyard between 2010 and 2020.

If BNSF fails to: 1) achieve the Table 1 diesel PM emission reduction levels in 2011, 2013, 2015, 2017, or 2020; or 2) provide comprehensive or interim diesel PM emission inventories, air dispersion modeling, or emission reduction plans in compliance with the schedule in Table 2; ARB will initiate rulemakings as specified in Section 9. The commitments, and ARB oversight, will ensure that the BNSF Hobart Railyard diesel PM emission levels are achieved, verifiable, and enforceable.

Summary of Commitments for the BNSF Hobart Railyard

BNSF commits to do the following at this railyard:

- Reduce 2005 diesel PM emissions from railyard operations by at least 55 percent by 2011, increasing the reductions to at least 85 percent by 2020, with intermediate commitments for emission reductions in calendar years 2013, 2015, and 2017 to ensure steady progress. BNSF is implementing existing U.S. Environmental Protection Agency (U.S. EPA) and ARB regulations and agreements and commits to initiate any additional actions needed to meet the diesel PM emission reduction levels on the stated schedule. This commitment shall be met irrespective of any increase in activity or growth at the BNSF Hobart Railyard through 2020.
- As of 2005, BNSF had 18 older switch and medium horsepower locomotives assigned to the BNSF Hobart Railyard. Between acceptance of this commitment and December 31, 2015, BNSF plans to complete the replacement or repower of existing older switch and medium horsepower locomotives such that all switch and medium horsepower locomotives that operate within the railyard (more than 25 percent of annual hours or 25 percent of annual miles traveled or 25 percent of annual diesel fuel consumption) meet emission levels of 3.0 g/bhp-hr oxides of nitrogen (NO_x) or less and emissions of 0.1 g/bhp-hr PM or less (over the U.S. EPA line haul duty cycle).
- By December 31, 2011 and December 31, 2012, evaluate and provide recommendations, if any, for implementation of those changes in railyard operations that BNSF believes may significantly reduce railyard diesel PM emissions or changes in the location of the railyard emission sources that ARB believes may reduce health risk, and that meet all other specified criteria articulated in Section 6.
- Beginning one month after BNSF's acceptance of these commitments, identify any non-preempted switch or medium horsepower locomotive that operates more

than five consecutive calendar days within the railyard and subsequently report this information to ARB with BNSF's annual reports pursuant to the 1998 Locomotive NOx Fleet Average Agreement.

- Prepare and submit railyard diesel PM emission inventories, air dispersion modeling analyses, and emission reduction plans in each year specified in Table 2.
- Work collaboratively with ARB to provide ongoing communication of railyard diesel PM emission reduction progress to the public through local community meetings and fact sheets.

As part of a broader initiative, BNSF commits to:

- Between 2011 and December 31, 2015, work collaboratively with ARB to develop and implement a formal demonstration program for advanced locomotive engines or aftertreatment devices, or other mutually agreed upon technologies to reduce emissions within the railyard. The objective of the locomotive demonstration program will be to support separate, but potentially parallel, efforts to achieve ARB verification of one or more advanced locomotive engines or aftertreatment devices for ultra low emitting switch and medium horsepower locomotives to achieve emission levels that are equal to or less than U.S. EPA Tier 4 NOx and/or PM emission standards.
- Loan two existing gen-set switch or medium horsepower locomotives annually through 2015 and provide any necessary technical assistance as BNSF's in-kind contribution to support the demonstration program. If the demonstration program is completed prior to 2015, BNSF's obligation to make these locomotives available would be satisfied as of the completion date.

ARB commits to:

- Install and operate one particulate matter (PM_{2.5}) ambient air quality monitor to provide an indication of air quality in the near the BNSF Hobart and UP Commerce Railyards, or to secure a commitment from the South Coast Air Quality Management District to do so, consistent with a siting and operation protocol supported by ARB.
- Prepare periodic health risk assessments (HRAs) as indicated in Table 3 for the railyard using the comprehensive railyard diesel PM emission inventories and air dispersion modeling analyses submitted by BNSF. Also to prepare periodic estimates of future health risks, through 2020, following BNSF's submittal of draft and final emission reduction plans.

- Review the emission inventories, air dispersion modeling, and emission reduction plans submitted by BNSF to determine the sufficiency of the information provided and notify BNSF of any deficiencies.
- Determine compliance with the diesel PM emission reduction levels for each of the years specified in Table 1, based on the comprehensive inventories submitted by BNSF and independent ARB verification through inspections, field surveys, and other mechanisms.
- Monitor BNSF's compliance with the commitments in this document, determine if BNSF has met its obligations, and if BNSF has failed to meet the commitments in specified sections, submit rulemakings for locomotives and railyards to the Board within four months from the date of any final determination of non-compliance, as specified in Section 9.
- Support BNSF's efforts to evaluate options for operational changes with technical assistance to evaluate the potential impacts of such changes on health risk for the railyard.

1. What are the commitments to reduce diesel PM emissions?

BNSF shall meet the diesel PM emission reduction levels at the BNSF Hobart railyard by the specified compliance deadlines as set forth in Table 1 irrespective of receipt of public incentive funds. BNSF may, however, use incentive funds, if available, to achieve the emission reduction levels. This includes funds under Proposition 1B to replace, repower, or retrofit locomotives. To meet the 85 percent reduction level, ARB staff estimates that the railyard diesel PM emissions of 24.2 tons per year in 2005 will need to be reduced to about 3.6 tons per year by 2020.

Typical emission sources within the railyard affected by the diesel PM emission reduction levels in Table 1 include interstate line haul locomotives, switch and medium horsepower locomotives, drayage trucks, cargo handling equipment such as cranes and yard hostlers, transport refrigeration units operated with drayage trucks or railcars, and stationary engines and maintenance equipment. Passenger locomotive emissions are excluded from the calculation of railyard diesel PM emissions and reductions used to determine compliance with Table 1.

Table 1
Diesel PM Emission Reduction Levels and Schedule
For BNSF Hobart Railyard

Diesel PM Reductions from 2005 Baseline*	Compliance Deadline
55 percent	December 31, 2011
65 percent	December 31, 2013
76 percent	December 31, 2015
78 percent	December 31, 2017
85 percent	December 31, 2020

* If, after the effective date of this program, ARB reduces the stringency or extends the effective date of ARB regulations affecting non-locomotive diesel PM emission sources at railyards, or U.S. EPA reduces the stringency or extends the effective date of its locomotive PM emission standards, the diesel PM emission reduction levels will be adjusted by ARB accordingly.

ARB staff will use the emissions inventory reported in the 2005 Health Risk Assessment as the 2005 baseline, together with the comprehensive emission inventory submittals for subsequent years, to determine compliance with the Table 1 emission reduction levels. ARB staff will validate the inventory information through a thorough technical review of the data, ongoing ARB railyard inspections, ARB field surveys, and ARB tracking of locomotive and railyard operations.

ARB has acknowledged that BNSF recently shifted all operations at BNSF Commerce Eastern Railyard, which was closed 2008, to the BNSF Hobart Railyard which resulted in a diesel PM emission increase at the Hobart Railyard. BNSF agrees to absorb all incremental diesel PM emission increases resulting from the Commerce Eastern Railyard operational shift.

2. Does growth change the commitments to reduce diesel PM emissions?

No. BNSF commits to reducing diesel PM emissions from the BNSF Hobart Railyard by at least 85 percent by 2020 and meeting the intermediate levels in Table 1, regardless of the potential increases in railyard activity levels, such as the number of container lifts.

3. How can BNSF reduce railyard diesel PM emissions 85 percent by 2020?

ARB's supporting analysis for feasible emission reductions at the BNSF Hobart Railyard is located in a separate document entitled, *Basis for Proposed Commitments to Reduce Diesel Particulate Matter at the BNSF Hobart Railyard (Basis for Proposed Commitments: June 2010)*. This *Basis for Proposed Commitments* document describes possible options that could be implemented to achieve the Table 1 diesel PM emission reduction levels.

In 2005, the railyard generated an estimated 24.2 tons per year of diesel PM emissions from freight operations. ARB staff estimates that existing U.S. EPA and ARB regulations and agreements will reduce diesel PM emissions at the railyard down to 5.7 tons per year by 2020 (a 76 percent reduction). ARB staff estimates that BNSF can further cut the railyard diesel PM emissions by 2.1 tons per year by 2020 (achieving an 85 percent reduction compared to 2005 levels).

4. What are the railroad commitments to prepare and submit emission inventories, air dispersion modeling, and emission reduction plans? What are the ARB commitments to publicly release the railroad documents and health risk assessments?

Table 2 shows the schedule for BNSF to submit the railyard diesel PM emission inventories, air dispersion modeling, and draft and final emission reduction plans. Table 3 identifies the dates by which ARB shall release the railyard diesel PM emission inventories, air dispersion modeling, health risk assessments, and the emission reduction plans for public review.

Table 2
BNSF Hobart Railyard
Schedule for BNSF Submittal of Documents:
Emission Inventories, Air Dispersion Modeling,
and Emission Reduction Plans

Railyard Operations Year	Emission Inventory^a	Air Dispersion Modeling	Draft Emission Reduction Plan	Final Emission Reduction Plan
2009	Sep 30, 2010(I)	-----	Oct 15, 2010	Dec 31, 2010
2010	Apr 1, 2011 (I)	-----	-----	-----
2011	Apr 1, 2012 (C)	Jun 1, 2012	Sep 1, 2012	Dec 31, 2012
2012	Apr 1, 2013 (I)	-----	-----	-----
2013	Apr 1, 2014 (C)	Jun 1, 2014	Sep 1, 2014	Dec 31, 2014
2014	Apr 1, 2015 (I)	-----	-----	-----
2015	Apr 1, 2016 (C)	Jun 1, 2016	Sep 1, 2016	Dec 31, 2016
2016	Apr 1, 2017 (I)	-----	-----	-----
2017	Apr 1, 2018 (C)	Jun 1, 2018	Sep 1, 2018	Dec 31, 2018
2018	Apr 1, 2019 (I)	-----	-----	-----
2019	Apr 1, 2020 (I)	-----	-----	-----
2020	Apr 1, 2021 (C)	-----	-----	-----

^a (C) = Comprehensive Emission Inventory. (I) = Interim Emission Inventory.

Table 3
Schedule for ARB Release of Documents:
Emission Inventories, Air Dispersion Modeling,
ARB Health Risk Assessment, and Emission Reduction Plans

Railyard Operations Year	Railroad Emission Inventory^a	Railroad Air Dispersion Modeling	ARB Health Risk Assessment	Railroad Draft Emission Reduction Plan^b	Railroad Final Emission Reduction Plan^b
2009	Oct 15, 2010 (I)	-----	Nov 15, 2010 ^c	Nov 1, 2010	Jan 15, 2011
2010	Apr 15, 2011(I)	-----	-----	-----	-----
2011	Apr 15, 2012 (C)	Jun 15, 2012	Oct 1, 2012	Oct 1, 2012	Jan 15, 2013
2012	Apr 15, 2013 (I)	-----	-----	-----	-----
2013	Apr 15, 2014 (C)	Jun 15, 2014	Oct 1, 2014	Oct 1, 2014	Jan 15, 2015
2014	Apr 15, 2015 (I)	-----	-----	-----	-----
2015	Apr 15, 2016 (C)	Jun 15, 2016	Oct 1, 2016	Oct 1, 2016	Jan 15, 2017
2016	Apr 15, 2017 (I)	-----	-----	-----	-----
2017	Apr 15, 2018 (C)	Jun 15, 2018	Oct 1, 2018	Oct 1, 2018	Jan 15, 2019
2018	Apr 15, 2019 (I)	-----	-----	-----	-----
2019	Apr 15, 2020 (I)	-----	-----	-----	-----
2020	Apr 15, 2021 (C)	-----	-----	-----	-----

^a (C) = Comprehensive Emission Inventory. (I) = Interim Emission Inventory.

^b Following submittal of the draft and final emission reduction plans, ARB staff will provide a brief supplemental document that estimates the associated health risk for future compliance years.

^c ARB will estimate the health risk for the 2009 calendar year based on the 2009 interim inventory and the 2005 Health Risk Assessment data.

a. Railyard Diesel PM Emission Inventories

i. Comprehensive Diesel PM Emission Inventories

BNSF commits to prepare the comprehensive diesel PM emission inventories for calendar years 2011, 2013, 2015, 2017, and 2020. BNSF shall prepare each comprehensive diesel PM emission inventory for the railyard in accordance with *ARB Railyard Emission Inventory Methodology* (2006) or its subsequent revisions, using data for the whole of the preceding calendar year. The comprehensive diesel PM emission inventories will include, to the extent reasonably available, detailed activity information such as locomotive event recorder data, hours of operation for cargo handling equipment and transport refrigeration units, and drayage truck time in operation within the railyard. The comprehensive inventory will also identify activity and growth projections through 2020, and the basis for those projections.

ii. Interim Diesel PM Emission Inventories

BNSF commits to prepare interim diesel PM emission inventories for the railyard for calendar years 2009, 2010, 2012, 2014, 2016, 2018, and 2019, using data for the whole of the calendar year. The interim emission inventories will identify and utilize updates on locomotive usage, other equipment changes, and activity levels (e.g., number of lifts, drayage truck activities, locomotive shop releases, if applicable) to quantify changes to the last comprehensive diesel PM emission inventory. ARB staff will use the interim emission inventories to consider if there are any potential issues with BNSF continuing to make sufficient progress in order to meet the railyard diesel PM emission levels specified in Table 1.

b. Air Dispersion Modeling

BNSF commits to prepare air dispersion modeling based on the schedule in Table 2. Air dispersion modeling is to be performed in accordance with *ARB Health Risk Assessment Guidance for Railyard and Intermodal Facilities* (2006) or its subsequent revisions. BNSF also commits to provide source apportionment data for receptors defined in the air dispersion model and a source contribution analysis. BNSF also commits to analyze the impacts on the modeled air concentrations from significant updates to the modeling methodology, such as the current version of AERMOD model from U.S. EPA, the availability of updated meteorological data, or any other modeling parameters or inputs which could substantively affect the modeling estimations.

c. Health Risk Assessments

ARB staff commits to prepare health risk assessments using the comprehensive diesel PM emission inventories and air dispersion modeling results. The risk assessments are to be prepared in accordance with *ARB Health Risk Assessment Guidance for Railyard and Intermodal Facilities* (2006) or its subsequent revisions. The updated risk assessments will provide detailed information comparing excess cancer risks and non-cancer health effects with the estimates in the 2005 Health Risk Assessment. ARB staff will compare 2005 railyard emissions and associated health effects with risk assessment results for later years using the same or similar methodology, and also include a separate analysis for any subsequent changes in future year methodologies. ARB staff shall complete the health risk assessment reports for the railyard according to the schedule provided in Table 3.

Following BNSF's submittal of the draft and final emission reduction plans, ARB also commits to provide a brief supplemental document to the public that estimates the associated health risk for future compliance years. If ARB's health risk estimates for the draft emission reduction plan do not project that health risk will continue to be reduced, ARB shall include that information in its written comments to BNSF on BNSF's draft emission reduction plan.

d. Emission Reduction Plans

BNSF commits to submit draft and final emission reduction plans according to the schedule in Table 2. The emission reduction plans are to be based on the most recent railyard diesel PM emission inventories. The purpose of the plans is for BNSF to detail the actions it will take to reduce railyard emissions down to the levels shown in Table 1 for the next compliance deadline, and the range of potential actions it intends to pursue for subsequent compliance deadlines. The emission reductions plans will document existing and projected railyard diesel PM emissions through 2020 (accounting for growth), describe changes in source category activities, identify existing and future actions to cut emissions and provide specific implementation schedules for these actions.

e. ARB Review**i. Diesel PM Emission Inventories and Air Dispersion Modeling**

Within 20 calendar days of receipt of a railyard comprehensive or interim diesel PM emission inventory, or air dispersion modeling, ARB shall review the submission for completeness and accuracy and will notify BNSF of its findings. If ARB determines that the submission is not complete and accurate, it will, within the above 20-day time period, notify BNSF in writing of any deficiency and the reasons therefor, and make such written notification publicly available.

