Blue Source's Greenhouse Gas Emission Reduction Protocol for JB Hunt's Intermodal Transport Project

Prepared by

Blue Source

4020 WestChase Blvd., Suite 470
Raleigh, NC 27607

December 2008

Table of Contents

Page

1.0 Introduction

Blue Source is an active supplier of emission reductions (ERs) sourced from geologic sequestration, conservation, transportation, and avoidance projects and companies. More recently, the company is actively involved in financing and developing these kinds of projects. J.B. Hunt Transport Services, Inc. (J.B. Hunt) is one of the largest truck-load transportation and logistics companies in North America. Their core business of transporting goods creates significant mobile source emissions.

In 1989, J.B. Hunt formed a partnership with the former Santa Fe Railroad (now Burlington Northern Santa Fe). J.B. Hunt describes this as “a watershed event in the intermodal industry and the first that linked major rail and truckload carriers in a joint marketing environment” Over the next decade new intermodal concepts were developed and tested.

In January 2000, J.B. Hunt decided to create JB Hunt Intermodal (JBI), a new business segment focused solely on growing and improving the efficiency of its intermodal operations. Intermodal freight transport utilizes the most efficient aspects of truck and rail modes. Freight trains carry cargo over long distance, high volume rail corridors, and trucks move the loads between the rail terminals and the cargo’s origin or destination. The new JBI business segment desired to make intermodal transport a viable option for more shippers by increasing speed and reliability.

To accomplish this, JBI spent approximately 300 million US dollars in new equipment, purchasing additional containers and chassis, tractors, and software to expand their intermodal operations. JBI now has the largest completely high-cube container fleet designed to take advantage of double-stack economics and efficiency. Partnerships with all major rail operators are now in place, allowing J.B. Hunt access to all major rail lines across the United States It also owns the largest drayage fleet in North America for container pick-up at their point of origin and drop-off at their final destination.

This protocol documents the methods used to determine the greenhouse gas ERs associated with the J.B. Hunts Intermodal project in accordance with International Standards Organization (ISO) 14064 guidelines (ISO 2006a, ISO 2006b). It also includes the calculated ERs from the project during the Oct. 2006 – Sep. 2008 time-period (the creation period). The protocol is based on established emission estimation techniques, conservative estimates, accurate/reliable data sources, emissions factors, and documented methodologies.

The protocol is organized in the following sections:

Section 2 Contact information of the project proponents;
Section 3 Detailed project description and operation;
Section 4 Baseline assessment;
Section 5-6 Project emissions and emission reductions
Section 7 Project additionality and validity
Section 8 Summary of emission reductions

2.0 Proponent Identification

Proponent Contact:

Mr. Mahesh Gundappa
Vice President, Engineering
Blue Source, LLC
4020 West Chase Blvd. Suite 470
Raleigh, NC 27607
Phone: (919) 827 0322
Fax: (919) 827 0479
E-mail:mgundappa@bluesource.com

Operating Contact:

Mr. Gary Whicker Senior
Vice President – Engineering Services
J.B. Hunt Transport, Inc.
615 J.B. Hunt Corporate Drive Lowell, Arkansas 72745
Phone – (479) 820-8143
Fax – (479) 820-4499
E-mail – Gary_Whicker@jbhunt.com

3.0 Emission Reduction Project Description

3.1 Site Description

JB Hunt's intermodal routes are shown in Figure 3-1. Today JBI operates a fleet of more than 38,500 company-owned 53' containers across a nationwide network of rail partners -- anchored by the Burlington Northern Santa Fe (BNSF) in the West and the Norfolk Southern (NS) in the East. JBI's services are enhanced by one of the largest private drayage fleets in the U.S. with over 2,100 trucks and 2,500 company drivers. In addition to the largest inventory of 53' domestic containers in the industry, Hunt also has access to a variety of non-company intermodal assets for loading, including rail-provided domestic containers, international boxes (20', 40' and 45') and temperature-controlled equipment.

JB Hunt Intermodal volumes are projected to exceed 850,000 annual loads in 2008. This growth reflects Hunt's focused commitment to customers' needs, including, superior customer service, better transit, greater service reliability and improved economics.

