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June 23, 2010

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Re: Review of California Air Resources Board's Proposed Actions to Further Reduce Diesel Particulate Matter at High Priority California Railyards

Dear Mr. Kracov,

Per your request, I have reviewed the *Proposed Actions to Further Reduce Diesel Particulate Matter at High Priority Railyards*¹ proposed by the California Air Resources Board ("CARB") for four railyards operated by the Burlington Northern and Santa Fe Railway Company ("BNSF") and Union Pacific Railroad Company ("UP"), specifically BNSF San Bernardino, BNSF Hobart, UP Commerce, and UP Intermodal Container Transfer Facility ("ICTF")/Dolores railyards, which includes the CARB's *Basis for Proposed Commitments* documents² and *Proposed Commitments*³ for each railyard. I have also reviewed CARB's *Recommendations to Implement Further Locomotive and Railyard Emission Reductions*⁴, CARB's *Technical Options to Achieve Additional Emissions and Risk*

¹ California Air Resources Board, *Proposed Actions to Further Reduce Diesel Particulate Matter at High Priority Railyards*, June 2010. Hereafter "Proposed Actions Document."

² California Air Resources Board, *Basis for Proposed Commitments to Reduce Particulate Matter at the BNSF San Bernardino Railyard*, June 15, 2010; California Air Resources Board, *Basis for Proposed Commitments to Reduce Particulate Matter at the BNSF Hobart Railyard*, June 15, 2010; California Air Resources Board, *Basis for Proposed Commitments to Reduce Particulate Matter at the UP Commerce Railyard*, June 15, 2010; and California Air Resources Board, *Basis for Proposed Commitments to Reduce Particulate Matter at the UP ICTF/Dolores Railyards*, June 15, 2010. Hereafter "Basis for Proposed Commitments."

³ California Air Resources Board, *Commitments for BNSF San Bernardino Railyard*, June 15, 2010; California Air Resources Board, *Commitments for BNSF Hobart Railyard*, June 15, 2010; California Air Resources Board, *Commitments for the UP Commerce Railyard*, June 15, 2010; and California Air Resources Board, *Commitments for the UP ICTF/Dolores Railyards*, June 15, 2010. Hereafter "Proposed Commitments."

⁴ California Air Resources Board, *Recommendations to Implement Further Locomotive and Railyard Emission Reductions*, September 2009. Hereafter "Recommendations Document."

*Reductions from California Locomotives and Railyards*⁵, and health risks assessments⁶ and mitigation plans for these four railyards.⁷

As discussed in my comments, the CARB's goal of reducing diesel particulate matter emissions and health risks in California may not be achieved with the Proposed Commitments for a number of reasons. The table of contents below summarizes the organization of my comments.

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⁵ California Air Resources Board, Technical Options to Achieve Additional Emissions and Risk Reductions from California Locomotives and Railyards, August 2009. Hereafter "Technical Options Report."

⁶ California Air Resources Board, Health Risk Assessment for the BNSF Railway San Bernardino Railyard, June 11, 2008; California Air Resources Board, Health Risk Assessment for the BNSF Railway Hobart Railyard, November 2, 2007; California Air Resources Board, Health Risk Assessment for the Union Pacific Railroad Commerce Railyard, November 2007; and California Air Resources Board, Health Risk Assessment for UP Intermodal Container Transfer Facility (ICTF) and Dolores Railyards, April 22, 2008. Hereafter "Health Risk Assessments."

⁷ Environ, Diesel Particulate Matter Mitigation Plan for the BNSF Railroad San Bernardino Rail Yard, August 21, 2008; Environ, Diesel Particulate Matter Mitigation Plan for the BNSF Railroad Hobart Rail Yard, September 26, 2008; Sierra Research, Diesel Particulate Matter Mitigation Plan for the Union Pacific Railroad Commerce Rail Yard, August 18, 2008; and Sierra Research, Diesel Particulate Matter Mitigation Plan for the Union Pacific Railroad ICTF and Dolores Rail Yards, August 25, 2008. Hereafter "Mitigation Plans."

I. The Proposed Commitments May Not Be Implemented, Thereby Merely Postponing Development of CARB Regulations

The Proposed Commitments do not require any action by UP and BNSF beyond those required under existing binding agreements and regulations until the year 2015. Yet, if the railroad companies cannot demonstrate compliance with the reductions specified in the Proposed Commitments in 2015 and beyond, there is no penalty involved. Upon failure to demonstrate compliance, the CARB would then resort to developing regulations.⁸ Thus, the railroad companies may merely be buying time by entering into the Proposed Commitments.

II. The Proposed Commitments Do Not Guarantee That Any Equipment at the Four Railyards Would Be Replaced, Repowered, or Remanufactured If Railyards Experience a Decrease in Activity

The Proposed Commitments require that BNSF and UP reduce diesel particulate matter emissions from the four railyards by 85% by 2020 compared to the 2005 baseline emission levels.⁹ The emission reductions attributable to the Proposed Commitments beyond those that will be achieved via existing binding agreements and regulations vary from 9% to 20% by 2015 and from 7% to 17% by 2020. (*See* Comment V.) According to the Proposed Commitments, these emission reductions have to be achieved “regardless of the potential increases in railyard activity levels, such as the number of container lifts.”¹⁰

The CARB appears to discount the possibility that any of the four railyards could potentially experience negative growth, *i.e.*, a decrease in activity, due to, for example, national and global economic reasons or rerouting of existing business. In this case, a certain percentage reduction of emissions at the respective railyard would be achieved simply through avoided emissions from activity that did not occur. Indeed, at least two railyards, BNSF San Bernardino and BNSF Hobart, have experienced negative growth of container lifts since 2006, showing that negative growth is undeniably a realistic possibility. Container lifts at BNSF San Bernardino decreased by 4.1% from 2007 to 2008; container lifts at BNSF Hobart sharply decreased by 12.1% from 2006 to 2007 and by 11.2% from 2007 to 2008. (*See* Figure 1.)

⁸ Proposed Actions Document, p. 1, and Proposed Commitments, pp. A2-10/A2-11, B2-10/B2-11, C2-10/C2-11, and D2-10/D2-11.

⁹ Proposed Commitments, pp. A2-4, B2-4, C2-4, D2-4.