Upon receipt of a notice of deficiency from ARB, BNSF will within 15 calendar days correct the deficiencies and resubmit the submission to ARB. Within 10 calendar days, ARB will notify BNSF as to whether the submission is complete and accurate. If not, ARB will make a preliminary determination of non-compliance following the procedures set forth in Section 9.b.ii below.

ii. Emission Reduction Plans

Within 30 calendar days of receipt of a draft railyard emission reduction plan, ARB shall review the plan for completeness and accuracy and shall notify BNSF of its findings. If ARB determines that the draft plan is not complete and accurate, or that the draft plan, in the ARB staff's opinion, cannot reasonably achieve the diesel PM reductions required by the next compliance deadline as set forth in Table 1, ARB shall, within the above 30-day time period, notify BNSF in writing of any deficiency and the reasons therefor, and make such written notification publicly available.

Within 30 calendar days of receipt of the final plan, ARB shall notify BNSF as to whether the plan is complete, accurate, and can reasonably achieve the diesel PM emission reductions required by the next compliance deadline as set forth in Table 1, and make such written notification publicly available. If not, ARB shall make a preliminary determination of non-compliance as set forth in Section 9.b.ii below. Subsequently, if the administrative appeals panel fully or partially affirms the finding of ARB staff, BNSF

will have 30 calendar days to submit to ARB a revised final plan for the next compliance deadline to cure any deficiencies upheld by the panel. If BNSF fails to submit a revised final plan or if ARB staff determines the revised final plan is still deficient, ARB may immediately commence the rulemaking process outlined in the opening paragraphs of Section 9.

f. Commitment to Follow Through on Final Emission Reduction Plan

BNSF shall take the necessary actions identified in the final emission reduction plan in accordance with the plan's implementation schedules to meet the diesel PM emission reduction levels for the next compliance deadline as set forth in Table 1. If BNSF determines that alternative actions not identified in its most recent plan should be implemented to achieve the emission reduction levels for the next compliance deadline, and the alternative actions materially alter the pathway for achieving the emission reductions in the plan, BNSF will within 15 days of its determination notify ARB of the alternative actions and the reasons for the changes.

5. What is the commitment for public meetings and outreach?

BNSF commits to hold a public meeting no later than December 15 of 2010, 2012, 2014, 2016, and 2018 with members of the surrounding community following the release of the most current ARB health risk assessment and BNSF draft emission reduction plan as specified in the Table 3 schedule. At the public meeting, BNSF and ARB staff will seek public input on the available documents prior to ARB's final determination on the emission reduction plan.

6. What is the commitment to evaluate options for operational changes?

BNSF commits to evaluate and provide recommendations, if any, for the implementation of those changes in railyard operations that BNSF believes may significantly reduce railyard diesel PM emissions or changes in the location of the railyard emission sources that ARB believes may reduce health risk. BNSF shall evaluate potential changes at the BNSF Hobart Railyard according to the following schedule, including:

- By December 31, 2010:
 - Relocation of the truck gate; and/or automated gate system, and/or installation of a bridge to provide access for trucks to the railyard.
- By December 31, 2011:
 - Electric infrastructure to support operation of rail mounted gantry cranes and stationary transport refrigeration units.
- By December 31, 2012:
 - Relocation of diesel-fueled yard tractors and transport refrigeration units.

BNSF will conduct this one-time operational review considering, among other things, the potential diesel PM emissions reductions that could be achieved, the technical feasibility of such actions, the operational impacts on the railyard's throughput velocity and fluidity, safety, the availability of land and access, the costs and cost-effectiveness of such actions, and any railyard-specific factors at the BNSF Hobart Railyard. Each operational option shall be analyzed, and recommendations, if any, for implementation will be completed as soon as possible for this railyard, but in any case not later than December 31, 2012. BNSF shall provide the assessment and any recommendations for implementation of operational changes to ARB, and ARB will make them publicly available.

ARB commits to support these efforts with technical assistance and to evaluate the impacts of each potential operational change on the maximum individual cancer risk for the railyard. ARB will make the results of this evaluation publicly available.

7. Will BNSF be able to access incentive funding to support these commitments?

BNSF, to the extent feasible, will compete for federal, state, local, and private incentive funding to supplement its capital expenditures, and to accelerate further diesel PM and NOx emission reductions at this railyard.

Consistent with State law and Board policies, ARB staff will support efforts by BNSF to seek a mix of federal, state, and local incentive funding to accelerate BNSF's ability to meet the diesel PM emission reduction levels for the railyard.

8. What are the provisions for BNSF and ARB to meet and confer by 2018?

BNSF agrees to meet and confer with ARB by 2018 to evaluate and explore opportunities for further diesel PM emission reductions by 2020 and beyond.

9. What are the mechanisms for ARB to enforce these commitments? What would trigger ARB to initiate regulatory action?

Upon a final determination of the ARB Executive Officer, or if appealed, of the administrative appeals panel, that BNSF has failed to meet its commitments set forth herein at Sections 1, 2, 4, 5, and 6, ARB commits to submit to the Board within four months from the date of the determined failure the following locomotive and railyard rulemakings:

- A regulation of switch and medium horsepower locomotives that are not preempted under federal law (e.g., locomotives that primarily operate in California and that were manufactured prior to 1973 or that exceed 133 percent of their useful life since original manufacture or last remanufacture, whichever is later).
- A designated railyard regulation that requires risk reduction audits and plans to achieve targeted emission reduction levels.

Nothing in this agreement precludes ARB from developing regulations within its authority as required to achieve the goals of the State Implementation Plan and Climate Change Scoping Plan.

ARB will also consider the following actions:

- Pursue federal legislation to expand ARB authority to adopt regulations for in-use locomotives.
- Petition U.S. EPA to strengthen existing federal locomotive regulations.

ARB is designated as the agency responsible for enforcement of the BNSF commitments. The enforcement authorities specified herein may only be exercised by ARB. BNSF may, at any time, initiate informal consultations with ARB to identify and resolve concerns or other issues regarding compliance with its commitments herein.

In determining whether BNSF has met its commitments, the parties agree to follow the following process.

a. ARB Verification of Railyard Diesel PM Emission Reduction Levels

To determine whether BNSF has met the BNSF Hobart Railyard diesel PM emission reduction levels specified in Table 1, ARB will review the comprehensive emission inventories and interim emission inventories in relation to information collected by ARB staff. ARB will conduct semi-annual railyard inspections, which will also be augmented by ARB photographic tracking and field surveys of railyard switch and medium horsepower locomotives. In addition, ARB staff will use the annual BNSF locomotive NOx fleet average agreement submittals to verify the number and tier of interstate line haul locomotives operating within the South Coast Air Basin. ARB staff will also randomly conduct inspections of BNSF interstate line haul locomotives entering and exiting the South Coast Air Basin to help assess compliance with the Table 1 diesel PM emission reduction levels.

b. Preliminary Determination of Non-Compliance

i. Failure to Comply with the Railyard Diesel PM Emission Reduction Levels

Within 30 working days of receipt of the comprehensive railyard diesel PM emission inventories, ARB shall make a written preliminary determination notifying BNSF as to whether BNSF met or failed to meet the diesel PM emission reduction levels specified in Table 1 for the previous year. If ARB determines that BNSF has failed to meet its emission reduction levels, ARB shall within the same 30 working days provide BNSF with its written preliminary determination, which will set forth the reasons for its findings. ARB will, with the greatest precision possible based on data submitted by BNSF, calculate the difference between the railyard diesel PM emission reduction level

reported by BNSF and the levels required in Table 1. ARB and BNSF shall use their respective best efforts to expedite submission and review of the reports. The time periods provided for ARB to make a preliminary compliance determination may be extended by written agreement between ARB and BNSF.

Within 15 calendar days of receipt of ARB's preliminary determination that BNSF has failed to meet the emission reduction levels, BNSF may request to meet and confer with ARB and/or provide ARB with such information and analysis as BNSF believes appropriate to demonstrate its compliance with the Table 1 diesel PM emission reduction levels. If a meet and confer is requested, the parties shall meet within 10 working days of the request. Within 15 calendar days after receipt of BNSF's response or after meeting and conferring with ARB, ARB shall review and consider the information provided by BNSF and make a final determination, in writing, as to whether BNSF has failed to meet the Table 1 diesel PM emission reduction levels. ARB will make such final written determination publicly available.

For the Table 1 compliance deadlines in 2011, 2013, 2015, 2017, or 2020, if the ARB staff determines that BNSF missed its percentage target for the BNSF Hobart Railyard by not more than 2 percent (e.g., reaching a 63 percent compliance level where 65 percent was required), BNSF will be given the opportunity to cure this deficiency by the next calendar year, provided it demonstrates the new compliance level by conducting a full inventory analysis. Failure to conduct the analysis or failure to cure the deficiency in the following calendar year shall constitute a failure to meet the appropriate targets in Table 1.

ii. Failure to Comply with Other Railyard Commitments

If ARB makes a preliminary determination that BNSF has failed to meet any other of its commitments set forth herein, ARB shall notify BNSF, in writing, of its findings. Within 15 calendar days, BNSF may request to meet and confer with ARB and/or provide ARB with such information and analysis as BNSF believes appropriate to demonstrate its compliance. If a meet and confer is requested, the parties shall meet within 10 working days of the request.

Within 15 calendar days after receipt of BNSF's response or after meeting and conferring with ARB, ARB will review and consider the information provided by BNSF and make a final determination, in writing, as to whether BNSF has failed to meet any of its non-emission reduction-related commitments. ARB will make such final written determination publicly available.

c. Final Determination by ARB of Non-Compliance

A final determination of non-compliance shall specifically identify the reasons why ARB has found BNSF not to be in compliance with agreed-upon commitments. A final determination of non-compliance for failure to meet the emission reduction levels set forth in Table 1 will provide ARB's final calculations of the emission reduction levels of the BNSF Hobart Railyard. Findings of BNSF's failure to meet other commitments shall set forth in detail ARB's determination of why the commitments have not been met. ARB will publicly post its final determination notice of non-compliance on its website and make available such notice on a list serve that will be established for notifying the public about compliance with the railyard emission reduction commitments.

d. Dispute Resolution

In the event of a dispute concerning an ARB final determination of non-compliance or any of the parties' respective commitments, the party asserting the dispute shall provide notice to the other party and set forth the issues underlying the dispute. The parties shall meet and confer regarding the identified issues within 15 working days after receipt of notification, and if they cannot reach agreement within 15 working days after such consultation, shall submit their respective positions to an administrative appeals panel, which shall consider the matter as expeditiously as possible. Except for confidential trade secret information, ARB will publicly post on its website and make available by the aforementioned list serve all documents submitted by the parties' to the administrative hearing panel. ARB will also post and make available a notice that interested persons may submit written statements of position and supporting documentation to the administrative appeals panel that will be made part of the record of the hearing.

i. Composition of Administrative Appeals Panel

The panel shall be comprised of one member selected by ARB, one member selected by BNSF, and a third member selected by the initial two members from a list of five or more persons that the parties shall agree to within 120 calendar days of the parties' exchange of commitment letters. The list shall include persons qualified to hear matters that are likely to be heard by the dispute resolution panel. From the list of five or more persons, the parties shall select the person most readily available to hear the matter within 30 calendar days (or as soon thereafter as possible) from the date that the person is contacted by either the ARB or BNSF panel member. If no person from the previously selected list is available to hear the matter within 45 calendar days of being notified, the ARB and BNSF panel members shall contact an arbitration referral service, identify the matter(s) at issue, and accept from the service a list of five persons who are qualified to hear the matter(s) at issue and are readily available. The two panel members selected by the parties may mutually agree on one of the five persons to serve on the panel, but if they cannot agree, each panel member will alternatively strike one person from the list until just one person remains. The two panel members selected by the parties will serve as technical advisors to the third panel member, who

shall serve as the presiding member of the panel and who shall be solely responsible for making the final decision on behalf of the panel.

ii. Administrative Appeals Panel Process

Unless otherwise determined that the matter(s) at issue require oral testimony, the panel shall make its decision based upon written submission of the parties. If a hearing to take testimony is determined to be necessary, the hearing shall be public. The panel shall determine the time and place of the hearing, and will set forth the procedures to be followed at the hearing. The panel will take all precautions necessary to preserve the confidentiality of trade secret or other confidential information, and will consider such evidence in a closed meeting.

iii. Public Comments to Administrative Appeals Panel

Interested persons parties may submit written statements and supporting documentation to the panel regarding the matter(s) at issue before the matter(s) are taken under submission; however, only ARB and BNSF shall be parties to the dispute resolution process.

iv. Final Decision by Administrative Appeals Panel

The presiding member shall issue his or her final decision on behalf of the panel within 30 calendar days from the date that the matter is submitted to the panel. While either party receiving an adverse decision from the panel may seek expedited review of the decision in the Superior Court for the County of Sacramento, if the panel's decision upholds the Executive Officer's final determination of non-compliance, ARB may immediately commence the rulemaking process outlined in the opening paragraphs of this section. If judicial review is not sought, then the decision of the panel will be binding on the parties.

Each party to the proceedings outlined above will bear its own costs and fees, with the exception that the parties agree to split all costs and fees arising from the employment of the third panel member.

June 15, 2010

Appendix C

June 15, 2010

This Page Intentionally Left Blank

**Basis for Proposed Commitments
to Reduce Diesel Particulate Matter at the
UP COMMERCE RAILYARD**

This revised document explains the Air Resources Board (ARB or Board) staff's basis and rationale for the commitments we propose to request from Union Pacific (UP) Railroad (Railroad) to further reduce emissions of diesel particulate matter (PM) at the UP Commerce Railyard. The purpose is to decrease the health risk from diesel PM at this high priority railyard to protect nearby communities, consistent with the Board's direction.

ARB staff independently assessed the potential for feasible emission reductions through the use of cleaner, cost-effective technology that is currently available or that we expect will become available over the next decade. The proposed commitments are based on the level of emission reductions likely to be achievable with the accelerated introduction of this technology. We also present ARB's estimate of the health risk reduction that would result from the Railroad's acceptance and implementation of the commitments.

1. What would the proposed commitments accomplish?

These commitments would require that the Railroad achieve the expected emission reductions from existing regulations and agreements, and that the Railroad take any additional actions needed to meet the diesel PM emission levels, regardless of any increases in activity or growth at the UP Commerce Railyard.

With these commitments, the remaining diesel PM emissions and health risk in 2015 would be 10 percent lower than under the existing regulations and agreements alone, and 44 percent lower by 2020.

The commitments would establish enforceable requirements, tracking mechanisms, and deadlines for UP Railroad to reduce diesel PM emissions at the railyard 50 percent by 2011, increasing to a reduction of 85 percent by 2020 (relative to calendar year 2005 levels). In each benchmark year, the remaining emissions could not be exceeded despite any growth or increase in activity at the railyard, including growth in the number of containers moved. The higher the growth, the more actions the Railroad would need to take to reduce emissions.

In most cases, there is a high correlation between reducing diesel PM emissions and reducing health risk. Our analysis links the two to estimate the expected change in health risk in proportion to the change in emissions. This relationship can vary based on the location of the emission sources in relation to the people exposed. ARB will periodically assess and publish the expected changes in health risk in response to past actions implemented by the Railroad and future actions proposed by the Railroad to reduce emissions.

The commitments would provide transparency and require regular public updates on: the equipment operating in the yard, the Railroad's plans to upgrade each type of equipment, and the resulting changes in emissions and health risk.

- The Railroad would develop and submit emission inventories, air dispersion modeling, and emission reduction plans to ARB on a defined schedule.
- ARB staff would use these submittals to periodically update the health risk assessment for the railyard to reflect the new emission reductions and any changes in the location of the emission sources within the facility. ARB would provide updated estimates of the projected health risks through 2020, concurrent with the release of the draft emission reduction plans.
- ARB would publish all of these documents for public review and comment on a defined schedule.
- The Railroad and ARB would hold community meetings to seek public input on the draft emission reduction plans and the updated health risk assessments.

The commitments would provide independent ARB verification of locomotives operating in the railyard to determine the number of units at each emission control level and compare those counts to data submitted by the Railroad.

The commitments would require the Railroad to evaluate the emission reductions associated with operational changes (for example moving truck gates and equipment operations to alternate locations within the facility). ARB staff would assess the impact of such changes on health risk.

The commitments would also add a new ambient air quality monitor for PM to provide an indication of air quality in the communities near the railyard.