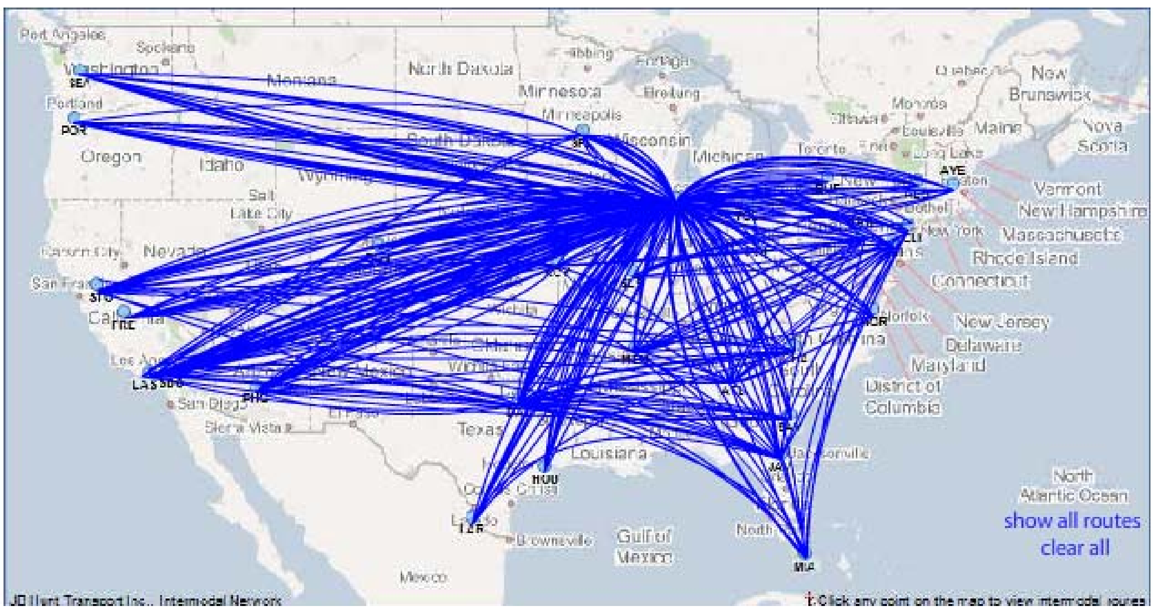

Figure 3-1 JB Hunt's Premium Intermodal Routes

3.2 Pre-Project Conditions

In 1989, J.B. Hunt formed a unique partnership with the former Santa Fe Railway (now BNSF) that linked major rail and truckload carriers in a joint marketing environment. However, prior to 2000, J.B. Hunt truck and intermodal operations were integrated and operated as a single entity with intermodal loads shipped using both trailers and containers.

In 2000, JBI was formed as an intermodal business segment within J.B. Hunt. JBI spent over 300 million USD in new equipment, including additional containers and chassis, tractors, and software to expand their intermodal operations.

3.3 Project Strategy

Intermodal freight transport utilizes the most efficient aspects of truck and rail modes. Freight trains carry cargo over long distance, high volume rail corridors, and trucks move the loads between the rail terminals and the cargo's origin or destination. Transporting freight via trains is over three times more efficient than trucks on a ton-mile basis (DIIRD, 2007)

The most efficient way to move containers long distances over land is to "double stack" them one on top of another onto railroad well car (rail cars with a "well" for the bottom container), commonly called COFC or "container on flat car". Trailers must be shipped single stack.

As the pioneer of truck-like intermodal service, J.B. Hunt is the largest domestic intermodal service provider, and continues to gain market share and lead the conversion of highway shipments to a more energy-efficient intermodal transportation service.

Key to making this conversion strategy successful is Hunt's focus on:

1) significant investment in private intermodal 53' containers, chassis, and dray tractors,
2) creating and building information and decision support systems to effectively manage intermodal operations,
3) expanding intermodal network reach by opening new services lanes and options, and
4) Vigorously educating the shipping community on the carbon benefits of intermodal transportation.

J.B. Hunt has continued aggressive investment in proprietary intermodal equipment. As the largest owner of private containers (nearly 40,000 53' high cube containers by the end of 2008), they also own and operate the largest intermodal dray fleet of over 2,100 tractors across the United States. This dray fleet uses state-of-the-art decision support technology to maximize efficiency and minimize total miles run while delivering high levels of on-time service. The equipment and technology investment by Hunt allows the intermodal service to effectively compete with the timeliness and reliability of traditional highway-only service.

Hunt has also worked with its railroad carriers to develop and expand service territories and offerings. J.B. Hunt performs the market potential analysis, and identifies the transit times and service schedules needed to satisfy customer needs. This market insight is then used to open new intermodal service options, including new intermodal rail ramps (the point of origin and termination of rail movement), new operating lanes, and improved service schedules to allow for more transit and faster transit options.

Finally, Hunt has also become a key source of assessing customers' transportation carbon footprint. "Clean Transport" is a J.B. Hunt analysis service that identifies conversion opportunities and calculates the associated carbon savings from converting highway to intermodal moves. This insight helps shippers identify and choose mode conversion as the primary means of reducing transportation-related carbon emissions.

3.4 Post Project Conditions

Freight shipped through JBI is loaded in containers and picked up at a shipper's location by a JBI tractor or third-party dray company for transport to the rail yard. The intermodal container is then transferred from highway vehicles (chassis) and stacked on rail cars for what is typically the longest leg of the route. At the destination rail yard, JBI freight is removed from the rail car, remounted on a chassis and moved to the final destination by JBI tractors or dray carriers.

J.B. Hunt's key role in infrastructure development is allowing more shippers to choose intermodal transport instead of long haul truck transport, reducing fuel use and providing significant greenhouse gas reductions. JBI now has the largest, completely high-cube container fleet designed to take advantage of double-stack economics and efficiency, allowing almost 90% of their intermodal freight to be shipped in containers. JBI employs several hundred people devoted to working with rail operators to plan the routes and maximize the efficiency of rail versus road, making intermodal transport a viable option for shippers.