¹⁰ *Ibid.*

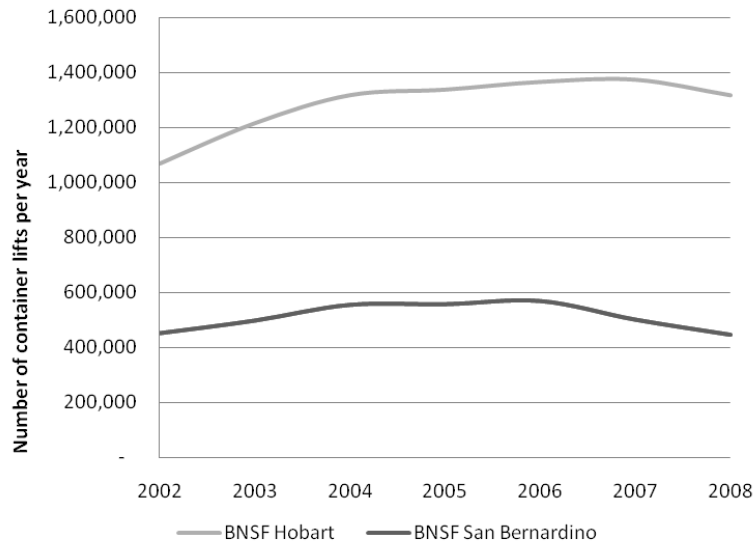


Figure 1: BNSF San Bernardino and BNSF Hobart historic activity data for number of container lifts per year
Data from Mitigation Plans

In case of negative growth (decrease in activity), the Proposed Commitments would not achieve an 85% percent reduction at the respective railyards and potentially would not achieve anything beyond the existing binding agreements and regulations, all the while future incremental cancer risks due to these railyards still by far exceed health-based significance thresholds. (See discussion in Comment VI.)

III. The CARB Fails to Provide Adequate Information for Review

The CARB's Proposed Actions Document fails to provide any backup data and calculations for the presented 2005 baseline emission estimates and projected future emissions reductions that would be achieved by the Proposed Commitments. Due to the lack of documentation, the presented emission estimates cannot be verified.

Other recent CARB documents for the respective railyards present very different estimates for 2005 baseline and projected future emissions as summarized in attached Table A-1. Because the CARB did not provide any backup data and calculations reviewers cannot compare the data in the Proposed Actions Document to the prior documents to figure out why the emissions estimates in the various documents differ.

IV. The Proposed Commitments Fail to Define a Methodology for Future Fleet Inventories and Emission Calculations

The Proposed Commitments fail to set out a methodology for future fleet inventories and emission calculations. Establishing an exact methodology is important to create inventories that are comparable to the established 2005 baseline emissions and avoid any errors in the determination of inventory and emissions.

CARB's own documents use differing growth rates, resulting in differing emission estimates and projected future reductions. Prior CARB documents for the four railyards assumed different growth rates for the four railyards to calculate projected future emissions; the August 2009 Technical Options Report assumed a uniform 1% growth rate for all railyards for all activities, and the August 2008 Mitigation Plans assumed different growth rates for each railyard and (See attached Table A-1 and discussion in Comment V.A.) The projected 3% future growth rate is not supported by the past growth rates at any of the four railyards, particularly not in the current economic climate. Also, the UP Commerce Railyard Mitigation Plan incorrectly determined the past growth rate (1.59%) as the average annual percent change at 0.8%.¹¹ Consequently, the projected lift count data were incorrectly determined based on an assumed 1.0% future growth rate and projected future emissions were underestimated in this document.

To avoid such errors in any future emission calculations and ensure that the methodology used for determining the 2005 baseline emissions is the same as the methodology used for estimating emissions to demonstrate compliance with the emission reduction requirements set forth in the Proposed Commitments, a precise methodology for establishing the inventory and calculating emissions must be created. The 1998 Memorandum of Understanding between the CARB and BNSF and UPF, for example, included a 79-page appendix setting out the procedures for calculating emissions.¹²

V. The CARB Presents Incorrect and Deceptive Information with Respect to the Effectiveness of the Proposed Commitments

Most of the information regarding the effectiveness of the Proposed Commitments contained in the CARB's Proposed Actions Document is based on unreliable or incorrect assumptions and is deceptively presented.

A. The 2005 Baseline Emissions Data and Projected Future Growth Rates Are Used Without Substantial Evidence

Various documents prepared for the four railyards, specifically the Basis for Proposed Commitments, the August 2009 Technical Options Report, and the August 2008 Mitigation Plans, rely on differing 2005 baseline emissions in tons per year ("tons/year") and growth rates to estimate future emissions and emissions reductions

¹¹ Furthermore, the average annual percent change is incorrectly calculated by including the percent change from 1997 to 1998, when 1998 was the first year representative for current operations. If correctly calculated, *i.e.*, without the percent change from 1997 to 1998, the average annual percent change would be 1.65%. See Sierra Research, Diesel Particulate Matter Mitigation Plan for the Union Pacific Railroad Commerce Rail Yard, August 18, 2008, Appendix B "Growth Data."

¹² Memorandum of Mutual Understandings and Agreements, South Coast Locomotive Fleet Average Emissions Program, July 2, 1998, Appendix C; http://www.arb.ca.gov/msprog/offroad/loco_flt.pdf.

under the existing program, *i.e.*, the 1998 and 2005 memoranda of understanding between the CARB and BNSF/UP. These differing assumptions result in dramatically different emission estimates and inconsistent percentage emission reductions determined in these documents, as shown in attached Table A-1.