If the Railroad did not deliver the required emission reductions on schedule, the commitments would require ARB staff to bring regulatory proposal(s) to the Board within four months of a final finding of non-compliance.

2. How did ARB staff develop the percent reduction in diesel PM emissions for the proposed commitments? What actions are reflected in the numbers?

Railyard-Specific Data on Emission Sources. We began by evaluating the number, activity, and control level of the specific emission sources operating at the UP Commerce Railyard, including:

- The interstate line haul locomotive fleet that serves the South Coast Air Basin and the railyard.
- The individual switch locomotives in the railyard.
- The individual cargo handling equipment in the railyard.

- The fleet of drayage trucks serving the railyard.
- The transport refrigeration units operated with drayage trucks or railcars in the railyard.

To project railyard emissions in future years, we used the equipment activity and controls, together with anticipated growth. ARB staff relied on a 1.5 percent per year increase in fuel use, which equates to a roughly 3 percent per year increase in containers, based on historic growth rates over the last 12 years.

Projected Emissions with Existing Program. We then evaluated how the existing program of regulations and agreements affects the kinds of equipment that will be operating and the emissions from that equipment.

We refer to different levels of emissions from locomotives based on emission standards set by the U.S. Environmental Protection Agency (U.S. EPA). The oldest locomotives (Pre-Tier 0) don't have emission controls. Tier 0 locomotives have modest NO_x controls, while Tier 1 locomotives have additional NO_x and PM controls. All new locomotive engines today meet at least Tier 2 emission standards to cut both pollutants. New Tier 3 locomotives will be available in the future with further PM controls, while advanced technology Tier 4 locomotives will significantly reduce NO_x and PM emissions.

The existing program numbers in this document reflect the benefits of the following rules and agreements to reduce diesel PM emissions and health risk from railyard operations:

- Adopted ARB regulations for drayage trucks, cargo equipment, transport refrigeration units, and cleaner fuel for intrastate locomotives.
- The 1998 ARB/Railroads Agreement to reduce fleet average emissions of nitrogen oxides (NO_x) from locomotives in the South Coast Air Basin to Tier 2 levels by 2010. The actions taken by the railroads to comply with these NO_x levels are providing additional PM reductions not mandated by the Agreement.
- The 2005 ARB/Railroads Agreement to reduce diesel PM emissions, (which has an associated reduction in health risk) near railyards, through the use of idle reduction devices and cleaner fuels, as well as prevention of excess smoke from locomotives.
- Under the 2008 U.S. EPA rulemaking, when railroads remanufacture locomotives, these locomotives must meet a PM emission standard that is 50 percent lower than the previous level.

Table 1 shows the railyard emissions in 2005, and the declining emissions in 2010, 2015, and 2020 due to the benefits of the existing program. This table also shows the additional reductions attributable to the proposed commitments (beyond the existing program) in 2015 and 2020.

In Table 1 below, the estimated emission reductions for various technologies are preliminary and are subject to revision upon confirmation of actual emissions performance.

Table 1
UP Commerce Railyard:
Estimated Diesel PM Emissions by Equipment Type
 (tons per year)

Equipment Type	2005	2010	2015	2020
Emissions with Existing Program Only				
Freight Locomotives				
- Line Haul	1.3	1.0	0.9	0.8
- Switch	1.9	0.5	0.5	0.5
- Service/Testing	1.7	1.3	1.2	1.1
<i>Subtotal for Locomotives</i>	4.9	2.8	2.6	2.4
Cargo Equipment	4.8	2.4	1.0	0.5
Drayage Trucks	2.0	0.4	0.3	0.2
Transport Refrigeration Units	0.3	0.2	0.1	0.01
Maintenance/Stationary	0.1	0.1	0.1	0.1
<i>Subtotal for Other Equipment</i>	7.2	3.1	1.5	0.8
Total Tons	12.1	5.9	4.1	3.2
Reduction (%) from 2005		52%	66%	74%
Emissions with Proposed Commitments				
(Table 2 shows the potential sources of the additional emission reductions noted below)				
Additional Emission Reductions with Commitments			- 0.4	-1.4
Tons Remaining	12.1	5.9	3.7	1.8
Reduction (%) from 2005		52%	69%	85%
Additional Reduction (%) Attributable to the Commitments in Future Years				
			10%	44%

Possible Paths to Further Reduce Emissions. Locomotives account for the majority of the remaining emissions after implementation of the existing program. In response, we focused our evaluation of the additional actions to further reduce emissions on locomotives. We believe the following accelerated upgrades and other actions could be implemented to achieve additional emission reductions:

- a. Ensure that any additional switch or medium horsepower locomotives that operate within the railyard (more than 25 percent of annual hours or 25 percent of annual miles traveled or 25 percent of annual diesel fuel consumption) meet emission levels of 3.0 g/bhp-hr NO_x or less and emissions of 0.1 g/bhp-hr PM or less (over the U.S. EPA line-haul duty cycle).
- b. Between 2013 and 2020, upgrade the fleet of line-haul locomotives to Tier 3 emission levels on average (based on a combination of increasingly cleaner locomotives).
- c. Between 2014 and 2020, retrofit Tier 3 switch and medium-horsepower locomotives with diesel PM filters or equivalent technology, or replace them with Tier 4 locomotives, once those technologies become commercially available, or begin implementing operational changes.
- d. By 2020, accelerate Tier 4 line haul locomotives into the fleet serving the Railyard, install electric infrastructure to support rail mounted gantry cranes, and install a stationary collection system to reduce locomotive maintenance and service related emissions. Also, relocate the locomotive maintenance and service facilities, including associated essential idling emissions, and relocate diesel-fueled yard tractors.

ARB recognizes that there are other pathways than those noted above for the Railroad to further reduce emissions.

Establishing the Performance Standard for Emission Reductions. We quantified the additional benefits of implementing the path described above, as shown in Table 2, and used the results to set the performance standards for the proposed commitments. As shown in Table 3, the performance standards are expressed as the percent emission reduction from 2005 levels to be achieved by each compliance deadline.

The Railroad would have to meet the emission reduction levels in Table 3, but would have the discretion to select the most efficient combination of actions and path to do so. The Railroad would define its detailed strategy to upgrade equipment and implement any operational changes in each emission reduction plan.

Table 2
UP Commerce Railyard:
Diesel PM Emission Reductions from Potential Actions Identified by ARB Staff
 (tons per year)

Potential Actions*	2015	2020
(a) Any additional switch or medium horsepower locomotives have cleaner Tier 3/gen-set technology	0	0
(b) Upgrade line-haul locomotives to Tier 3 emission levels on average (included in existing program)	N/A	N/A
(c) Retrofit or replace Tier 3 switch and medium-horsepower locomotives with diesel PM filters or equivalent technology or begin implementing operational changes	-0.4	- 0.4
(d) Accelerate Tier 4 line haul locomotives, electrify cranes, install stationary collection system, and implement operational changes	0	- 1.0
Additional Emission Reductions with Commitments	-0.4	-1.4

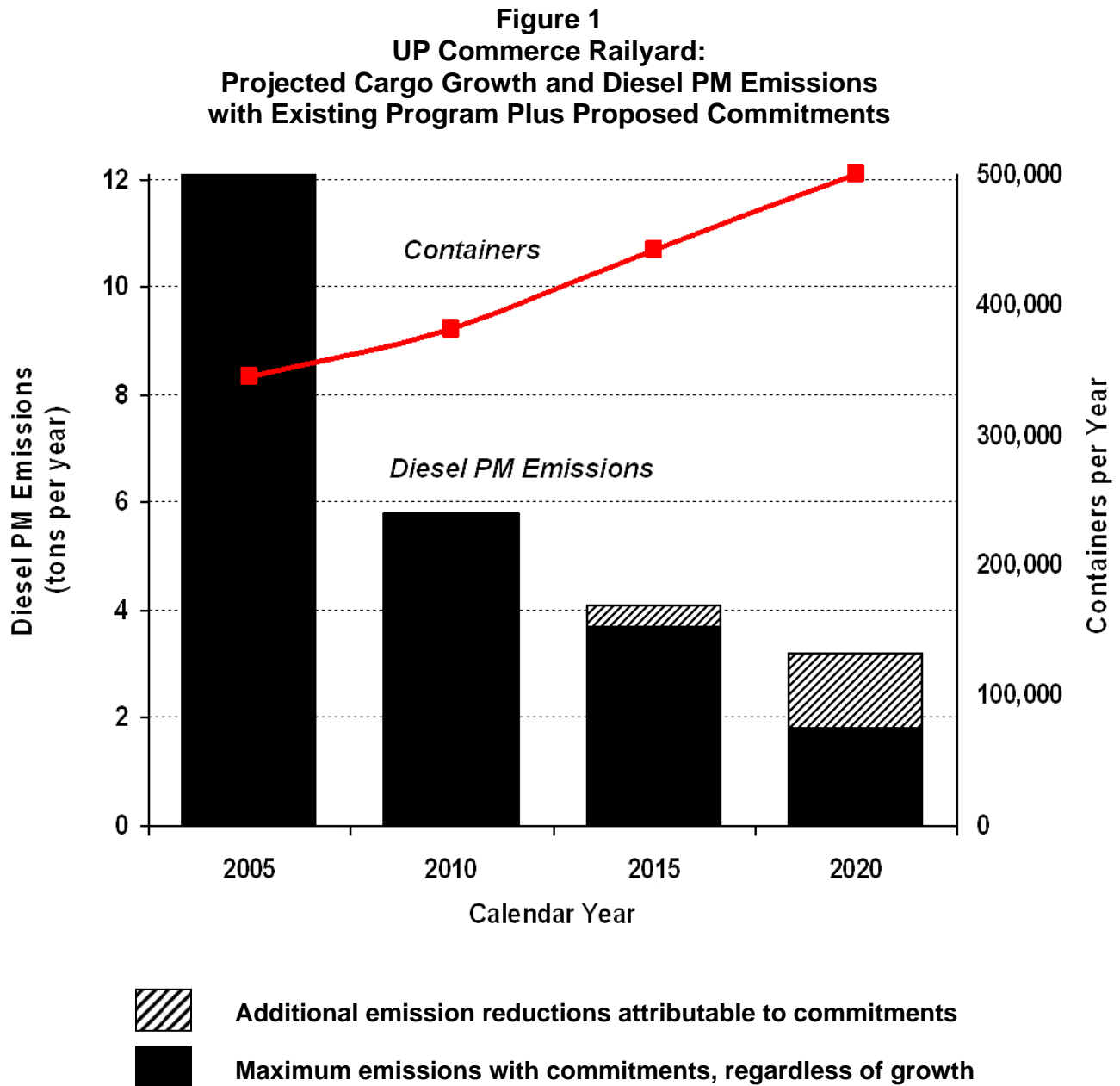
* Specific actions to be detailed by UP in the Railyard Emission Reduction Plan.

Table 3
UP Commerce Railyard:
Proposed Commitments to Reduce Diesel PM Emissions

Diesel PM Reductions From 2005 Baseline	Compliance Deadline
50 percent	December 31, 2011
55 percent	December 31, 2013
69 percent	December 31, 2015
70 percent	December 31, 2017
85 percent	December 31, 2020

3. How would cargo growth affect the emission levels to be achieved under the commitments?

The commitments would require that emissions be reduced to specific levels, regardless of growth. The greater the growth, the greater the reductions that the Railroad must achieve to meet those fixed levels. Figure 1 illustrates the decline in diesel PM emissions that would result under the existing program plus the commitments, while cargo grows up to the railyard's capacity of nearly 500,000 container lifts by 2020.



This cargo forecast is based on historical container lift volumes at the railyard, correlated with UP and BNSF national locomotive diesel fuel consumption. The container projections after 2010 rely on a three percent per year container growth rate for this yard, and the emissions estimates assume a corresponding 1.5 percent per year growth in fuel use.

Unlike the other three high priority railyards, UP Commerce experienced continued growth in domestic container traffic between 2005 and 2010. Because there is more uncertainty related to future growth estimates for this yard, ARB staff included a provision in the commitments that applies to the 2015 compliance deadline only. In this case, if ARB determines that UP missed its percent reduction target for this yard in 2015 by less than two percent, UP will have two years to cure the deficiency, rather than the one year applicable to other compliance deadlines and other railyards.

4. How much would the proposed commitments reduce the potential diesel PM health risks near the railyard?

Compared to 2005 numbers, ARB staff estimates that the emission reductions required under the commitments would cut the maximum individual cancer risk by 52 percent by 2010, rising to 85 percent by 2020, as shown in Table 4. The reductions would also significantly decrease the number of people exposed to an excess cancer risk above 10 in a million in 2010, as shown in Table 5.

Table 4
UP Commerce Railyard:
Estimated Maximum Individual Cancer Risk
(Excess Cancer Risk in a Million)

	Excess Cancer Risk			
	2005	2010	2015	2020
Existing Program	500	240	170	130
Existing Program + Commitments		240	155	75
Total Reduction (%) from 2005 Due to Existing Program+ Commitments		52%	69%	85%

Table 5
UP Commerce Railyard:
Estimated Population Exposure to
Excess Cancer Risk Greater than 10 in a Million

	Number of People Exposed			
	2005	2010	2015	2020
Existing Program	270,000	135,000	75,000	50,000
Existing Program + Commitments		135,000	66,000	22,000
Total Reduction (%) from 2005 Due to Existing Program+ Commitments		50%	76%	92%

5. How would ARB staff verify that the Railroad is achieving the diesel PM emission reductions required under the commitments?

To monitor compliance, ARB staff would thoroughly review the comprehensive inventories of equipment, activity, and emissions provided by the Railroad. We will also independently develop our own information sources to verify the data provided by the Railroad. ARB staff plans to: (1) conduct semi-annual railyard emission source inspections through 2015, (2) track locomotive activity through photographic databases, and (3) conduct unannounced field surveys outside the railyard to count the number, type, and emissions level of operating locomotives.

We will also cross-check the Railroad's inventory with data submitted to comply with ARB regulations for cargo equipment, drayage trucks, and transport refrigeration units; as well as the 1998 Locomotive NOx Fleet Average Agreement.

6. What alternatives to the proposed commitments did ARB staff evaluate?

Staff evaluated two primary alternatives to the proposed commitments -- ARB regulations for non-preempted locomotives and electrification of cargo equipment at the railyard. We are convinced that the proposed commitments would ensure significantly greater and faster reductions in diesel PM emissions and health risk than the regulatory alternatives described below.

ARB Regulation of Non-Preempted Locomotives

To evaluate the effectiveness of this approach in reducing emissions from locomotives at the UP Commerce Railyard, we considered the number of units that could be regulated. For the reasons described below, there are virtually no non-preempted locomotives that currently operate on a continuous basis at the UP Commerce Railyard or in the South Coast Air Basin. Thus, a regulation to reduce diesel PM emissions from non-preempted locomotives would yield little to no air quality benefits in this region.

Under the Federal Clean Air Act and U.S. EPA regulation, states are expressly preempted from regulating the emissions of newly built or remanufactured locomotives. U.S. EPA did suggest (Preamble to 2008 rulemaking) that states may have the authority to regulate locomotives that have exceeded their “useful lives,” defined as 133 percent of the time to the first remanufacture. This would make line haul locomotives eligible for state regulation when they are roughly ten years old. Switch and medium horsepower locomotives typically last longer until the first full remanufacture (defined by U.S. EPA), making them eligible for state regulation when they are about 15 years old.

In response to the requirements of the 1998 Locomotive NO_x Fleet Average Agreement in the South Coast Air Basin, UP has replaced non-preempted switch locomotives within the railyard with Tier 0 or better switch or medium horsepower locomotives. To comply, UP is also using nearly all Tier 0, 1, and 2 interstate line haul locomotives (rather than non-preempted locomotives) for operations in the South Coast Air Basin.

ARB Regulation to Require Electrification of Cargo Handling Equipment

A second alternative would be an ARB regulation to require the electrification infrastructure needed to reduce railyard cargo handling equipment diesel PM emissions to near zero. As discussed below, these emission reductions are technically feasible for several railyard applications, but are not cost-effective today, especially in comparison with reductions from locomotives.

At this time, staff believes it is more effective to focus limited resources on providing reductions of locomotive emissions, rather than diverting significant resources to the smaller remaining cargo handling equipment emissions. However, an investment in electrification infrastructure could provide cleaner power for transport refrigeration units operating at the railyard.

An existing ARB regulation for diesel cargo handling equipment used at ports and intermodal railyards requires this equipment to achieve the most stringent Tier 4 PM emissions standards by about 2015. Based on staff’s analysis, the existing regulation will require railyard equipment to be about 90 percent cleaner than the equipment used in 2005.

By 2020, the diesel PM emissions from cargo handling equipment at the UP Commerce Railyard will be reduced to about 0.1 tons per year. The capital costs to install 18 electrified rail mounted gantry cranes would be \$5 million or more per unit (about \$100 million for all), plus electrification infrastructure costs (\$100 million), for a total cost of about \$200 million. The total electrification capital costs, divided by the remaining diesel crane and yard hostler NO_x and diesel PM emissions within the railyard, would result in a cost-effectiveness of about \$500 per pound of emissions reduced.

The capital costs to replace 26 diesel yard hostlers with electric yard hostlers is about \$200,000 per unit (about \$5.2 million for all). The total electric yard tractor capital costs, divided by the remaining diesel yard tractor oxides of nitrogen and diesel PM emissions within the railyard, would result in a cost-effectiveness of about \$125 per pound of emissions reduced

Locomotives are the largest remaining diesel PM emissions source within the railyard after 2015, representing up to 75 percent of remaining railyard diesel PM emissions. Locomotive NOx and PM emission reductions have a cost-effectiveness range of \$1 to \$10 per pound of NOx and PM emissions reduced.

ARB rulemakings must consider the cost and cost-effectiveness of new technologies over time, as well as the benefits. Accelerating or increasing the reductions that will be achieved under the existing ARB regulation for cargo handling equipment by mandating electric equipment would provide a small increment of additional reductions at a high cost. We do not expect that ARB staff could recommend a regulatory action to mandate electrification of cargo handling equipment at this time due to the very poor cost-effectiveness.

Commitments for the UP Commerce Railyard

The Air Resources Board (ARB) requests additional commitments from Union Pacific Railroad (UP) to further reduce diesel particulate matter (PM) emissions at the UP Commerce Railyard between 2010 and 2020.

If UP fails to: 1) achieve the Table 1 diesel PM emission reduction levels in 2011, 2013, 2015, 2017, or 2020; or 2) provide comprehensive or interim diesel PM emission inventories, air dispersion modeling, or emission reduction plans in compliance with the schedule in Table 2; ARB will initiate rulemakings as specified in Section 9. The commitments, and ARB oversight, will ensure that the UP Commerce Railyard diesel PM emission levels are achieved, verifiable, and enforceable.

Summary of Commitments for the UP Commerce Railyard:

UP commits to do the following at this railyard:

- Reduce 2005 diesel PM emissions from railyard operations by at least 50 percent by 2011, increasing the reductions to at least 85 percent by 2020, with intermediate commitments for emission reductions in calendar years 2013, 2015, and 2017 to ensure steady progress. UP is implementing existing U.S. Environmental Protection Agency (U.S. EPA) and ARB regulations and agreements and commits to initiate any additional actions needed to meet the diesel PM emission reduction levels on the stated schedule. This commitment shall be met irrespective of any increase in activity or growth at the UP Commerce Railyard through 2020.
- Ensure that any additional switch or medium horsepower locomotives that operate within the railyard (more than 25 percent of annual hours or 25 percent of annual miles traveled or 25 percent of annual diesel fuel consumption) meet emission levels of 3.0 g/bhp-hr oxides of nitrogen (NO_x) or less and emissions of 0.1 g/bhp-hr PM or less (over the U.S. EPA line-haul duty cycle). UP has already upgraded existing locomotives that operate within the railyard (more than 25 percent of annual hours or 25 percent of annual miles traveled or 25 percent of annual diesel fuel consumption) to meet these emission levels.
- By December 31, 2011 and December 31, 2012, evaluate and provide recommendations, if any, for implementation of those changes in railyard operations that UP believes may significantly reduce railyard diesel PM emissions or changes in the location of the railyard emission sources that ARB believes may reduce health risk, and that meet all other specified criteria articulated in Section 6.
- Beginning one month after UP's acceptance of these commitments, identify any non-preempted switch or medium horsepower locomotive that operate more than five consecutive calendar days within the railyard and subsequently report this

information to ARB with UP's annual reports pursuant to the 1998 Locomotive NOx Fleet Average Agreement.

- Prepare and submit railyard diesel PM emission inventories, air dispersion modeling analyses, and emission reduction plans in each year specified in Table 2.
- Work collaboratively with ARB to provide ongoing communication of railyard diesel PM emission reduction progress to the public through local community meetings and fact sheets.

As part of a broader initiative, UP commits to:

- Between 2011 and December 31, 2015, work collaboratively with ARB to develop and implement a formal demonstration program for advanced locomotive engines or aftertreatment devices, or other mutually agreed upon technologies to reduce emissions within the railyard. The objective of the locomotive demonstration program will be to support separate, but potentially parallel, efforts to achieve ARB verification of one or more advanced locomotive engines or aftertreatment devices for ultra low emitting switch and medium horsepower locomotives to achieve emission levels that are equal to or less than U.S. EPA Tier 4 NOx and/or PM emission standards.
- Loan two existing genset switch or medium horsepower locomotives annually through 2015 and provide any necessary technical assistance as UP's in-kind contribution to support the demonstration program. If the demonstration program is completed prior to 2015, UP's obligation to make these locomotives available would be satisfied as of the completion date.

ARB commits to:

- Install and operate one particulate matter (PM2.5) ambient air quality monitor to provide an indication of air quality in the communities near the UP Commerce and BNSF Hobart Railyards, or to secure a commitment from the South Coast Air Quality Management District to do so, consistent with a siting and operation protocol supported by ARB.
- Prepare periodic health risk assessments (HRAs) as indicated in Table 3 for the railyard using the comprehensive railyard diesel PM emission inventories and air dispersion modeling analyses submitted by UP. Also, to prepare periodic estimates of future health risks, through 2020, following UP's submittal of draft and final emission reduction plans.
- Review the emission inventories, air dispersion modeling, and emission reduction plans submitted by UP to determine the sufficiency of the information provided and notify UP of any deficiencies.

- Determine compliance with the diesel PM emission reduction levels for each of the years specified in Table 1, based on the comprehensive inventories submitted by UP and independent ARB verification through inspections, field surveys, and other mechanisms.
- Monitor UP's compliance with the commitments in this document, determine if UP has met its obligations, and if UP has failed to meet the commitments in specified sections, submit rulemakings for locomotives and railyards to the Board within four months from the date of any final determination of non-compliance, as specified in Section 9.
- Support UP's efforts to evaluate options for operational changes with technical assistance to evaluate the potential impacts of such changes on health risk for the railyard.

1. What are the commitments to reduce diesel PM emissions?

UP shall meet the diesel PM emission reduction levels at the UP Commerce Railyard by the specified compliance deadlines set forth in Table 1 irrespective of receipt of public incentive funds. UP may, however, use incentive funds, if available, to achieve the emission reduction levels. This includes funds under Proposition 1B to replace, repower, or retrofit locomotives. To meet the 85 percent reduction level, ARB staff estimates that the railyard diesel PM emissions of 12.1 tons per year in 2005 will need to be reduced to about 1.8 tons per year by 2020.

Typical emission sources within the railyard affected by the diesel PM emission reduction levels in Table 1 include interstate line haul locomotives, switch and medium horsepower locomotives, drayage trucks, cargo handling equipment such as cranes and yard hostlers, transport refrigeration units operated with drayage trucks or railcars, and stationary engines and maintenance equipment. Passenger locomotive emissions are excluded from the calculation of the railyard diesel PM emissions used to determine compliance with Table 1.

Table 1
Diesel PM Emission Reduction Levels and Schedule for
UP Commerce Railway

Diesel PM Reductions From 2005 Baseline*	Compliance Deadline
50 percent	December 31, 2011
55 percent	December 31, 2013
69 percent	December 31, 2015
70 percent	December 31, 2017
85 percent	December 31, 2020

* If, after the effective date of this program, ARB reduces the stringency or extends the effective date of ARB regulations affecting non-locomotive diesel PM emission sources at railyards, or U.S. EPA reduces the stringency or extends the effective date of its locomotive PM emission standards, the diesel PM emission reduction levels will be adjusted by ARB accordingly.

ARB staff will use the emissions inventory reported in the 2005 Health Risk Assessment as the 2005 baseline, together with the comprehensive emission inventory submittals for subsequent years, to determine compliance with the Table 1 emission reduction levels. ARB staff will validate the inventory information through a thorough technical review of the data, ongoing ARB railyard inspections, ARB field surveys, and ARB tracking of locomotive and railyard operations.

2. Does growth change the commitments to reduce diesel PM emissions?

No. UP commits to reducing diesel PM emissions from the UP Commerce Railway by at least 85 percent by 2020 and meeting the intermediate levels in Table 1, regardless of the potential increases in railyard activity levels, such as the number of container lifts.

3. How can UP reduce railyard diesel PM emissions 85 percent by 2020?

ARB's supporting analysis for feasible emission reductions at UP Commerce Railway is located in a separate document entitled: *Basis for Proposed Commitments to Reduce Diesel Particulate Matter at the UP Commerce Railway (Basis for Proposed Commitments: June 2010)*. This *Basis for Proposed Commitments* document describes possible options that could be implemented to achieve the Table 1 diesel PM emission reduction levels.

In 2005, the railyard generated an estimated 12.1 tons per year of diesel PM emissions from freight operations. ARB staff estimates that existing U.S. EPA and ARB regulations and agreements will reduce diesel PM emissions at the railyard down to about 3.2 tons per year by 2020 (a 74 percent reduction). ARB staff estimates that UP

can further cut the railyard diesel PM emissions by 1.4 tons per year by 2020 (achieving an 85 percent reduction compared to 2005 levels).

4. What are the railroad commitments to prepare and submit emission inventories, air dispersion modeling, and emission reduction plans? What are the ARB commitments to publicly release the railroad documents and health risk assessments?

Table 2 shows the schedule for UP to submit the railyard diesel PM emission inventories, air dispersion modeling, and draft and final emission reduction plans. Table 3 identifies the dates by which ARB shall release the railyard diesel PM emission inventories, air dispersion modeling, health risk assessments, and the emission reduction plans for public review.

Table 2
UP Commerce Railyard
Schedule for UP Submittal of Documents:
Emission Inventories, Air Dispersion Modeling,
and Emission Reduction Plans

Railyard Operations Year	Emission Inventory ^a	Air Dispersion Modeling	Draft Emission Reduction Plan	Final Emission Reduction Plan
2009	Sep 30, 2010 (I)	-----	Oct 15, 2010	Dec 31, 2010
2010	Apr 1, 2011 (I)	-----	-----	-----
2011	Apr 1, 2012 (C)	Jun 1, 2012	Sep 1, 2012	Dec 31, 2012
2012	Apr 1, 2013 (I)	-----	-----	-----
2013	Apr 1, 2014 (C)	Jun 1, 2014	Sep 1, 2014	Dec 31, 2014
2014	Apr 1, 2015 (I)	-----	-----	-----
2015	Apr 1, 2016 (C)	Jun 1, 2016	Sep 1, 2016	Dec 31, 2016
2016	Apr 1, 2017 (I)	-----	-----	-----
2017	Apr 1, 2018 (C)	Jun 1, 2018	Sep 1, 2018	Dec 31, 2018
2018	Apr 1, 2019 (I)	-----	-----	-----
2019	Apr 1, 2020 (I)	-----	-----	-----
2020	Apr 1, 2021 (C)	-----	-----	-----

^a (C) = Comprehensive Emission Inventory. (I) = Interim Emission Inventory.

Table 3
Schedule for ARB Release of Documents:
Emission Inventories, Air Dispersion Modeling,
ARB Health Risk Assessments and Emission Reduction Plans

Railyard Operations Year	Railroad Emission Inventory ^a	Railroad Air Dispersion Modeling	ARB Health Risk Assessment	Railroad Draft Emission Reduction Plan ^b	Railroad Final Emission Reduction Plan ^b
2009	Oct 15, 2010 (I)	-----	Nov 15, 2010 ^c	Nov 1, 2010	Jan 15, 2011
2010	Apr 15, 2011(I)	-----	-----	-----	-----
2011	Apr 15, 2012 (C)	Jun 15, 2012	Oct 1, 2012	Oct 1, 2012	Jan 15, 2013
2012	Apr 15, 2013 (I)	-----	-----	-----	-----
2013	Apr 15, 2014 (C)	Jun 15, 2014	Oct 1, 2014	Oct 1, 2014	Jan 15, 2015
2014	Apr 15, 2015 (I)	-----	-----	-----	-----
2015	Apr 15, 2016 (C)	Jun 15, 2016	Oct 1, 2016	Oct 1, 2016	Jan 15, 2017
2016	Apr 15, 2017 (I)	-----	-----	-----	-----
2017	Apr 15, 2018 (C)	Jun 15, 2018	Oct 1, 2018	Oct 1, 2018	Jan 15, 2019
2018	Apr 15, 2019 (I)	-----	-----	-----	-----
2019	Apr 15, 2020 (I)	-----	-----	-----	-----
2020	Apr 15, 2021 (C)	-----	-----	-----	-----

^a (C) = Comprehensive Emission Inventory. (I) = Interim Emission Inventory.

^b Following submittal of the draft and final emission reduction plans, ARB staff will provide a brief supplemental document that estimates the associated health risk for future compliance years.

^c ARB will estimate the health risk for the 2009 calendar year based on the 2009 interim inventory and the 2005 Health Risk Assessment data.

a. Railyard Diesel PM Emission Inventories

i. Comprehensive Diesel PM Emission Inventories

UP commits to prepare the comprehensive diesel PM emission inventories for calendar year 2011, 2013, 2015, 2017, and 2020. UP shall prepare each comprehensive diesel PM emission inventory for the railyard in accordance with *ARB Railyard Emission Inventory Methodology* (2006) or its subsequent revisions, using data for the whole of the preceding calendar year. The comprehensive diesel PM emission inventories will include, to the extent reasonably available, detailed activity information such as locomotive event recorder data, hours of operation for cargo handling equipment and transport refrigeration units, and drayage truck time in operation within the railyard. The

comprehensive inventory will also identify activity and growth projections through 2020, and the basis for those projections.

ii. Interim Diesel PM Emission Inventories

UP commits to prepare interim diesel PM emission inventories for the railyard for calendar years 2009, 2010, 2012, 2014, 2016, 2018, and 2019, using data for the whole of the calendar year. The interim emission inventories will identify and utilize updates on locomotive usage, other equipment changes, and activity levels (e.g., number of lifts, drayage truck activities, locomotive shop releases, if applicable) to quantify changes to the last comprehensive diesel PM emission inventory. ARB staff will use the interim emission inventories to consider if there are any potential issues with UP continuing to make sufficient progress in order to meet the railyard diesel PM emission levels specified in Table 1.

b. Air Dispersion Modeling

UP commits to prepare air dispersion modeling based on the schedule in Table 2. Air dispersion modeling is to be performed in accordance with *ARB Health Risk Assessment Guidance for Railyard and Intermodal Facilities* (2006) or its subsequent revisions. UP also commits to provide source apportionment data for receptors defined in the air dispersion model and a source contribution analysis. UP also commits to analyze the impacts on the modeled air concentrations from significant updates to the modeling methodology, such as the current version of AERMOD model from U.S. EPA, the availability of updated meteorological data, or any other modeling parameters or inputs which could substantively affect the modeling estimations.

c. Health Risk Assessments

ARB staff commits to prepare health risk assessments using the comprehensive diesel PM emission inventories and air dispersion modeling results. The risk assessments are to be prepared in accordance with *ARB Health Risk Assessment Guidance for Railyard and Intermodal Facilities* (2006) or its subsequent revisions. The updated risk assessments will provide detailed information comparing excess cancer risks and non-cancer health effects with the estimates in the 2005 Health Risk Assessment. ARB staff will compare 2005 railyard emissions and associated health effects with risk assessment results for later years using the same or similar methodology, and also include a separate analysis for any subsequent changes in future year methodologies. ARB staff shall complete the health risk assessment reports for the railyard according to the schedule provided in Table 3.