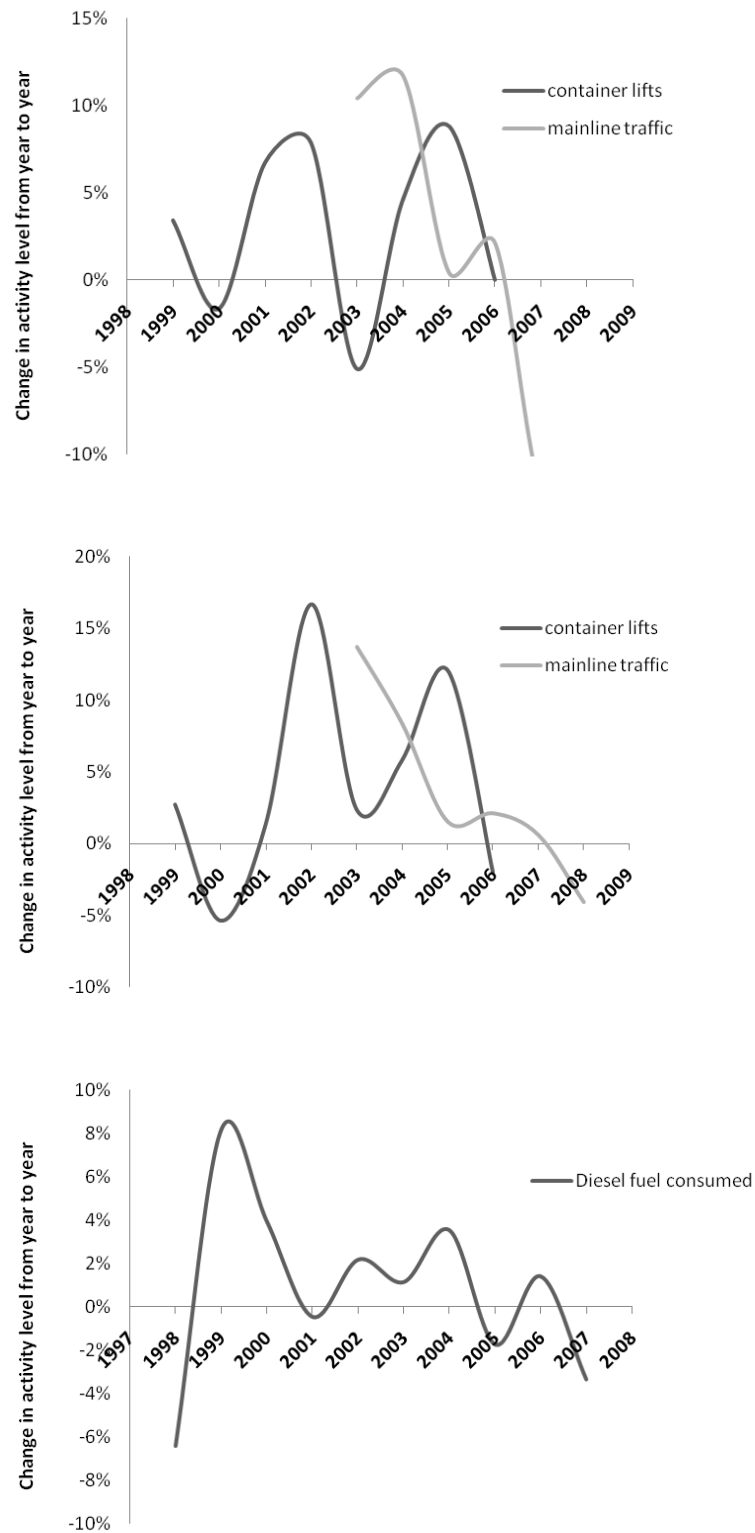
For example, for BNSF San Bernardino, the Basis for Proposed Commitments relies on a lower 2005 baseline (22.2 tons/year) than either the Technical Options Report (22.4 tons/year) or the Mitigation Plan for the same railyard (22.4 tons/year) and estimates lower remaining emissions in 2020 (4.9 tons/year) than either the Technical Options Report (6.0 tons/year) or the Mitigation Plan (5.4 tons/year). For BNSF Hobart, the Basis for Proposed Commitments relies on a lower 2005 baseline (24.2 tons/year) than either the Technical Options Report (24.7 tons/year) or the Mitigation Plan for the same railyard (24.7 tons/year) and estimates lower remaining emissions in 2020 (5.7 tons/year) than the Technical Options Report (5.9 tons/year) but higher remaining emissions than the Mitigation Plan (4.2 tons/year). For UP Commerce, the Basis for Proposed Commitments and the Technical Options Report rely on the same 2005 baseline (12.1 tons/year), which is considerably higher than that used in the Mitigation Plan for the same railyard (9.6 tons/year); the Basis for Proposed Commitments estimates lower remaining emissions in 2020 (3.2 tons/year) compared to the Technical Options Report (5.9 tons/year) but higher compared to the Mitigation Plan (2.9 tons/year).

These examples illustrate that the inventory and estimated emission reductions can be easily manipulated by making changes to underlying assumptions such as the growth rate, the gallons of fuel consumed, or the number of equipment complying with various emission standards.

For example, to estimate future emissions and emission reductions that would be achieved in future years, the Basis for Proposed Commitment documents assumed future growth rates uniformly at 3% for all four railyards and all activities at these railyards. The CARB states that these future growth rates were “based on a 1.5% per year increase in fuel use, which equates to a roughly 3% per year increase in containers based on historic growth rates over the last 12 years.”¹³ However, the assumed future growth rates of 3% are not supported by information on historic activity contained in the Mitigation Plans, which demonstrate that each of the four railyards historically experienced dramatically fluctuating activity levels of both container lifts and mainline traffic, and the growth rate in the past decade was nowhere near 3% for most activities at three of the railyards.

Figure 2 illustrates the dramatic percent change in activity for container lifts and mainline traffic at the BNSF San Bernardino and BNSF Hobart railyards from 1999 through 2008 and activity and diesel fuel consumption at the UP Commerce railyard.

¹³ Basis for Proposed Commitments, pp. A1-3, B1-3, C1-3, and D1-3.



**Figure 2: Change in activity level from year to year
at BNSF San Bernardino (top), BNSF Hobart (center), and UP Commerce (bottom)**

Clearly, any growth rates that are determined from these past activity data are highly unreliable due to the dramatically fluctuating percent change from one year to the next. Clearly, the growth rates cannot be easily predicted from past activities, and also as noted above, there is the possibility of a negative growth in the future. For what it is worth, at the BNSF San Bernardino railyard, the growth rate for container lifts based on these available activity data from 2002 through 2008 was negative at -0.2%. If only the last three years are considered as an indicator for the current economy, the growth rate would be negative at -7.3%. In either case, the assumed 3% growth rate is clearly incorrect except for mainline traffic, which indeed experienced a growth rate of 3.0% from 1999 through 2007. At the BNSF Hobart railyard, the growth rate for container lifts based on available activity data from 2002 through 2008 was 3.5%. If only the last three years were considered, the growth rate would be negative at -0.5%. For mainline traffic the growth rate from 1999 through 2007 was 4.0% and from 2005 through 2008 was 4.8%. For the UP Commerce railyard, the growth rate from 1996 through 2007 was 1.6% for the amount of diesel fuel consumed, which is close to the CARB's estimate. (See also Footnote 11.) Finally, the UP is planning to modernize the UP ICTF railyard facility, doubling the capacity.¹⁴ The CARB elsewhere assumes container lifts will increase from a count of 626,000 in 2005 and reach full operational capacity at 1.5 million container lifts by 2016.¹⁵ If these numbers indeed materialize, the associated growth rate would be 8.3%.