Following UP's submittal of the draft and final emission reduction plans, ARB also commits to provide a brief supplemental document to the public that estimates the associated health risk for future compliance years. If ARB's health risk estimates for the draft emission reduction plan do not project that health risk will continue to be

reduced, ARB shall include that information in its written comments to UP on UP's draft emission reduction plan.

d. Emission Reduction Plans

UP commits to submit draft and final emission reduction plans according to the schedule in Table 2. The emission reduction plans are to be based on the most recent railyard diesel PM emission inventories. The purpose of the plans is for UP to detail the actions it will take to reduce railyard emissions down to the levels shown in Table 1 for the next compliance deadline, and the range of potential actions it intends to pursue for subsequent compliance deadlines. The emission reductions plans will document existing and projected railyard diesel PM emissions through 2020 (accounting for growth), describe changes in source category activities, identify existing and future actions to cut emissions and provide specific implementation schedules for these actions.

e. ARB Review

i. Diesel PM Emission Inventories and Air Dispersion Modeling

Within 20 calendar days of receipt of a railyard comprehensive or interim diesel PM emission inventory, or air dispersion modeling, ARB shall review the submission for completeness and accuracy and will notify UP of its findings. If ARB determines that the submission is not complete and accurate, it will, within the above 20-day time period, notify UP in writing of any deficiency and the reasons therefor, and make such written notification publicly available.

Upon receipt of a notice of deficiency from ARB, UP will within 15 calendar days correct the deficiencies and resubmit the submission to ARB. Within 10 calendar days, ARB will notify UP as to whether the submission is complete and accurate. If not, ARB will make a preliminary determination of non-compliance following the procedures set forth in Section 9.b.ii below.

ii. Emission Reduction Plans

Within 30 calendar days of receipt of a draft railyard emission reduction plan, ARB shall review the plan for completeness and accuracy and shall notify UP of its findings. If ARB determines that the draft plan is not complete and accurate, or that the draft plan, in ARB staff's opinion, cannot reasonably achieve the diesel PM reductions required by the next compliance deadline as set forth in Table 1, ARB shall, within the above 30-day time period, notify UP in writing of any deficiency and the reasons therefor, and make such written notification publicly available.

Within 30 calendar days of receipt of the final plan, ARB shall notify UP as to whether the plan is complete, accurate, and can reasonably achieve the diesel PM emission reductions required by the next compliance deadline as set forth in Table 1, and make

such written notification publicly available. If not, ARB shall make a preliminary determination of non-compliance as set forth in Section 9.b.ii below. Subsequently, if the administrative appeals panel fully or partially affirms the finding of ARB staff, UP will have 30 calendar days to submit to ARB a revised final plan for the next compliance deadline to cure any deficiencies upheld by the panel. If UP fails to submit a revised final plan or if ARB staff determines the revised final plan is still deficient, ARB may immediately commence the rulemaking process outlined in the opening paragraphs of Section 9.

f. Commitment to Follow Through on Final Emission Reduction Plan

UP shall take the necessary actions identified in the final emission reduction plan in accordance with the plan's implementation schedules to meet the diesel PM emission reduction levels for the next compliance deadline as set forth in Table 1. If UP determines that alternative actions not identified in its most recent plan should be implemented to achieve the emission reduction levels for the next compliance deadline, and the alternative actions materially alter the pathway for achieving the emission reductions in the plan, UP will within 15 days of its determination notify ARB of the alternative actions and the reasons for the changes.

5. What is the commitment for public meetings and outreach?

UP commits to hold a public meeting no later than December 15 of 2010, 2012, 2014, 2016, and 2018 with members of the surrounding community following the release of the most current ARB health risk assessment and UP draft emission reduction plan as specified in the Table 3 schedule. At the public meeting, UP and ARB staff will seek public input on the available documents prior to ARB's final determination on the emission reduction plan.

6. What is the commitment to evaluate options for operational changes?

UP commits to evaluate and provide recommendations, if any, for the implementation of those changes in railyard operations that UP believes may significantly reduce railyard diesel PM emissions or changes in the location of the railyard emission sources that ARB believes may reduce health risk. UP shall evaluate potential changes at the UP Commerce Railyard according to the following schedule, including:

- By December 31, 2011:
 - Installation of a stationary collection system to reduce locomotive maintenance and service related emissions.
 - Relocation of diesel-fueled yard tractors.

- By December 31, 2012:
 - Relocation of the locomotive maintenance and service facilities, including associated essential idling emissions.
 - Electric infrastructure to support operation of rail mounted gantry cranes.

UP will conduct this one-time operational review considering, among other things, the potential diesel PM emissions reductions that could be achieved, the technical feasibility of such actions, the operational impacts on the railyard's throughput velocity and fluidity, safety, the availability of land and access, the costs and cost-effectiveness of such actions, and any railyard-specific factors at the UP Commerce Railyard. Each operational option shall be analyzed, and recommendations, if any, for implementation will be completed as soon as possible for this railyard, but in any case not later than December 31, 2012. UP shall provide the assessment and any recommendations for implementation of operational changes to ARB, and ARB will make them publicly available.

ARB commits to support these efforts with technical assistance and to evaluate the impacts of each potential operational change on the maximum individual cancer risk for the railyard. ARB will make the results of this evaluation publicly available.

7. Will UP be able to access incentive funding to support these commitments?

UP, to the extent feasible, will compete for federal, state, local, and private incentive funding to supplement its capital expenditures, and to accelerate further diesel PM and NOx emission reductions at this railyard.

Consistent with State law and Board policies, ARB staff will support efforts by UP to seek a mix of federal, state, and local incentive funding to accelerate UP's ability to meet the diesel PM emission reduction levels for the railyard.

8. What are the provisions for UP and ARB to meet and confer by 2018?

UP agrees to meet and confer with ARB by 2018 to evaluate and explore opportunities for further diesel PM emission reductions by 2020 and beyond.

9. What are the mechanisms for ARB to enforce these commitments? What would trigger ARB to initiate regulatory action?

Upon a final determination of the ARB Executive Officer, or if appealed, of the administrative appeals panel, that UP has failed to meet its commitments set forth herein at Sections 1, 2, 4, 5, and 6, ARB commits to submit to the Board within four months from the date of the determined failure the following locomotive and railyard rulemakings:

- A regulation of switch and medium horsepower locomotives that are not preempted under federal law (e.g., locomotives that primarily operate in California and that were manufactured prior to 1973 or that exceed 133 percent of their useful life since original manufacture or last remanufacture, whichever is later).
- A designated railyard regulation that requires risk reduction audits and plans to achieve targeted emission reduction levels.

Nothing in this agreement precludes ARB from developing regulations within its authority as required to achieve the goals of the State Implementation Plan and Climate Change Scoping Plan.

ARB will also consider the following actions:

- Pursue federal legislation to expand ARB authority to adopt regulations for in-use locomotives.
- Petition U.S. EPA to strengthen existing federal locomotive regulations.

ARB is designated as the agency responsible for enforcement of the UP commitments. The enforcement authorities specified herein may only be exercised by ARB. UP may, at any time, initiate informal consultations with ARB to identify and resolve concerns or other issues regarding compliance with its commitments herein.

In determining whether UP has met its commitments, the parties agree to the following exclusive process.

a. ARB Verification of Railyard Diesel PM Emission Reduction Levels

To determine whether UP has met the UP Commerce Railyard diesel PM emission reduction levels specified in Table 1, ARB will review the comprehensive emission inventories and interim emission inventories in relation to information collected by ARB staff. ARB will conduct semi-annual railyard inspections, which will also be augmented by ARB photographic tracking and field surveys of railyard switch and medium horsepower locomotives. In addition, ARB staff will use the annual UP locomotive NOx fleet average agreement submittals to verify the number and tier of interstate line haul locomotives operating within the South Coast Air Basin. ARB staff will also randomly conduct inspections of UP interstate line haul locomotives entering and exiting the South Coast Air Basin to help assess compliance with the Table 1 diesel PM emission reduction levels.

b. Preliminary Determination of Non-Compliance**i. Failure to Comply with the Railyard Diesel PM Emissions Reduction Levels**

Within 30 working days of receipt of the comprehensive railyard diesel PM emission inventories, ARB shall make a written preliminary determination notifying UP as to whether UP met or failed to meet the diesel PM emission reduction levels specified in Table 1 for the previous year. If ARB determines that UP has failed to meet its emission reduction levels, ARB shall within the same 30 working days provide UP with its written preliminary determination, which will set forth the reasons for its findings. ARB will, with the greatest precision possible based on data submitted by UP, calculate the difference between the railyard diesel PM emission reduction level reported by UP and the levels required in Table 1. ARB and UP shall use their respective best efforts to expedite submission and review of the reports. The time periods provided for ARB to make a preliminary compliance determination may be extended by written agreement between ARB and UP.

Within 15 calendar days of receipt of ARB's preliminary determination that UP has failed to meet the emission reduction levels, UP may request to meet and confer with ARB and/or provide ARB with such information and analysis as UP believes appropriate to demonstrate its compliance with the Table 1 diesel PM emission reduction levels. If a meet and confer is requested, the parties shall meet within 10 working days of the request. Within 15 calendar days after receipt of UP's response or after meeting and conferring with ARB, ARB shall review and consider the information provided by UP and make a final determination, in writing, as to whether UP has failed to meet the Table 1 diesel PM emission reduction levels. ARB will make such final written determination publicly available.

For the Table 1 compliance deadlines in 2011, 2013, 2017, or 2020, if ARB staff determines that UP missed its percentage target for the UP Commerce Railyard by not more than 2 percent (e.g., reaching a 53 percent compliance level where 55 percent was required), UP will be given the opportunity to cure this deficiency within by the next calendar year, provided it demonstrates the new compliance level by conducting a full inventory analysis. For the Table 1 compliance deadline 2015, if ARB staff determines that UP missed its percentage target for the UP Commerce Railyard by not more than 2 percent (e.g., reaching a 67 percent compliance level where 69 percent was required), UP will be given the opportunity to cure this deficiency by the next compliance deadline in 2017, provided it demonstrates the new compliance level by conducting a full inventory analysis. Failure to conduct the analysis or failure to cure the deficiency by the required year shall constitute a failure to meet the appropriate targets in Table 1.

ii. Failure to Comply with Other Railyard Commitments

If ARB makes a preliminary determination that UP has failed to meet any other of its commitments set forth herein, ARB shall notify UP, in writing, of its findings. Within 15 calendar days, UP may request to meet and confer with ARB and/or provide ARB with such information and analysis as UP believes appropriate to demonstrate its compliance. If a meet and confer is requested, the parties shall meet within 10 working days of the request.

Within 15 calendar days after receipt of UP's response or after meeting and conferring with ARB, ARB will review and consider the information provided by UP and make a final determination, in writing, as to whether UP has failed to meet any of its non-emission reduction-related commitments. ARB will make such final written determination publicly available.

c. Final Determination by ARB of Non-Compliance

A final determination of non-compliance shall specifically identify the reasons why ARB has found UP not to be in compliance with agreed-upon commitments. A final determination of non-compliance for failure to meet the emission reduction levels set forth in Table 1 will provide ARB's final calculations of the emission reduction levels of the UP Commerce Railyard. Findings of UP's failure to meet other commitments shall set forth in detail ARB's determination of why the commitments have not been met. ARB will publicly post its final determination notice of non-compliance on its website and make available such notice on a list serve that will be established for notifying the public about compliance with the railyard emission reduction commitments.

d. Dispute Resolution

In the event of a dispute concerning an ARB final determination of non-compliance or any of the parties' respective commitments, the party asserting the dispute shall provide notice to the other party and set forth the issues underlying the dispute. The parties shall meet and confer regarding the identified issues within 15 working days after receipt of notification, and if they cannot reach agreement within 15 working days after such consultation, shall submit their respective positions to an administrative appeals panel, which shall consider the matter as expeditiously as possible. Except for confidential trade secret information, ARB will publicly post on its website and make available by the aforementioned list serve all documents submitted by the parties' to the administrative hearing panel. ARB will also post and make available a notice that interested persons may submit written statements of position and supporting documentation to the administrative appeals panel that will be made part of the record of the hearing.

i. Composition of Administrative Appeals Panel

The panel shall be comprised of one member selected by ARB, one member selected by UP, and a third member selected by the initial two members from a list of five or more persons that the parties shall agree to within 120 calendar days of the parties' exchange of commitment letters. The list shall include persons qualified to hear matters that are likely to be heard by the dispute resolution panel. From the list of five or more persons, the parties shall select the person most readily available to hear the matter within 30 calendar days (or as soon thereafter as possible) from the date that the person is contacted by either the ARB or UP panel member. If no person from the previously selected list is available to hear the matter within 45 calendar days of being notified, the ARB and UP panel members shall contact an arbitration referral service, identify the matter(s) at issue, and accept from the service a list of five persons who are qualified to hear the matter(s) at issue and are readily available. The two panel members selected by the parties may mutually agree on one of the five persons to serve on the panel, but if they cannot agree, each panel member will alternatively strike one person from the list until just one person remains. The two panel members selected by the parties will serve as technical advisors to the third panel member, who shall serve as the presiding member of the panel and who shall be solely responsible for making the final decision on behalf of the panel.

ii. Administrative Appeals Panel Process

Unless otherwise determined that the matter(s) at issue require oral testimony, the panel shall make its decision based upon written submission of the parties. If a hearing to take testimony is determined to be necessary, the hearing shall be public. The panel shall determine the time and place of the hearing, and will set forth the procedures to be followed at the hearing. The panel will take all precautions necessary to preserve the confidentiality of trade secret or other confidential information, and will consider such evidence in a closed meeting.

iii. Public Comments to Administrative Appeals Panel

Interested persons may submit written statements and supporting documentation to the panel regarding the matter(s) at issue before the matter(s) are taken under submission; however, only ARB and UP shall be parties to the dispute resolution process.

iv. Final Decision by Administrative Appeals Panel

The presiding member shall issue his or her final decision on behalf of the panel within 30 calendar days from the date that the matter is submitted to the panel. While either party receiving an adverse decision from the panel may seek expedited review of the decision in the Superior Court for the County of Sacramento, if the panel's decision upholds the Executive Officer's final determination of non-compliance, ARB may immediately commence the rulemaking process outlined in the opening paragraphs of

this section. If judicial review is not sought, then the decision of the panel will be binding on the parties.

Each party to the proceedings outlined above will bear its own costs and fees, with the exception that the parties agree to split all costs and fees arising from the employment of the third panel member.

June 15, 2010

Appendix D

June 15, 2010

This Page Intentionally Left Blank

**Basis for Proposed Commitments
to Reduce Diesel Particulate Matter at the
UP ICTF/DOLORES RAILYARDS**

This revised document explains the Air Resources Board (ARB or Board) staff's basis and rationale for the commitments we propose to request from Union Pacific (UP) Railroad (Railroad) to further reduce emissions of diesel particulate matter (PM) at the UP ICTF/Dolores Railyards. The purpose is to decrease the health risk from diesel PM at this high priority railyard to protect nearby communities, consistent with the Board's direction.

ARB staff independently assessed the potential for feasible emission reductions through the use of cleaner, cost-effective technology that is currently available or that we expect will become available over the next decade. The proposed commitments are based on the level of emission reductions likely to be achievable with the accelerated introduction of this technology. We also present ARB's estimate of the health risk reduction that would result from the Railroad's acceptance and implementation of the commitments.

1. What would the proposed commitments accomplish?

These commitments would require that the Railroad achieve the expected emission reductions from existing regulations and agreements, and that the Railroad take any additional actions needed to meet the diesel PM emission levels, regardless of any increases in activity or growth at the UP ICTF/Dolores Railyards.

With these commitments, the remaining diesel PM emissions and health risk in 2015 would be 9 percent lower than under the existing regulations and agreements alone, and 32 percent lower by 2020.

The commitments would establish enforceable requirements, tracking mechanisms, and deadlines for UP Railroad to reduce diesel PM emissions at the railyard 60 percent by 2011, increasing to a reduction of 85 percent by 2020 (relative to calendar year 2005 levels). In each benchmark year, the remaining emissions could not be exceeded despite any growth or increase in activity at the railyard, including growth in the number of containers moved. The higher the growth, the more actions the Railroad would need to take to reduce emissions.

In most cases, there is a high correlation between reducing diesel PM emissions and reducing health risk. Our analysis links the two to estimate the expected change in health risk in proportion to the change in emissions. This relationship can vary based on the location of the emission sources in relation to the people exposed. ARB will periodically assess and publish the expected changes in health risk in response to past actions implemented by the Railroad and future actions proposed by the Railroad to reduce emissions.

The commitments would provide transparency and require regular public updates on: the equipment operating in the yard, the Railroad's plans to upgrade each type of equipment, and the resulting changes in emissions and health risk.

- The Railroad would develop and submit emission inventories, air dispersion modeling, and emission reduction plans to ARB on a defined schedule.
- ARB staff would use these submittals to periodically update the health risk assessment for the railyard to reflect the new emission reductions and any changes in the location of the emission sources within the facility. ARB would provide updated estimates of the projected health risks through 2020, concurrent with the release of the draft emission reduction plans.
- ARB would publish all of these documents for public review and comment on a defined schedule.
- The Railroad and ARB would hold community meetings to seek public input on the draft emission reduction plans and the updated health risk assessments.

The commitments would provide independent ARB verification of locomotives operating in the railyard to determine the number of units at each emission control level and compare those counts to data submitted by the Railroad.

The commitments would require the Railroad to evaluate the emission reductions associated with operational changes (for example, moving truck gates and equipment operations to alternate locations within the facility). ARB staff would assess the impact of such changes on health risk.

If the Railroad did not deliver the required emission reductions on schedule, the commitments would require ARB staff to bring regulatory proposal(s) to the Board within four months of a final finding of non-compliance.

2. How did ARB staff develop the percent reduction in diesel PM emissions for the proposed commitments? What actions are reflected in the numbers?

Railyard-Specific Data on Emission Sources. We began by evaluating the number, activity, and control level of the specific emission sources operating at the UP ICTF/Dolores Railyards, including:

- The interstate line haul locomotive fleet that serves the South Coast Air Basin and the railyard.
- The individual switch locomotives in the railyard.
- The individual cargo handling equipment in the railyard.
- The fleet of drayage trucks serving the railyard.
- The transport refrigeration units operated with drayage trucks or railcars in the railyard.

To project railyard emissions in future years, we used the equipment activity and controls, together with anticipated growth. ARB staff relied on a 1.5 percent per year increase in fuel use, which equates to a roughly 3 percent per year increase in containers, based on historic growth rates over the last 12 years.

Projected Emissions with Existing Program. We then evaluated how the existing program of regulations and agreements affects the kinds of equipment that will be operating and the emissions from that equipment.

We refer to different levels of emissions from locomotives based on emission standards set by the U.S. Environmental Protection Agency (U.S. EPA). The oldest locomotives (Pre-Tier 0) don't have emission controls. Tier 0 locomotives have modest NOx controls, while Tier 1 locomotives have additional NOx and PM controls. All new locomotive engines today meet at least Tier 2 emission standards to cut both pollutants. New Tier 3 locomotives will be available in the future with further PM controls, while advanced technology Tier 4 locomotives will significantly reduce NOx and PM emissions.

The existing program numbers in this document reflect the benefits of the following rules and agreements to reduce diesel PM emissions and health risk from railyard operations:

- Adopted ARB regulations for drayage trucks, cargo equipment, transport refrigeration units, and cleaner fuel for intrastate locomotives.
- The 1998 ARB/Railroads Agreement to reduce fleet average emissions of nitrogen oxides (NOx) from locomotives in the South Coast Air Basin to Tier 2 levels by 2010. The actions taken by the railroads to comply with these NOx levels are providing additional PM reductions not mandated by the Agreement.
- The 2005 ARB/Railroads Agreement to reduce diesel PM emissions (which has an associated reduction in health risk) near railyards, through the use of idle reduction devices and cleaner fuels, as well as prevention of excess smoke from locomotives.
- Under the 2008 U.S. EPA rulemaking, when railroads remanufacture locomotives, these locomotives must meet a PM emission standard that is 50 percent lower than the previous level.

Table 1 shows the railyard emissions in 2005, and the declining emissions in 2010, 2015, and 2020 due to the benefits of the existing program. This table also shows the additional reductions attributable to the proposed commitments (beyond the existing program) in 2015 and 2020.

In Table 1 below, the estimated emission reductions for various technologies are preliminary and are subject to revision upon confirmation of actual emissions performance.

Table 1
UP ICTF/Dolores Railyards:
Estimated Diesel PM Emissions by Equipment Type
 (tons per year)

Equipment Type	2005	2010	2015	2020
Emissions with Existing Program Only				
Freight Locomotives				
- Line Haul	1.2	0.9	0.85	0.8
- Switch	5.6	1.4	1.4	1.4
- Service/Testing	1.2	0.9	0.85	0.8
<i>Subtotal for Locomotives</i>	8.0	3.2	3.1	3.0
Cargo Equipment	4.4	2.2	1.1	0.45
Drayage Trucks	5.9	1.1	0.9	0.6
Transport Refrigeration Units	1.5	0.7	0.5	0.2
Diesel Heavy Equipment	0.4	0.2	0.1	0.1
Maintenance/Stationary	0.06	0.06	0.06	0.06
<i>Subtotal for Other Equipment</i>	12.3	4.3	2.7	1.4
Total Tons	20.3	7.5	5.8	4.4
Reduction (%) from 2005		63%	71%	78%
Emissions with Proposed Commitments				
(Table 2 shows the potential sources of the additional emission reductions noted below)				
Additional Emission Reductions with Commitments			-0.5	-1.4
Tons Remaining	20.3	7.5	5.3	3.0
Reduction (%) from 2005		63%	74%	85%
Additional Reduction (%) Attributable to the Commitments in Future Years				
			9%	32%

Possible Paths to Further Reduce Emissions. Locomotives account for the majority of the remaining emissions after implementation of the existing program. In response, we focused our evaluation of the additional actions to further reduce emissions on locomotives. We believe the following accelerated upgrades and other actions could be implemented to achieve additional emission reductions:

- a. Ensure that any additional switch or medium horsepower locomotives that operate within the railyard (more than 25 percent of annual hours or 25 percent of annual miles traveled or 25 percent of annual diesel fuel consumption) meet emission levels of 3.0 g/bhp-hr NO_x or less and emissions of 0.1 g/bhp-hr PM or less (over the U.S. EPA line-haul duty cycle).
- b. Between 2013 and 2020, upgrade the fleet of line-haul locomotives to Tier 3 emission levels on average (based on a combination of increasingly cleaner locomotives).
- c. Between 2014 and 2020, retrofit Tier 3 switch and medium-horsepower locomotives with diesel PM filters or equivalent technology, or replace them with Tier 4 locomotives, once those technologies become commercially available, or begin implementing operational changes.
- d. By 2020, accelerate Tier 4 line haul locomotives into the fleet serving the Railyard, install electric infrastructure to support rail mounted gantry cranes and stationary transport refrigeration units, and install a stationary collection system to reduce locomotive maintenance and service related emissions. Also, relocate the locomotive maintenance and service facilities, the truck gate, diesel-fueled yard tractors, and transport refrigeration units.

ARB recognizes that there are other pathways than those noted above for the railroad to further reduce emissions.

Establishing the Performance Standard for Emission Reductions. We quantified the additional benefits of implementing the path described above, as shown in Table 2, and used the results to set the performance standards for the proposed commitments. As shown in Table 3, the performance standards are expressed as the percent emission reduction from 2005 levels to be achieved by each compliance deadline.

The Railroad would have to meet the emission reduction levels in Table 3, but would have the discretion to select the most efficient combination of actions and path to do so. The Railroad would define its detailed strategy to upgrade equipment and implement any operational changes in each emission reduction plan.

Table 2
UP ICTF/Dolores Railyards:
Diesel PM Emission Reductions from
Potential Actions Identified by ARB Staff
 (tons per year)

Potential Actions*	2015	2020
(a) Any additional switch or medium horsepower locomotives have cleaner Tier 3/gen-set technology	0	0
(b) Upgrade line-haul locomotives to Tier 3 emission levels on average (included in existing program)	N/A	N/A
(c) Retrofit or replace Tier 3 switch and medium-horsepower locomotives with diesel PM filters or equivalent technology or begin implementing operational changes	-0.5	- 0.8
(d) Accelerate Tier 4 line haul locomotives, electrify cranes, install stationary collection system, and implement operational changes	0	- 0.6
Additional Emission Reductions with Commitments	-0.5	-1.4

* Specific actions to be detailed by UP in the Railyard Emission Reduction Plan.

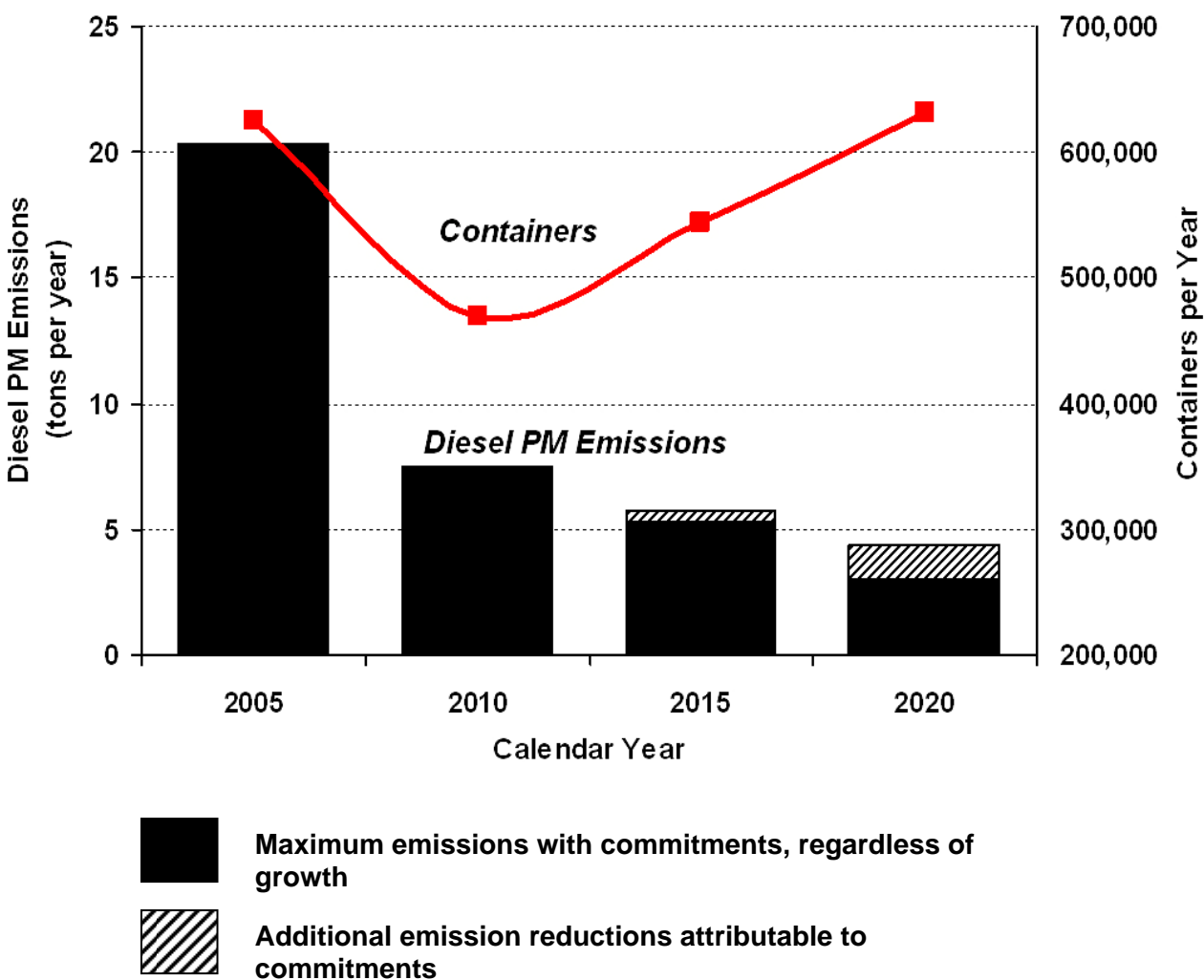
Table 3
UP ICTF/Dolores Railyards:
Proposed Commitments to Reduce Diesel PM Emissions

Diesel PM Reductions From 2005 Baseline	Compliance Deadline
60 percent	December 31, 2011
65 percent	December 31, 2013
74 percent	December 31, 2015
75 percent	December 31, 2017
85 percent	December 31, 2020

3. How would growth affect the emission levels to be achieved under the commitments?

The commitments would require that emissions be reduced to specific levels, regardless of growth. The greater the growth, the greater the reductions that the Railroad must achieve to meet those fixed levels. Figure 1 illustrates the decline in diesel PM emissions that would result under the existing program plus the commitments, while cargo grows up to approximately 630,000 container lifts by 2020.

Figure 1
UP ICTF/Dolores Railyards:
Projected Cargo Growth and Diesel PM Emissions
With Existing Program Plus Proposed Commitments



This cargo forecast is based on historical container lift volumes at the railyard, correlated with UP and BNSF national locomotive diesel fuel consumption. The container projections after 2010 rely on a three percent per year container growth rate for this yard, and the emissions estimates assume a corresponding 1.5 percent per year growth in fuel use.

4. How much would the proposed commitments reduce the potential diesel PM health risks near the railyard?

Compared to 2005 numbers, ARB staff estimates that the emission reductions required under the commitments would cut the maximum individual cancer risk 62 percent by 2010, rising to 85 percent by 2020, as shown in Table 4. The reductions would also significantly decrease the number of people exposed to an excess cancer risk above 10 in a million in 2010, as shown in Table 5.

Table 4
UP ICTF/Dolores Railyards:
Estimated Maximum Individual Cancer Risk
(Excess Cancer Risk in a Million)

	Excess Cancer Risk			
	2005	2010	2015	2020
Existing Program	800	300	230	175
Existing Program + Commitments	N/A	300	210	120
Total Reduction (%) from 2005 Due to Existing Program + Commitments	N/A	62%	74%	85%

Table 5
UP ICTF/Dolores Railyards:
Estimated Population Exposure to
Excess Cancer Risk Greater than 10 in a Million

	Number of People Exposed			
	2005	2010	2015	2020
Existing Program	600,000	270,000	210,000	120,000
Existing Program + Commitments	N/A	270,000	180,000	65,000
Total Reduction (%) from 2005 Due to Existing Program + Commitments	N/A	55%	70%	89%

5. How would ARB staff verify that the Railroad is achieving the diesel PM emission reductions required under the commitments?

To monitor compliance, ARB staff would thoroughly review the comprehensive inventories of equipment, activity, and emissions provided by the Railroad. We will also independently develop our own information sources to verify the data provided by the Railroad. ARB staff plans to: (1) conduct semi-annual railyard emission source inspections through 2015, (2) track locomotive activity through photographic databases, and (3) conduct unannounced field surveys outside the railyard to count the number, type, and emissions level of operating locomotives.

We will also cross-check the Railroad's inventory with data submitted to comply with ARB regulations for cargo equipment, drayage trucks, and transport refrigeration units; as well as the 1998 Locomotive NOx Fleet Average Agreement.

6. What alternatives to the proposed commitments did ARB staff evaluate?

Staff evaluated two primary alternatives to the proposed commitments – ARB regulations for non-preempted locomotives and electrification of cargo equipment at the railyard. We are convinced that the proposed commitments would ensure significantly greater and faster reductions in diesel PM emissions and health risk than the regulatory alternatives described below.

ARB Regulation of Non-Preempted Locomotives

To evaluate the effectiveness of this approach in reducing emissions from locomotives at the UP ICTF/Dolores Railyards, we considered the number of units that could be regulated. For the reasons described below, there are virtually no non-preempted locomotives that currently operate on a continuous basis at the UP ICTF/Dolores Railyards or in the South Coast Air Basin. Thus, a regulation to reduce diesel PM emissions from non-preempted locomotives would yield little to no air quality benefits in this region.