Clearly, the assumption of a 3% future growth rate at all railyards is entirely speculative and arbitrary. Consequently, because of the inconsistent assumptions, the presentation of the tons of diesel particulate matter emissions per year that would purportedly be reduced by the Proposed Commitments is equally speculative and most likely incorrect. In the case of UP Commerce railyard it likely resulted in the presentation of deceptive information regarding the number of tons of diesel particulate matter emissions that would in reality be reduced if past growth rates are indeed any indication of future growth.

B. The Percentage Reductions Attributable to the Proposed Commitments Are Deceptively Presented

Further, the presented incremental emission reductions in future years attributable to the Proposed Commitments, given as percentages, while correctly calculated, are also deceptive as they demonstrate high percentages of reduction when the values of reduced emissions in tons are rather small when compared with the 2005 baseline. (The caveat to these estimated emission reductions on a mass basis is that they rely on the assumed 3% growth rate for each of the railyards. Because these growth rates are highly speculative, as discussed above, these values are also speculative and likely incorrect.)

¹⁴ Union Pacific, The Intermodal Container Transfer Facility Modernization Project; <http://www.uprr.com/customers/intermodal/featured/ictf/index.shtml>.

¹⁵ Mitigation Plan for UP Commerce, p. 14.

CARB states that the additional emission reductions attributable to the Proposed Commitments vary from 9% to 20% in 2015 and from 32% to 50% in 2020. But even if the numbers are accurate, this overstates reduction percentage. On a mass basis, emission reductions vary from 0.4 tons to 1.8 tons by 2015 and from 1.4 tons to 3.6 tons by 2020. Table 1 shows the 2005 baseline emissions (Row 1), the projected future emissions with the existing program (Row 2), and the additional emission reductions attributable to the Proposed Commitments in future years as presented by the respective Basis for Proposed Commitments for all four railyards on a mass basis (Row 3) and on a percent basis (Row 4).

Table 1: 2005 Baseline emissions, projected future emissions with the existing program, and additional emission reductions attributable to the Proposed Commitments in future years

Row		BNSF San Bernardino	BNSF Hobart	UP Commerce	UP/ICTF Dolores
1	2005 baseline emissions	22.2 tons	24.2 tons	12.1 tons	20.3 tons
2	Future emissions with existing program	8.9 tons by 2015 7.0 tons by 2020	7.4 tons by 2015 5.7 tons by 2020	4.1 tons by 2015 3.2 tons by 2020	5.8 tons by 2015 4.4 tons by 2020
3	Additional emission reduction in future years attributable to Commitments	1.8 tons by 2015 3.6 tons by 2020	1.5 tons by 2015 2.1 tons by 2020	0.4 tons by 2015 1.4 tons by 2020	0.5 tons by 2015 1.4 tons by 2020
4	Additional emission reduction attributable to Commitments in future years	20% by 2015 50% by 2020	20% by 2015 37% by 2020	10% by 2015 44% by 2020	9% by 2015 32% by 2020
5	Additional emission reduction from 2005 baseline attributable to Commitments	8% by 2015 17% by 2020	6% by 2015 9% by 2020	3% by 2015 11% by 2020	3% by 2015 7% by 2020

Thus, in reality, Table 1, Row 5, shows that the additional emission reductions attributable to the Commitments determined based on the 2005 baseline emissions are much smaller, varying from only 3% to 8% by 2015 and from 7% to 17% by 2020. The emission reductions compared to the 2005 baseline convey a better sense of the effectiveness of the Proposed Commitments in reducing emissions and associated adverse health impacts than those presented by the Proposed Commitments.

Of course, taking into account the above discussion of growth rates, the public would be better served by a presentation of future emission estimates, both as percentages and on a mass basis, that does not account for growth rates but rather is based on a per equipment or activity level.

C. The Locomotive Fuel Consumption, Used to Estimate Emissions from Locomotives Are Inappropriate and Result in Unreliable Emission Estimates

Assuming that the Proposed Actions Document is based on the same methodology employed in the Technical Options Report, the estimates of 2005 baseline and future emissions at the four railyards rely on the assumption that all MHP at the

four railyards consume the same amount of diesel fuel per year, 100,000 gallons per year regardless of which emission standard they meet. Pre-Tier 0 and Tier 0 switch locomotives were assumed to consume 50,000 gallons of diesel fuel and ULEs, Tier 3 and Tier 4 switch locomotives were assumed to consume 40,000 gallons per year “due to a 20% reduction due to a 20% reduction with ULEs: gensets, electric hybrids, and LNGs.”¹⁶ These numbers appear to be speculative and inappropriate. Cleaner engines will require less fuel and are likely different for locomotives complying with various emission standards. Therefore, future emissions from the respective engines could be considerably lower than estimated by the CARB. Thus, the Proposed Commitments could result in the replacement of far fewer old and dirty locomotives than if CARB were to regulate these locomotives.

VI. The Proposed Commitments Do Not Address All Railyards that Would Benefit the Most from Diesel Particulate Matter Emission Reductions

The Staff Report included in the Proposed Actions Document states that the four railyards subject to the Commitments were selected because they have the greatest emissions of diesel particulate matter and associated health risks to neighboring residents.¹⁷ (This statement as written is incorrect as the UP Roseville railyard has the third highest individual emissions; however, the combined emissions from the UP Commerce and BNSF Hobart railyards, which are located adjacent to each other, are higher.) The selection of the four highest emitting railyards is arbitrary and does not take into account the effect of future emission reductions due to existing agreements and regulations by 2020, which result in a different ranking of the highest emitting railyards and associated health risks. Table 2 summarizes the Maximum Individual Cancer Risk (“MICR”) estimates for 2005 for the 18 Class I railyards in California, the percentage reduction due to existing binding agreements and regulations by 2020, and the projected MICRs by 2020.

¹⁶ Technical Options Report, p. 177 and 189.

¹⁷ Proposed Actions Document, p. 2.