Under the Federal Clean Air Act and U.S. EPA regulation, states are expressly preempted from regulating the emissions of newly built or remanufactured locomotives. U.S. EPA did suggest (Preamble to 2008 rulemaking) that states may have the authority to regulate locomotives that have exceeded their “useful lives,” defined as 133 percent of the time to the first remanufacture. This would make line haul locomotives eligible for state regulation when they are roughly ten years old. Switch and medium horsepower locomotives typically last longer until the first full remanufacture (defined by U.S. EPA), making them eligible for state regulation when they are about 15 years old.

In response to the requirements of the 1998 Locomotive NOx Fleet Average Agreement in the South Coast Air Basin, UP has replaced non-preempted switch locomotives within the railyard with Tier 0 or better switch or medium horsepower locomotives. To comply,

UP is also using nearly all Tier 0, 1, and 2 interstate line haul locomotives (rather than non-preempted locomotives) for operations in the South Coast Air Basin.

ARB Regulation to Require Electrification of Cargo Handling Equipment

A second alternative would be an ARB regulation to require the electrification infrastructure needed to reduce railyard cargo handling equipment diesel PM emissions to near zero. As discussed below, these emission reductions are technically feasible for several railyard applications, but are not cost-effective today, especially in comparison with reductions from locomotives.

At this time, staff believes it is more effective to focus limited resources on providing reductions of locomotive emissions, rather than diverting significant resources to the smaller remaining cargo handling equipment emissions. However, an investment in electrification infrastructure could provide cleaner power for transport refrigeration units operating at the railyard.

An existing ARB regulation for diesel cargo handling equipment used at ports and intermodal railyards requires this equipment to achieve the most stringent Tier 4 PM emissions standards by about 2015. Based on staff's analysis, the existing regulation will require railyard equipment to be about 90 percent cleaner than the equipment used in 2005.

By 2020, the diesel PM emissions from cargo handling equipment at the UP ICTF/Dolores Railyards will be reduced to about 0.45 ton per year. The capital costs to install 10 electrified rail mounted gantry cranes would be \$5 million or more per unit (about \$50 million for all), plus electrification infrastructure costs (\$50 million), for a total cost of about \$100 million. The total electrification capital costs, divided by the remaining diesel crane and yard hostler NOx and diesel PM emissions within the railyard, would result in a cost-effectiveness of greater than \$500 per pound of emissions reduced.

The capital cost to replace 56 diesel yard hostlers with electric yard hostlers is about \$200,000 per unit (about \$11 million for all). The total electric yard tractor capital costs, divided by the remaining diesel yard tractor NOx and diesel PM emissions within the railyard, would result in a cost-effectiveness of about \$100 per pound of emissions reduced.

Locomotives are the largest remaining diesel PM emissions source within the railyard after 2015, representing up to 70 percent of remaining railyard diesel PM emissions. Locomotive NOx and PM emission reductions have a cost-effectiveness range of \$1 to \$10 per pound of NOx and PM emissions reduced.

ARB rulemakings must consider the cost and cost-effectiveness of new technologies over time, as well as the benefits. Accelerating or increasing the reductions that will be achieved under the existing ARB regulation for cargo handling equipment by mandating

electric equipment would provide a small increment of additional reductions at a high cost. We do not expect that ARB staff could recommend a regulatory action to mandate electrification of cargo handling equipment at this time due to the very poor cost-effectiveness.

Commitments for the UP ICTF/Dolores Railyards

The Air Resources Board (ARB) requests additional commitments from Union Pacific Railroad (UP) to further reduce diesel particulate matter (PM) emissions at the UP Intermodal Container Transfer Facility (ICTF) and UP Dolores Railyards between 2010 and 2020.

The UP ICTF Railyard is an intermodal railyard which was originally built in 1987. The adjacent UP Dolores Railyard is a classification and locomotive maintenance facility built in 1943. For purposes of this document, the UP ICTF/Dolores Railyards are treated as one combined railyard facility (the “railyard”).

If UP fails to 1) achieve the Table 1 diesel PM emission reduction levels in 2011, 2013, 2015, 2017, or 2020; or 2) provide comprehensive or interim diesel PM emission inventories, air dispersion modeling, or emission reduction plans in compliance with the schedule in Table 2; ARB will initiate rulemakings as specified in Section 9. The commitments, and ARB oversight, will ensure that the UP ICTF/Dolores Railyards diesel PM emission levels are achieved, verifiable, and enforceable.

Summary of Commitments for the UP ICTF/Dolores Railyards

UP commits to do the following at this railyard:

- Reduce 2005 diesel PM emissions from railyard operations by at least 60 percent by 2011, increasing the reductions to at least 85 percent by 2020, with intermediate commitments for emission reductions in calendar years 2013, 2015, and 2017 to ensure steady progress. UP is implementing existing U.S. Environmental Protection Agency (U.S. EPA) and ARB regulations and agreements and commits to initiate any additional actions needed to meet the diesel PM emission reduction levels on the stated schedule. This commitment shall be met irrespective of any increase in activity or growth at the UP ICTF/Dolores Railyards through 2020, including any increase in capacity resulting from the proposed UP ICTF Modernization Plan.
- Ensure that any additional switch or medium horsepower locomotives that operate within the railyard (more than 25 percent of annual hours or 25 percent of annual miles traveled or 25 percent of annual diesel fuel consumption) meet emission levels of 3.0 g/bhp-hr oxides of nitrogen (NOx) or less and emissions of 0.1 g/bhp-hr PM or less (over the U.S. EPA line-haul duty cycle). UP has already upgraded existing locomotives that operate within the railyard (more than 25 percent of annual hours or 25 percent of annual miles traveled or 25 percent of annual diesel fuel consumption) to meet these emission levels.
- By December 31, 2011 and December 31, 2012, evaluate and provide recommendations, if any, for implementation of those changes in railyard operations that UP believes may significantly reduce railyard diesel PM

emissions or changes in the location of the railyard emission sources that ARB believes may reduce health risk, and that meet all other specified criteria articulated in Section 6.

- Beginning one month after UP's acceptance of these commitments, identify any non-preempted switch or medium horsepower locomotive that operates more than five consecutive calendar days within the railyard and subsequently report this information to ARB with UP's annual reports pursuant to the 1998 Locomotive NOx Fleet Average Agreement.
- Prepare and submit railyard diesel PM emission inventories, air dispersion modeling analyses, and emission reduction plans in each year specified in Table 2.
- Work collaboratively with ARB to provide ongoing communication of railyard diesel PM emission reduction progress to the public through local community meetings and fact sheets.

As part of a broader initiative, UP commits to:

- Between 2011 and December 31, 2015, work collaboratively with ARB to develop and implement a formal demonstration program for advanced locomotive engines or aftertreatment devices, or other mutually agreed upon technologies to reduce emissions within the railyard. The objective of the locomotive demonstration program will be to support separate, but potentially parallel, efforts to achieve ARB verification of one or more advanced locomotive engines or aftertreatment devices for ultra low emitting switch and medium horsepower locomotives to achieve emission levels that are equal to or less than U.S. EPA Tier 4 NOx and/or PM emission standards.
- Loan two existing gen-set switch or medium horsepower locomotives annually through 2015 and provide any necessary technical assistance as UP's in-kind contribution to support the demonstration program. If the demonstration program is completed prior to 2015, UP's obligation to make these locomotives available would be satisfied as of the completion date.

ARB commits to:

- Prepare periodic health risk assessments (HRAs) as indicated in Table 3 for the railyard using the comprehensive railyard diesel PM emission inventories and air dispersion modeling analyses submitted by UP. Also to prepare periodic estimates of future health risks, through 2020, following UP's submittal of draft and final emission reduction plans.

- Review the emission inventories, air dispersion modeling, and emission reduction plans submitted by UP to determine the sufficiency of the information provided and notify UP of any deficiencies.
- Determine compliance with the diesel PM emission reduction levels for each of the years specified in Table 1, based on the comprehensive inventories submitted by UP and independent ARB verification through inspections, field surveys, and other mechanisms.
- Monitor UP's compliance with the commitments in this document, determine if UP has met its obligations, and if UP has failed to meet the commitments in specified sections, submit rulemakings for locomotives and railyards to the Board within four months from the date of any final determination of non-compliance, as specified in Section 9.
- Support UP's efforts to evaluate options for operational changes with technical assistance to evaluate the potential impacts of such changes on health risk for the railyard.

1. What are the commitments to reduce diesel PM emissions?

UP shall meet the diesel PM emission reduction levels at the UP ICTF/Dolores Railyards by the specified compliance deadlines set forth in Table 1 irrespective of receipt of public incentive funds. UP may, however, use incentive funds, if available, to achieve the emission reduction levels. This includes funds under Proposition 1B to replace, repower, or retrofit locomotives. To meet the 85 percent reduction level, ARB staff estimates that the railyard diesel PM emissions of 20.3 tons per year in 2005 will need to be reduced to about 3.0 tons per year by 2020.

Typical emission sources within the railyard affected by the diesel PM emission reduction levels in Table 1 include interstate line haul locomotives, switch and medium horsepower locomotives, drayage trucks, cargo handling equipment such as cranes and yard hostlers, transport refrigeration units operated with drayage trucks or railcars, and stationary engines and maintenance equipment. Passenger locomotive emissions are excluded from the calculation of railyard diesel PM emissions and reductions used to determine compliance with Table 1.

Table 1
Diesel PM Emission Reduction Levels and Schedule for
UP ICTF/Dolores Railyards

Diesel PM Reductions From 2005 Baseline*	Compliance Deadline
60 percent	December 31, 2011
65 percent	December 31, 2013
74 percent	December 31, 2015
75 percent	December 31, 2017
85 percent	December 31, 2020

* If, after the effective date of this program, ARB reduces the stringency or extends the effective date of ARB regulations affecting non-locomotive diesel PM emission sources at railyards, or U.S. EPA reduces the stringency or extends the effective date of its locomotive PM emission standards, the diesel PM emission reduction levels will be adjusted by ARB accordingly.

ARB staff will use the emissions inventory reported in the 2005 Health Risk Assessment as the 2005 baseline, together with the comprehensive emission inventory submittals for subsequent years, to determine compliance with the Table 1 emission reduction levels. ARB staff will validate the inventory information through a thorough technical review of the data, ongoing ARB railyard inspections, ARB field surveys, and ARB tracking of locomotive and railyard operations.

2. Does growth change the commitments to reduce diesel PM emissions?

No. UP commits to reducing diesel PM emissions from the UP ICTF/Dolores Railyards by at least 85 percent by 2020 and meeting the intermediate levels in Table 1, regardless of whether the proposed UP ICTF Modernization Plan is implemented and regardless of the potential increases in railyard activity levels, such as the number of container lifts.

3. How can UP reduce railyard diesel PM emissions 85 percent by 2020?

ARB's supporting analysis for feasible emission reductions at UP ICTF/Dolores Railyards is located in a separate document, entitled *Basis for Proposed Commitments to Reduce Diesel Particulate Matter at the UP ICTF/Dolores Railyards (Basis for Proposed Commitments: June 2010)*. This *Basis for Proposed Commitments* document describes possible options that could be implemented to achieve the Table 1 diesel PM emission reduction levels.

In 2005, the railyard generated an estimated 20.3 tons per year of diesel PM emissions from freight operations. ARB staff estimates that existing U.S. EPA and ARB

regulations and agreements will reduce diesel PM emissions at the railyard down to 4.4 tons per year by 2020 (a 78 percent reduction). ARB staff estimates that UP can further cut the railyard diesel PM emissions by 1.4 tons per year by 2020 (achieving an 85 percent reduction compared to 2005 levels).

The required diesel PM emission reductions from existing U.S. EPA and ARB regulations and agreements at the railyard will occur with or without implementation of the UP ICTF Modernization Plan. If the Modernization Plan is put into place, increases in locomotive emissions due to greater container volume would be largely offset by the near elimination of cargo equipment emissions through conversion of the equipment from diesel fuel to electric power.

4. What are the railroad commitments to prepare and submit emission inventories, air dispersion modeling, and emission reduction plans? What are the ARB commitments to publicly release the railroad documents and health risk assessments?

Table 2 shows the schedule for UP to submit the railyard diesel PM emission inventories, air dispersion modeling, and draft and final emission reduction plans. Table 3 identifies the dates by which ARB shall release the railyard diesel PM emission inventories, air dispersion modeling, health risk assessments, and the emission reduction plans for public review.

Table 2
UP ICTF/Dolores Railyards
Schedule for UP Submittal of Documents:
Emission Inventories, Air Dispersion Modeling,
and Emission Reduction Plans

Railyard Operations Year	Emission Inventory ^a	Air Dispersion Modeling	Draft Emission Reduction Plan	Final Emission Reduction Plan
2009	Sep 30, 2010 (I)	-----	Oct 15, 2010	Dec 31, 2010
2010	Apr 1, 2011 (I)	-----	-----	-----
2011	Apr 1, 2012 (C)	Jun 1, 2012	Sep 1, 2012	Dec 31, 2012
2012	Apr 1, 2013 (I)	-----	-----	-----
2013	Apr 1, 2014 (C)	Jun 1, 2014	Sep 1, 2014	Dec 31, 2014
2014	Apr 1, 2015 (I)	-----	-----	-----
2015	Apr 1, 2016 (C)	Jun 1, 2016	Sep 1, 2016	Dec 31, 2016
2016	Apr 1, 2017 (I)	-----	-----	-----
2017	Apr 1, 2018 (C)	Jun 1, 2018	Sep 1, 2018	Dec 31, 2018
2018	Apr 1, 2019 (I)	-----	-----	-----
2019	Apr 1, 2020 (I)	-----	-----	-----
2020	Apr 1, 2021 (C)	-----	-----	-----

^a (C) = Comprehensive Emission Inventory. (I) = Interim Emission Inventory.

Table 3
Schedule for ARB Release of Documents:
Emission Inventories, Air Dispersion Modeling,
ARB Health Risk Assessments, and Emission Reduction Plans

Railyard Operations Year	Railroad Emission Inventory^a	Railroad Air Dispersion Modeling	ARB Health Risk Assessment	Railroad Draft Emission Reduction Plan	Railroad Final Emission Reduction Plan^b
2009	Oct 15, 2010 (I)	-----	Nov 15, 2010 ^c	Nov 1, 2010	Jan 15, 2011
2010	Apr 15, 2011(I)	-----	-----	-----	-----
2011	Apr 15, 2012 (C)	Jun 15, 2012	Oct 1, 2012	Oct 1, 2012	Jan 15, 2013
2012	Apr 15, 2013 (I)	-----	-----	-----	-----
2013	Apr 15, 2014 (C)	Jun 15, 2014	Oct 1, 2014	Oct 1, 2014	Jan 15, 2015
2014	Apr 15, 2015 (I)	-----	-----	-----	-----
2015	Apr 15, 2016 (C)	Jun 15, 2016	Oct 1, 2016	Oct 1, 2016	Jan 15, 2017
2016	Apr 15, 2017 (I)	-----	-----	-----	-----
2017	Apr 15, 2018 (C)	Jun 15, 2018	Oct 1, 2018	Oct 1, 2018	Jan 15, 2019
2018	Apr 15, 2019 (I)	-----	-----	-----	-----
2019	Apr 15, 2020 (I)	-----	-----	-----	-----
2020	Apr 15, 2021 (C)	-----	-----	-----	-----

^a (C) = Comprehensive Emission Inventory. (I) = Interim Emission Inventory.

^b Following submittal of the draft and final emission reduction plan, ARB staff will provide a brief supplemental document that estimates the associated health risk for future compliance years.