Table 2: Maximum incremental cancer risk and reduction by 2020 due to existing binding agreements and regulations at Class I Railyards in California

Railyard	2005 MICR^a (per million)	2005 MICR Rank	Reduction by 2020^a	2020 MICR (per million)	2020 MICR Rank
San Bernardino	2500	1	76%	600	1
UP ICTF	800	2	73%	216	4
UP Roseville	645	3	61%	252	2
UP Hobart	500	4	76%	120	6
UP Commerce	500	5	76%	120	7
UP Oakland	460	6	71%	133	5
BNSF Barstow	450	7	45%	248	3
UP City of Industry	450	8	76%	108	8
UP LATC	250	9	63%	93	9
BNSF Watson	175	10	64%	63	12
UP Colton	150	11	42%	87	10
UP Stockton	150	12	72%	42	13
BNSF Stockton	120	13	46%	65	11
UP Mira Loma	100	14	67%	33	14
BNSF Richmond	100	15	73%	27	15
BNSF Commerce Eastern	100	16	81%	19	17
BNSF San Diego	70	17	63%	26	16

a Data from Technical Options Report, Table A-4, p. 155.

As Table 2 shows, the estimated MICRs in 2020 at all 14 railyards still by far exceed the health-based significance threshold of one in one million established by the federal Clean Air Act.¹⁸ Table 2 also shows that the remaining incremental cancer risks in 2020 attributable to the combined emissions from the UP Hobart and UP Commerce railyards (MICR 120 per million + MICR 120 per million = MICR 240 per million) are somewhat lower than the individual emissions from UP Roseville and BNSF Barstow railyards (MICR 252 per million and MICR 248 per million, respectively). This is, in part, due to the fact that these railyards would experience a lower percentage reduction (Roseville 61%, Barstow 45%) due to existing agreements and regulations than the four selected railyards (73%-76%) and thus would have higher emissions and associated estimated incremental cancer risks in 2020. Therefore, the UP Roseville and BNSF Barstow railyards should also be addressed as the high-priority railyards. UP Oakland will have the fifth highest remaining incremental cancer risk in 2020 (MICR 133 per million), falling just outside of the top four, and is therefore left out of the Proposed Commitments' goals regarding emission reductions.

¹⁸ See Clean Air Act, Section 112(f)(2)(a).

VII. There Is a Reasonable Possibility that the Proposed Commitments Would Result in Significant Increases of Criteria Pollutant Emissions at Other Railyards, Requiring Review under the California Environmental Quality Act

Rather than the dirtier equipment from the four high-priority yards being repowered and destroyed, it could potentially be moved to any of the other 14 Class I railyards (*e.g.*, UP Roseville, UP Oakland or BNSF Barstow) in California, moved out of state, or sold to regional or shortline railroad companies in order to meet the fleet-wide average emission reductions set forth in the Proposed Commitments, unless these locomotives were covered by existing binding agreements that tether the respective engines to the four railyards or prohibit the transfer of such older, dirtier locomotives into their fleet at the other 14 Class I railyards in California, smaller railyards. This would result in an increase of criteria pollutant emissions including nitrogen oxides (“NO_x”) and volatile organic compounds (“VOC”), which are both ozone precursors, as well as diesel particulate matter at other railyards.

The CARB claims that re-directing of old, dirty units to other railyards in the region, state, or country is “unlikely given the mechanisms the railroads are using to upgrade their fleet.” The CARB explains that to meet the performance standards under the Proposed Commitments, it “expects” 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, which means that there would be no old, dirty locomotives to route to other communities. The CARB further “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.¹⁹

However, the CARB’s expectations alone are not sufficient evidence that relocation of older, dirtier equipment would not occur. The CARB’s expectations also appear to be contradicted by the experience of railroad expert Mr. Colon Fulk, whose testimony is submitted herewith. Mr. Fulk maintains that movement of locomotives between railyards is a routine activity and occurs fairly frequently. Moreover, as of 2008, there were still 130 pre-Tier 0 and 20 Tier 0 MHP locomotives and 34 pre-Tier 0 and 29 Tier 0 switch locomotives operating in the South Coast air basin.²⁰ It seems unlikely that all these locomotives have been repowered, remanufactured or replaced since 2008 and it is therefore unlikely that none of these locomotives are operating at the four railyards. Finally, even exchange of relatively new, *e.g.*, MHP or switch locomotives complying with the U.S. Environmental Protection Agency (“EPA”) emission standards Tier 3 and Tier 4, could result in significant emissions increases at the railyard that receives the lower tiered locomotive, as demonstrated below.

¹⁹ Proposed Actions Document, p. 19.

²⁰ Technical Options Report, pp. 177 and 189.

Relocating locomotives to other railyards in California could therefore result in increased emissions at those other railyards which are not subject to the Proposed Commitments or other binding agreements far in excess of applicable significance thresholds for particulate matter and other pollutants under the California Environmental Quality Act ("CEQA"). Table 3 compares emissions in pounds per day ("lb/day") of NO_x and particulate matter smaller than 10 micrometers ("PM₁₀") and smaller than 2.5 micrometers ("PM_{2.5}") from operating medium horsepower ("MHP") and switch locomotives that comply with various EPA emission standards to the quantitative mass emission significance thresholds in lb/day established by the Bay Area Air Quality Management District ("BAAQMD"), the Mojave Desert Air Quality Management District ("MDAQMD"), and the Sacramento Metropolitan Air Pollution Control District ("SMAQMD"). Other air districts have established significance thresholds at comparable levels.

Table 3: Comparison of NO_x, PM₁₀ and PM_{2.5} emissions from MHP and switch locomotives and mass-based significance thresholds for emissions established by three air districts^a

Pollutant	Locomotive Emissions (lb/day)								Mass Emission Significance Thresholds (lb/day)		
	MHP				Switch				BAAQMD ^c	MDAQMD ^d	SMAQMD ^e
NO _x	pre-Tier 0 169.7	Tier 0 119.6	Tier 3 37.7	Tier 4 16.3	pre-Tier 0 109.3	Tier 0 87.9	Tier 3 15.1	Tier 4 6.5	54	137	65
PM ₁₀ ^b	pre-Tier 0 and Tier 0 7.2		Tier 3 0.4		pre-Tier 0 and Tier 0 4.3		Tier 3 0.6		82	82	none
PM _{2.5} ^b	pre-Tier 0 and Tier 0 7.1		Tier 3 0.4		pre-Tier 0 and Tier 0 3.7		Tier 3 0.6		54	82	none

- a Emissions calculated based emission factors and annual fuel consumption from Recommendations Report, Appendix E, p. 175, and Appendix F, p. 190
- b PM₁₀ and PM_{2.5} emissions calculated based on speciation profiles for diesel-powered stationary internal combustion engine (Profile 117: PM₁₀/PM: 0.96; PM_{2.5}/PM 0.937); see http://arb.ca.gov/ei/speciate/profphp05/pmprof_list.php?a=goto&value=1
- c Bay Area Air Quality Management District, California Environmental Quality Act, Air Quality Guidelines, June 2010, p. 2-2; <http://snipurl.com/xo2ru> [www_baaqmd_gov]
- d Mojave Desert Air Quality Management District, California Environmental Quality Act (CEQA) and Federal Conformity Guidelines, February 2009, p. 10; <http://snipurl.com/xo2vl> [www_mdaqmd_ca_gov]
- e Sacramento Metropolitan Air Pollution Control District, SMAQMD Thresholds of Significance Table, December 2009; <http://snipurl.com/xo2zp> [www_airquality_org]

Based on the emission estimates presented in Table 3, it can be concluded that relocation or exchange of MHP or switch locomotives may result in exceedance of the mass emission significance thresholds established by the BAAQMD, MDAQMD, or SMAQMD, as illustrated by the following examples:

- Relocating one Pre-Tier 0 or Tier 0 MHP or switch locomotive to a railyard located within the San Francisco Bay Area air basin (e.g., UP Oakland, BNSF Richmond), the Mojave Desert air basin (e.g., BNSF Barstow), or the Sacramento Valley air basin (e.g., UP Roseville) would result in exceeding the mass daily significance thresholds for NO_x emissions established by the

BAAQMD, MDAQMD, and SMAQMD, assuming the locomotive would operate at the same level of activity.

- Relocating one Pre-Tier 0 or Tier 0 MHP or switch locomotive from one of the four high-priority railyards in exchange for a cleaner Tier 3 engine from one of the other railyards within the San Francisco Bay Area (*e.g.*, UP Oakland or BNSF Richmond) or Sacramento Valley air basins (*e.g.*, UP Roseville) would result increased emissions of between 73 and 132 lb/day of NO_x, by far in exceedance of the mass daily significance thresholds for NO_x emissions established by the BAAQMD and SMAQMD.²¹
- Relocating nine pre-Tier 0 or Tier 0 MHP locomotives from one of the four high-priority railyards in exchange for cleaner Tier 3 engines from one of the other Class I railyards within the San Francisco Bay Area air basin (*e.g.*, UP Oakland or BNSF Richmond) would result in increased emissions of 62 lb/day of PM₁₀ and 61 lb/day of PM_{2.5}²² at the railyard where the Tier 3 locomotives are moved to, exceeding the mass daily significance thresholds for PM_{2.5} emissions established by the BAAQMD of 54 lb/day.
- Exchanging three Tier 3 MHP locomotives from one of the four high-priority railyards for Tier 4 locomotives from a railyard located within the San Francisco Bay Area air basin (*e.g.*, UP Oakland or BNSF Richmond) would result in an increase of 64 lb/day of NO_x emissions at the railyard where the Tier 3 locomotives are moved to, exceeding the BAAQMD's significance thresholds for NO_x emissions of 54 lb/day.²³
- In the Sacramento Valley air basin (*e.g.*, UP Roseville), the exchange of four Tier 4 MHP locomotives for Tier 3 locomotives would result in 85 lb/day of NO_x emissions, by far exceeding the SMAQMD's significance thresholds for NO_x emissions of 65 lb/day.

The latter two examples illustrate that even relocation and exchange of relatively clean, newer engines for ones that comply with one emission standard (Tier), lower may

²¹ (MHP Pre-Tier 0: 169.7 lb/day NO_x) - (MHP Tier 3: 37.7 lb/day NO_x) = **132.0 lb/day NO_x**;
 (MHP Tier 0: 119.6 lb/day NO_x) - (MHP Tier 3: 37.7 lb/day NO_x) = **81.9 lb/day NO_x**;
 (Switch Pre-Tier 0: 109.3 lb/day NO_x) - (Switch Tier 3: 15.1 lb/day NO_x) = **94.2 lb/day NO_x**; and
 (Switch Tier 0: 87.9 lb/day NO_x) - (Switch Tier 3: 15.1 lb/day NO_x) = **72.8 lb/day NO_x**.

²² (MHP Pre-Tier 0 or Tier 0: 7.2 lb/day PM₁₀) - (MHP Tier 3: 0.4 lb/day PM₁₀) = 6.8 lb/day PM₁₀;
 6.8 lb/day PM₁₀ × 9 = **62.0 lb/day PM₁₀**; and
 (MHP Pre-Tier 0 or Tier 0: 7.2 lb/day PM_{2.5}) - (MHP Tier 3: 0.4 lb/day PM_{2.5}) = 6.7 lb/day PM_{2.5};
 6.7 lb/day PM_{2.5} × 9 = **60.6 lb/day PM_{2.5}**.

²³ (MHP Tier 3: 37.7 lb/day NO_x) - (MHP Tier 4: 16.3 lb/day NO_x) = 21.4 lb/day NO_x;
 21.4 lb/day NO_x × 3 = **64.1 lb/day NO_x**.

result in increased emissions of pollutants high enough to result in significant adverse impacts on air quality.

According to the analysis of Mr. Colon Fulk, it is quite possible, if not likely, that UP and BNSF would implement the Proposed Commitments by moving at least this many locomotives, which could cause significant adverse impacts on air quality at UP Roseville, UP Oakland, BNSF Barstow or other railyards.

Further, the above estimates of daily emissions are conservative because they assume that MHP and switch locomotives operate at the same level of activity throughout the year and, thus, emissions on any given day are the same.²⁴ While in general the MHP and switch locomotive utilization is relatively constant, on most railroads the weekends, especially Sundays are a somewhat slower, thereby using the MHP and switch locomotives less on Sundays. Thus, in reality, on some weekdays emissions from the railyards would be higher than estimated above.

Because NO_x are ozone precursors, any increase in NO_x emissions would exacerbate the existing air quality problems and impede future achievement of state and federal ozone attainment status in various air basins. The South Coast, San Francisco Bay Area, Sacramento Valley, and the southwestern portion of the Mojave Desert air basins are all designated as state and federal ozone non-attainment areas. Thus, any increase in NO_x emissions would impede the respective air basin's efforts to achieve attainment in the future. Similarly, increased PM₁₀ emissions would further exacerbate existing air quality problems and impede various air basins' future achievement of attainment status. Both the Sacramento Valley and Mojave Desert air basins are designated state and federal non-attainment areas for PM₁₀ and the San Francisco Bay Area air basin is designated as a state non-attainment area for PM₁₀. All three air basins are designated state and federal non-attainment areas for PM_{2.5}.