^c ARB will estimate the health risk for the 2009 calendar year based on the 2009 interim inventory and the 2005 Health Risk Assessment data.

a. Railyard Diesel PM Emission Inventories

i. Comprehensive Diesel PM Emission Inventories

UP commits to prepare the comprehensive diesel PM emission inventories for calendar years 2011, 2013, 2015, 2017, and 2020. UP shall prepare each comprehensive diesel PM emission inventory for the railyard in accordance with *ARB Railyard Emission Inventory Methodology* (2006) or its subsequent revisions, using data for the whole of the preceding calendar year. The comprehensive diesel PM emission inventories will include, to the extent reasonably available, detailed activity information such as locomotive event recorder data, hours of operation for cargo handling equipment and transport refrigeration units, and drayage truck time in operation within the railyard. The comprehensive inventory will also identify activity and growth projections through 2020, and the basis for those projections.

ii. Interim Diesel PM Emission Inventories

UP commits to prepare interim diesel PM emission inventories for the railyard for calendar years 2009, 2010, 2012, 2014, 2016, 2018, and 2019, using data for the whole of the calendar year. The interim emission inventories will identify and utilize updates on locomotive usage, other equipment changes, and activity levels (e.g., number of lifts, drayage truck activities, locomotive shop releases, if applicable) to quantify changes to the last comprehensive diesel PM emission inventory. ARB staff will use the interim emission inventories to consider if there are any potential issues with UP continuing to make sufficient progress in order to meet the railyard diesel PM emission levels specified in Table 1.

b. Air Dispersion Modeling

UP commits to prepare air dispersion modeling based on the schedule in Table 2. Air dispersion modeling is to be performed in accordance with *ARB Health Risk Assessment Guidance for Railyard and Intermodal Facilities* (2006) or its subsequent revisions. UP also commits to provide source apportionment data for receptors defined in the air dispersion model and a source contribution analysis. UP also commits to analyze the impacts on the modeled air concentrations from significant updates to the modeling methodology, such as the current version of AERMOD model from U.S. EPA, the availability of updated meteorological data, or any other modeling parameters or inputs which could substantively affect the modeling estimations.

c. Health Risk Assessments

ARB staff commits to prepare health risk assessments using the comprehensive diesel PM emission inventories and air dispersion modeling results. The risk assessments are to be prepared in accordance with *ARB Health Risk Assessment Guidance for Railyard and Intermodal Facilities* (2006) or its subsequent revisions. The updated risk assessments will provide detailed information comparing excess cancer risks and non-cancer health effects with the estimates in the 2005 Health Risk Assessment. ARB staff will compare 2005 railyard emissions and associated health effects with risk assessment results for later years using the same or similar methodology, and also include a separate analysis for any subsequent changes in future year methodologies. ARB staff shall complete the health risk assessment reports for the railyard according to the schedule provided in Table 3.

Following UP's submittal of the draft and final emission reduction plans, ARB also commits to provide a brief supplemental document to the public that estimates the associated health risk for future compliance years. If ARB's health risk estimates for the draft emission reduction plan do not project that health risk will continue to be reduced, ARB shall include that information in its written comments to UP on UP's draft emission reduction plan.

d. Emission Reduction Plans

UP commits to submit draft and final emission reduction plans according to the schedule in Table 2. The emission reduction plans are to be based on the most recent railyard diesel PM emission inventories. The purpose of the plans is for UP to detail the actions it will take to reduce railyard emissions down to the levels shown in Table 1 for the next compliance deadline, and the range of potential actions it intends to pursue for subsequent compliance deadlines. The emission reductions plans will document existing and projected railyard diesel PM emissions through 2020 (accounting for growth), describe changes in source category activities, identify existing and future actions to cut emissions and provide specific implementation schedules for these actions.

e. ARB Review

i. Diesel PM Emission Inventories and Air Dispersion Modeling

Within 20 calendar days of receipt of a railyard comprehensive or interim diesel PM emission inventory, or air dispersion modeling, ARB shall review the submission for completeness and accuracy and will notify UP of its findings. If ARB determines that the submission is not complete and accurate, it will, within the above 20-day time period, notify UP in writing of any deficiency and the reasons therefor, and make such written notification publicly available.

Upon receipt of a notice of deficiency from ARB, UP will within 15 calendar days correct the deficiencies and resubmit the submission to ARB. Within 10 calendar days, ARB will notify UP as to whether the submission is complete and accurate. If not, ARB will make a preliminary determination of non-compliance following the procedures set forth in Section 9.b.ii below.

ii. Emission Reduction Plans

Within 30 calendar days of receipt of a draft railyard emission reduction plan, ARB shall review the plan for completeness and accuracy and shall notify UP of its findings. If ARB determines that the draft plan is not complete and accurate, or that the draft plan, in ARB staff's opinion, cannot reasonably achieve the diesel PM reductions required by the next compliance deadline as set forth in Table 1, ARB shall, within the above 30-day time period, notify UP in writing of any deficiency and the reasons therefor, and make such written notification publicly available.

Within 30 calendar days of receipt of the final plan, ARB shall notify UP as to whether the plan is complete, accurate, and can reasonably achieve the diesel PM emission reductions required by the next compliance deadline as set forth in Table 1, and make such written notification publicly available. If not, ARB shall make a preliminary determination of non-compliance as set forth in Section 9.b.ii below. Subsequently, if the administrative appeals panel fully or partially affirms the finding of ARB staff, UP will

have 30 calendar days to submit to ARB a revised final plan for the next compliance deadline to cure any deficiencies upheld by the panel. If UP fails to submit a revised final plan or if ARB staff determines the revised final plan is still deficient, ARB may immediately commence the rulemaking process outlined in the opening paragraphs of Section 9.

f. Commitment to Follow Through on Final Emission Reduction Plan

UP shall take the necessary actions identified in the final emission reduction plan in accordance with the plan's implementation schedules to meet the diesel PM emission reduction levels for the next compliance deadline as set forth in Table 1. If UP determines that alternative actions not identified in its most recent plan should be implemented to achieve the emission reduction levels for the next compliance deadline, and the alternative actions materially alter the pathway for achieving the emission reductions in the plan, UP will within 15 days of its determination notify ARB of the alternative actions and the reasons for the changes.

5. What is the commitment for public meetings and outreach?

UP commits to hold a public meeting no later than December 15 of 2010, 2012, 2014, 2016, and 2018 with members of the surrounding community following the release of the most current ARB health risk assessment and/or UP draft emission reduction plan as specified in the Table 3 schedule. At the public meeting, UP and ARB staff will seek public input on the available documents prior to ARB's final determination on the emission reduction plan.

6. What is the commitment to evaluate options for operational changes?

UP commits to evaluate and provide recommendations, if any, for the implementation of those changes in railyard operations that UP believes may significantly reduce railyard diesel PM emissions or changes in the location of the railyard emission sources that ARB believes may reduce health risk. UP shall evaluate potential changes at the UP ICTF/Dolores Railyards according to the following schedule, including:

- By December 31, 2011:
 - Installation of a stationary collection system to reduce locomotive maintenance and service related emissions.
 - Relocation of diesel-fueled yard tractors and transport refrigeration units.
- By December 31, 2012:
 - Relocation of the truck gate (part of the UP ICTF Modernization Plan)
 - Relocation of the locomotive maintenance and service facilities.
 - Electric infrastructure to support operation of rail mounted gantry cranes and stationary transport refrigeration units.

UP will conduct this one-time operational review considering, among other things, the potential diesel PM emissions reductions that could be achieved, the technical feasibility of such actions, the operational impacts on the railyard's throughput velocity and fluidity, safety, the availability of land and access, the costs and cost-effectiveness of such actions, and any railyard-specific factors at the UP ICTF/Dolores Railyards. Each operational option shall be analyzed, and recommendations, if any, for implementation will be completed as soon as possible for this railyard, but in any case not later than December 31, 2012. UP shall provide the assessment and any recommendations for implementation of operational changes to ARB, and ARB will make them publicly available.

ARB commits to support these efforts with technical assistance and to evaluate the impacts of each potential operational change on the maximum individual cancer risk for the railyard. ARB will make the results of this evaluation publicly available.

7. Will UP be able to access incentive funding to support these commitments?

UP, to the extent feasible, will compete for federal, state, local, and private incentive funding to supplement its capital expenditures, and to accelerate further diesel PM and NOx emission reductions at this railyard.

Consistent with State law and Board policies, ARB staff will support efforts by UP to seek a mix of federal, state, and local incentive funding to accelerate UP's ability to meet the diesel PM emission reduction levels for the railyard.

8. What are the provisions for UP and ARB to meet and confer by 2018?

UP agrees to meet and confer with ARB by 2018 to evaluate and explore opportunities for further diesel PM emission reductions by 2020 and beyond.

9. What are the mechanisms for ARB to enforce these commitments? What would trigger ARB to initiate regulatory action?

Upon a final determination of the ARB Executive Officer, or if appealed, of the administrative appeals panel, that UP has failed to meet its commitments set forth herein at Sections 1, 2, 4, 5, and 6, ARB commits to submit to the Board within four months from the date of the determined failure the following locomotive and railyard rulemakings:

- A regulation of switch and medium horsepower locomotives that are not preempted under federal law (e.g., locomotives that primarily operate in California and that were manufactured prior to 1973 or that exceed 133 percent of their useful life since original manufacture or last remanufacture, whichever is later).
- A designated railyard regulation that requires risk reduction audits and plans to achieve targeted emission reduction levels.

Nothing in this agreement precludes ARB from developing regulations within its authority as required to achieve the goals of the State Implementation Plan and Climate Change Scoping Plan.

ARB will also consider the following actions:

- Pursue federal legislation to expand ARB authority to adopt regulations for in-use locomotives.
- Petition U.S. EPA to strengthen existing federal locomotive regulations.

ARB is designated as the agency responsible for enforcement of the UP commitments. The enforcement authorities specified herein may only be exercised by ARB. UP may, at any time, initiate informal consultations with ARB to identify and resolve concerns or other issues regarding compliance with its commitments herein.

In determining whether UP has met its commitments, the parties agree to the following exclusive process.

a. ARB Verification of Railyard Diesel PM Emission Reduction Levels

To determine whether UP has met the UP ICTF/Dolores Railyards diesel PM emission reduction levels specified in Table 1, ARB will review the comprehensive emission inventories and interim emission inventories in relation to information collected by ARB staff. ARB will conduct semi-annual railyard inspections, which will also be augmented by ARB photographic tracking and field surveys of railyard switch and medium horsepower locomotives. In addition, ARB staff will use the annual UP locomotive NO_x fleet average agreement submittals to verify the number and tier of interstate line haul locomotives operating within the South Coast Air Basin. ARB staff will also randomly conduct inspections of UP interstate line haul locomotives entering and exiting the South Coast Air Basin to help assess compliance with the Table 1 diesel PM emission reduction levels.

b. Preliminary Determination of Non-Compliance

i. Failure to Comply with the Railyard Diesel PM Emission Reduction Levels

Within 30 working days of receipt of the comprehensive railyard diesel PM emission inventories, ARB shall make a written preliminary determination notifying UP as to whether UP met or failed to meet the diesel PM emission reduction levels specified in Table 1 for the previous year. If ARB determines that UP has failed to meet its emission reduction levels, ARB shall within the same 30 working days provide UP with its written preliminary determination, which will set forth the reasons for its findings. ARB will, with the greatest precision possible based on data submitted by UP, calculate the difference between the railyard diesel PM emission reduction level reported by UP and the levels

required in Table 1. ARB and UP shall use their respective best efforts to expedite submission and review of the reports. The time periods provided for ARB to make a preliminary compliance determination may be extended by written agreement between ARB and UP.

Within 15 calendar days of receipt of ARB's preliminary determination that UP has failed to meet the emission reduction levels, UP may request to meet and confer with ARB and/or provide ARB with such information and analysis as UP believes appropriate to demonstrate its compliance with the Table 1 diesel PM emission reduction levels. If a meet and confer is requested, the parties shall meet within 10 working days of the request. Within 15 calendar days after receipt of UP's response or after meeting and conferring with ARB, ARB shall review and consider the information provided by UP and make a final determination, in writing, as to whether UP has failed to meet the Table 1 diesel PM emission reduction levels. ARB will make such final written determination publicly available.

For the Table 1 compliance deadlines in 2011, 2013, 2015, 2017, or 2020, if ARB staff determines that UP missed its percentage target for the UP ICTF/Dolores Railyards by not more than 2 percent (e.g., reaching a 73 percent compliance level where 75 percent was required), UP will be given the opportunity to cure this deficiency by the next calendar year, provided it demonstrates the new compliance level by conducting a full inventory analysis. Failure to conduct the analysis or failure to cure the deficiency in the following calendar year shall constitute a failure to meet the appropriate targets in Table 1.

ii. Failure to Comply with Other Railyard Commitments

If ARB makes a preliminary determination that UP has failed to meet any other of its commitments set forth herein, ARB shall notify UP, in writing, of its findings. Within 15 calendar days, UP may request to meet and confer with ARB and/or provide ARB with such information and analysis as UP believes appropriate to demonstrate its compliance. If a meet and confer is requested, the parties shall meet within 10 working days of the request.

Within 15 calendar days after receipt of UP's response or after meeting and conferring with ARB, ARB will review and consider the information provided by UP and make a final determination, in writing, as to whether UP has failed to meet any of its non-emission reduction-related commitments. ARB will make such final written determination publicly available.

c. Final Determination by ARB of Non-Compliance

A final determination of non-compliance shall specifically identify the reasons why ARB has found UP not to be in compliance with agreed-upon commitments. A final determination of non-compliance for failure to meet the emission reduction levels set forth in Table 1 will provide ARB's final calculations of the emission reduction levels of

the UP ICTF/Dolores Railyards. Findings of UP's failure to meet other commitments shall set forth in detail ARB's determination of why the commitments have not been met. ARB will publicly post its final determination notice of non-compliance on its website and make available such notice on a list serve that will be established for notifying the public about compliance with the railyard emission reduction commitments.

d. Dispute Resolution

In the event of a dispute concerning an ARB final determination of non-compliance or any of the parties' respective commitments, the party asserting the dispute shall provide notice to the other party and set forth the issues underlying the dispute. The parties shall meet and confer regarding the identified issues within 15 working days after receipt of notification, and if they cannot reach agreement within 15 working days after such consultation, shall submit their respective positions to an administrative appeals panel, which shall consider the matter as expeditiously as possible. Except for confidential trade secret information, ARB will publicly post on its website and make available by the aforementioned list serve all documents submitted by the parties' to the administrative hearing panel. ARB will also post and make available a notice that interested persons may submit written statements of position and supporting documentation to the administrative appeals panel that will be made part of the record of the hearing.

i. Composition of Administrative Appeals Panel

The panel shall be comprised of one member selected by ARB, one member selected by UP, and a third member selected by the initial two members from a list of five or more persons that the parties shall agree to within 120 calendar days of the parties' exchange of commitment letters. The list shall include persons qualified to hear matters that are likely to be heard by the dispute resolution panel. From the list of five or more persons, the parties shall select the person most readily available to hear the matter within 30 calendar days (or as soon thereafter as possible) from the date that the person is contacted by either the ARB or UP panel member. If no person from the previously selected list is available to hear the matter within 45 calendar days of being notified, the ARB and UP panel members shall contact an arbitration referral service, identify the matter(s) at issue and accept from the service a list of five persons who are qualified to hear the matter(s) at issue and are readily available. The two panel members selected by the parties may mutually agree on one of the five persons to serve on the panel, but if they cannot agree, each panel member will alternatively strike one person from the list until just one person remains. The two panel members selected by the parties will serve as technical advisors to the third panel member, who shall serve as the presiding member of the panel and who shall be solely responsible for making the final decision on behalf of the panel.

ii. Administrative Appeals Panel Process

Unless otherwise determined that the matter(s) at issue require oral testimony, the panel shall make its decision based upon written submission of the parties. If a hearing to take testimony is determined to be necessary, the hearing shall be public. The panel shall determine the time and place of the hearing, and will set forth the procedures to be followed at the hearing. The panel will take all precautions necessary to preserve the confidentiality of trade secret or other confidential information, and will consider such evidence in a closed meeting.

iii. Public Comments to Administrative Appeals Panel

Interested persons may submit written statements and supporting documentation to the panel regarding the matter(s) at issue before the matter(s) are taken under submission; however, only ARB and UP shall be parties to the dispute resolution process.

iv. Final Decision by Administrative Appeals Panel

The presiding member shall issue his or her final decision on behalf of the panel within 30 calendar days from the date that the matter is submitted to the panel. While either party receiving an adverse decision from the panel may seek expedited review of the decision in the Superior Court for the County of Sacramento, if the panel's decision upholds the Executive Officer's final determination of non-compliance, ARB may immediately commence the rulemaking process outlined in the opening paragraphs of this section. If judicial review is not sought, then the decision of the panel will be binding on the parties.

Each party to the proceedings outlined above will bear its own costs and fees, with the exception that the parties agree to split all costs and fees arising from the employment of the third panel member.