The above conclusions also apply to other air basins in California; the three railyards and air basins discussed above serve as examples only.

Because there is a reasonable possibility that emissions of NO_x and PM₁₀ would increase beyond significance thresholds established by California air districts, this potential increase in criteria pollutant emissions should therefore be analyzed under CEQA.

²⁴ Personal communication with Colon Fulk, June 22, 2010.

VIII. Instead of the Proposed Commitments, the CARB Should Develop Regulations to Comply with Requirements Set Forth in the Federal Clean Air Act and the California Health and Safety Code

The CARB's Proposed Actions document does not provide a rigorous analysis of alternatives of the Proposed Commitments approach vs. regulatory approach with backup data for the calculations. Instead, the decision to go the route of the Proposed Commitments rests on a number of unsupported assumptions, as discussed above.

The Federal Clean Air Act ("CAA") delegates regulatory responsibility to the CARB for criteria pollutant and air toxic control measures. Thus, pursuant to CAA sections 110(a), 172(c) and 182(b), the State Implementation Plan ("SIP") must demonstrate attainment or include all feasible measures. CAA section 209(e) also gives California authority to regulate certain non-road engines and to adopt "in-use" requirements. Pursuant to this delegation, the California Health & Safety Code sections 36902, 40462, 40469 and 43018 confirm that the CARB has authority to take "whatever" actions are "necessary, cost-effective and technologically feasible" to achieve the maximum degree of reduction possible from mobile sources. Further, the CARB has an express duty pursuant to the California Health & Safety Code sections 40702 and 43013 to regulate through rulemaking locomotive and railyard sources, unless preempted by federal law.

The CARB claims that "virtually no non-preempted locomotives" operate at the four railyards. This statement appears to be contradicted by the CARB's data showing that as of 2008, there were 130 Pre-Tier 0 and 20 Tier 0 medium horsepower ("MHP") locomotives and 34 pre-Tier 0 and 29 Tier 0 switch locomotives operating in the South Coast air basin. (Statewide, there are 400 pre-Tier 0 or Tier 0 MHP locomotives and 244 pre-Tier 0 or Tier 0 switch locomotives.)²⁵ It appears unlikely that all these older locomotives have been remanufactured, repowered, or replaced since. Also, the Proposed Commitments confirm that at least 32 older switcher locomotives still operate at BNSF San Bernardino and BNSF Hobart.²⁶

The CARB's August 2009 Technical Options document concludes that replacement and retrofit of these older, non-preempted locomotives are feasible, cost-effective and likely not preempted by federal law and could therefore be addressed by CARB regulations. In particular, Option 1 (replacement of 152 Tier 0 and older switch locomotives with Tier 3 Ultra-Low Emitting Switch Locomotives), Option 2 (retrofit of 244 gen-set switch locomotives with NO_x and particulate matter emission controls), Option 5 (repower of 400 older medium horsepower locomotives with low-emitting engines), and Option 7 (retrofit of 400 low-emitting medium horsepower locomotives with NO_x and particulate matter emission controls) are deemed feasible and cost effective. Thus, the CARB should implement regulations based on these options to

²⁵ Recommendations Document, Appendix A, pp. A-6 through A-8.

²⁶ Proposed Commitments for BNSF San Bernardino and BNSF Hobart, p. A2-1 and B2-1.

reduce emissions from non-preempted locomotives to comply with its responsibilities under the CAA and California Health and Safety Code.

IX. Conclusions

In my opinion, the Proposed Commitments fall short of achieving the CARB's goal of reducing diesel particulate matter emissions from railyards and associated health risks for a number of reasons.

Most importantly, the Proposed Commitments address only four railyards and, thus, leave communities at other railyards with projected similar or even higher future exposure to carcinogenic diesel particulate matter emissions high and dry. The CARB estimates that communities across the State that are not near the priority railyards would receive about 15% of the benefits from the lower-emission locomotives brought in to meet the emission targets at the priority railyards.²⁷ However, as discussed in my comments above, even these marginal benefits may not materialize. Thus, the communities at the other 14 Class I railyards would not have much or even any benefit from the Proposed Commitments and would continue to be exposed to extremely unhealthful concentrations of diesel particulate matter.

Further, if any of the four railyards were to experience a drop in activity by the proposed compliance deadlines of 2015 and 2020, as has been observed in the past few years, the Proposed Commitments would not result in much or even any benefits over the already existing binding agreements and regulations.

In addition, the Proposed Commitments as well as the supporting documents are based on unreliable and faulty assumptions with respect to past and future activity and fuel consumption at the four railyards.

Finally, the staff report in the Proposed Actions Document claims that there are virtually no benefits in these high priority railyards to be achieved if CARB were to depend solely on its regulatory authority for locomotives.²⁸ However, it appears that there are still a large number of non-preempted old and dirty MHP and switch locomotives operating in California as well as other equipment whose emissions could be addressed by regulations.

In short, it is my opinion that the inventory-based approach used by the CARB is unreliable and likely not as effective as regulations and that CARB's expectations with respect to the effectiveness of the Proposed Commitments to reduce diesel particulate matter emissions and associated health risks from the four railyards are unrealistic, too little, and too late. The communities exposed to unhealthful levels of diesel particulate

²⁷ Proposed Actions document, p. 9.

²⁸ Proposed Actions document, p. i.

matter would be better served by regulations that address specific high-polluting locomotives and other equipment. If the CARB chooses not to regulate but rather to continue with the Proposed Commitments, the potential increase in emissions that could result from backsliding, *i.e.*, transfer or exchange of more polluting locomotives to other railyards, requires CEQA review.

Please feel free to call me at (415) 492-2131 or e-mail at petra@ppless.com if you have any questions about the comments in this letter.

Sincerely,

A handwritten signature in black ink, appearing to read 'Petra Pless', with a large, stylized flourish above it.

Petra Pless, D.Env.

Table A-1: Comparison of 2005 baseline emissions and projected future emissions from BNSF San Bernardino, BNSF Hobart, UP Commerce, and UP ICTF/Dolores railyards in 2010, 2015, and 2020 presented in various CARB documents

Railyard	2005 Baseline			2010			2015			2020		
	Basis for Proposed Commitments 6/2010 ^a	Technical Options Report 8/2009 ^b	Mitigation Plans 8-9/2008 ^c	Basis for Proposed Commitments 6/2010 ^a	Technical Options Report 8/2009 ^b	Mitigation Plans 8-9/2008 ^c	Basis for Proposed Commitments 6/2010 ^a	Technical Options Report 8/2009 ^b	Mitigation Plans 8-9/2008 ^c	Basis for Proposed Commitments 6/2010 ^a	Technical Options Report 8/2009 ^b	Mitigation Plans 8-9/2008 ^c
	Emissions (tons/year)											
BNSF San Bernardino	22.2	22.4	22.4	11.7	13.2	12.0/11.7 ¹	7.6	9.0	8.2/7.6 ¹	4.9	6.0	5.4/4.9 ¹
BNSF Hobart	24.2	24.7	24.7	10.3	10.5	9.5	7.4	7.9	6.4	5.7	5.9	4.2
UP Commerce	12.1	12.1	9.6	5.9	11.1	5.4	4.1	7.7	3.7	3.2	5.9	2.9
UP ICTF/Dolores	20.3	23.7	20.3	7.5	14.4	11.8	5.8	7.9	n/a	4.4	6.6	n/a
	Reduction with existing program											
BNSF San Bernardino				45%	41%	46%/48% ¹	60%	60%	63%/66% ¹	78%	73%	76%/78% ¹
BNSF Hobart				57%	57%	62%	70%	68%	74%	76%	76%	83%
UP Commerce				52%	8%	44%	66%	36%	61%	74%	51%	70%
UP ICTF/Dolores				63%	39%	42%	71%	67%	n/a	78%	72%	n/a
	Projected annual growth rate assumed for calculation of future emissions											
BNSF San Bernardino										3.0% ²	1.0%	0.0%/3.0% ³
BNSF Hobart										3.0% ²	1.0%	1.6%/4.0% ³
UP Commerce										3.0% ²	1.0%	1.0% ^{3,4}
UP ICTF/Dolores										3.0% ²	1.0%	various ^{3,5}

¹ including growth/not including growth

² Projected annual growth rate is based on a 1.5% per year increase in fuel use, which equates to a roughly 3% per year increase in containers based on historic growth rates over the last 12 years; see Basis for Proposed Commitments, pp. A1-3, B1-3, C1-3, and D1-3.

³ Projected annual growth rates based on:

BNSF San Bernardino (container lifts: historical activity has grown at a rate of less than zero percent from 2002 through 2008 with projected 2008 activity to be 20% below that for 2005, thus projected growth rate set at 0%; mainline traffic: growth rate of about 3% per year based on data from 1999 through 2007);

BNSF Hobart (container lifts: historical activity has grown at a rate of 3.5% per year between 2002 through 2008 but at 1.6% per year from 2003 through 2008, and at 0% from 2004 through 2008 with the 2008 activity projected to be 1.5% less than 2005, thus mid-range estimate of 1.6% chosen; mainline traffic: has been increasing at a rate of about 4% based on data from 1999 through 2007);

UP Commerce (review of historic fuel use data and other historic operational factors such as container lift counts, tons of freight, etc.);

UP ICTF/Dolores (UP is preparing to completely modernize the ICTF, which will increase container capacity and dramatically reduce diesel particulate matter, criteria pollutant, and greenhouse gas emissions. The modernized facility was assumed to incrementally increase as the modernization project is completed by 2016. For years 2007 through 2016 it was assumed that no infrastructure changes would be made at the Dolores yard and that it currently operates at its capacity. While the overall activity level at the Dolores yard is not expected to increase in future years, operations will shift to incorporate more ICTF-related activities. Other non-ICTF-related activities will be shifted to other UP facilities in the L.A. basin.).

⁴ The past growth rate for UP Commerce was incorrectly calculated at 0.8% instead of 1.6%. Based on this incorrectly calculated past growth rate, emission estimates in the Mitigation Plan thus assumed an average future growth rate of 1%. See Comment IV.

- 5 For ICTF, 2010 road power emissions calculated as 44% increase from 2005; 2012 through 2016 emission forecasts for road power activity and yard switching activity were calculated in proportion to the increasing number of lifts due to modernization of ICTF which will increase container capacity. For Dolores, it was assumed that the overall activity level at the yard is not increasing and that the yard is currently operating at capacity.
- a The Basis for Proposed Commitments are attached as appendices to the California Air Resources Board, Proposed Actions to Further Reduce Diesel Particulate Matter at High Priority Railyards, June 2010:
- Appendix A: Basis for Proposed Commitments to Reduce Particulate Matter at the BNSF San Bernardino Railyard, June 15, 2010, Table I ;
- Appendix B: Basis for Proposed Commitments to Reduce Particulate Matter at the BNSF Hobart Railyard, June 15, 2010, Table I;
- Appendix C: Basis for Proposed Commitments to Reduce Particulate Matter at the UP Commerce Railyard, June 15, 2010, Table I; and
- Appendix D: Basis for Proposed Commitments to Reduce Particulate Matter at the UP ICTF/Dolores Railyards, June 15, 2010, Table I.
- b California Air Resources Board, Technical Options to Achieve Additional Emissions and Risk Reductions from California Locomotives and Railyards, August 2009, Table A-4. Estimates include commitments UP and BNSF have made since the release of the railyard mitigation plans; see p. 154.
- c Environ, Diesel Particulate Matter Mitigation Plan for the BNSF Railroad San Bernardino Rail Yard, August 21, 2008, Table 3-I (metric tonnes converted to short tons; 2005 cargo handling equipment emissions were revised with EMFAC2007 version 2.3 emission rates and a different growth rate was applied to mainline freight and passenger traffic from that from the activity within the yard);
- Environ, Diesel Particulate Matter Mitigation Plan for the BNSF Railroad Hobart Rail Yard, September 26, 2008, Table 3-I (metric tonnes converted to short tons; 2005 cargo handling equipment emissions were revised with EMFAC2007 version 2.3 emission rates and a different growth rate was applied to mainline freight and passenger traffic from that from the activity within the yard);
- Sierra Research, Diesel Particulate Matter Mitigation Plan for the Union Pacific Railroad Commerce Rail Yard, August 18, 2008, Table I (based on emission estimates in California Air Resources Board health risk assessment for UP Commerce Rail Yard adjusted based on new information including default engine load factor for yard hostlers, emission factors for heavy-heavy duty drayage truck operations based on new EMFAC2007 model, and emission reductions due to December 2007 California Air Resources Board Regulation to Control Emissions from In-use On-road Diesel-fueled Heavy-duty Drayage Trucks); and
- Sierra Research, Diesel Particulate Matter Mitigation Plan for the Union Pacific Railroad ICTF and Dolores Rail Yards, August 25, 2008, Table I.