3.5 Data Collection and Analysis

A *fuel-based methodology* is used to calculate all CO_2e emissions. Thus, the largest data requirements are truck mileage (empty, loaded and deadhead), and fuel economy (which is then converted to fuel consumption). J.B. Hunt engineers provided spreadsheets containing monthly values of empty and deadhead truck miles, load weights, truck fleet fuel economies, and loaded and empty rail miles from October 2006 to September 2008.

Actual "ramp-to-ramp" train miles were not provided by the railroads; therefore nearest road miles based on the distance between origination and destination cities were used. To calculate actual train miles travelled for shipment of JB Hunt's loads, these values were adjusted by two factors.

1) Empty mile adjustment factor, which compares the miles associated with empty rail moves with loaded miles. Average annual values ranged between 6.0 - 7.9 percent of loaded miles.
2) PC rail miles adjustment factor, which compares train miles with road miles between origin and destination. JB Hunt engineers used a commercial software program called "PC Railer", to compare actual rail miles with Rand McNally road miles based on origination and destination codes for major rail routes used to transport between 70-80 percent of JB Hunt's total freight volume. The comparison indicated the PC Railer

miles were about 10 percent more than the Rand McNally miles (annual average values ranging between 9.6 – 10.1 percent)

To account for these effects, intermodal miles traveled were increased by about 16 - 18 percent in the calculation of project emissions. Empty mile and actual mile adjustment factors are shown in Table A-1 in the appendix.

Information regarding the energy intensities (Btu/revenue-ton-miles) of the railroads was obtained from the American Railroad Association and the two largest carriers for J.B. Hunt, BNSF and NS railroads. (Hunt, 2008), which together transports more than 90 percent of JB Hunt's intermodal shipments. For the remainder, American Railroad Association energy intensities for Class 1 railroads were used (AAR, 2008) BNSF indicated that their intermodal locomotives are 21% less efficient than their overall fleet average. The reasons for the difference are the use of larger locomotive engines for intermodal transport, requiring travel at higher than average speeds (70mph vs. 45mph). An additional 1% factor is applied to account for rail yard emissions for loading and unloading containers. Energy intensity factors are shown in Table A-2.

Truck transport data are also based on Rand McNally miles. However, actual truck miles driven by the JBT and JBI fleet drivers are greater than the standard Rand McNally miles. In order to reflect actual miles driven, the Rand McNally miles are multiplied by two factors.

1) Loaded mile adjustment factor,, which combines the loaded truck, empty truck, and deadhead miles, and compares them to the Rand McNally miles. This factor ranged from 1.1 to 1.15 (i.e. 10 - 15 percent increase) for the JBT fleet, and about 1.5 for the JBI fleet. For the purposes of this project, an adjustment factor was calculated for each month during the creation period of October 2006 to September 2008.
2) Variance factor, which represents the additional miles driven by the truck drivers that are not required for shipment of the load. During the creation period, the monthly values of the variance factor for the JBT fleet ranged between 1.097 and 1.11 percent of the Rand McNally miles. Variance miles for the JBI intermodal fleet are not tracked and the JBT factors were used for the JBI fleet. Since the JBI fleet travels only one-tenth the distance of the JBT fleet, any error introduced by this assumption on the calculated emission reductions is insignificant

Loaded mile and variance factors are shown in Table A-3.

JB Hunt uses company drivers and independent contractors (ICs) for both the JBT and JBI fleets. To calculate fuel economies for these fleets, weekly reports from the engine electronic control modules (ECM) on each truck were downloaded by J.B. Hunt's dispatch system and transmitted to J.B. Hunt's data warehouse. The weekly reports were aggregated and queried by J.B. Hunt engineers to calculate monthly average fuel economies for both company drivers and ICs in each fleet. Average monthly values of fuel economies are shown in Table A-4 in the appendix. JBI also outsources a small percentage of the freight hauling to smaller operators. Outsourced truck fuel economies were assumed conservatively to be about 0.75 mpg lower than the corresponding monthly JBI fleet average numbers.

Greenhouse gas emissions factors for carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O) based on diesel combustion in mobile sources were obtained from a document published in 2008 by the USEPA under its Climate Leaders program (USEPA, 2008). The global warming potentials (GWP) of CH_4 and N_2O are 21 and 310 times that of CO_2, respectively. These GWP's were used to convert the CH_4, and N_2O emissions to carbon dioxide equivalent (CO_2e) emissions. A summary of greenhouse gas emissions factors used for this report is shown in Table **A-5**..

4.0 Baseline Assessment

Emissions reductions were being created as part of an intermodal investment made during the early 1990s. In 2000, significant investments were made in containers, chassis, tractors, software, and new facilities to convert highway shipments to rail. Baseline emissions reflect emissions associated with activities that would have occurred in the absence of JB Hunt's investments in the intermodal project. Various scenarios were identified as potentially representative of the baseline and evaluated to determine the most likely scenario in the absence of the project. Potential baseline scenarios include:

1. All freight would have been transported over the road by JB Hunt or other industry carriers
2. All long-haul freight would have been transported intermodal rail by other industry carriers, and
3. A portion of the freight would be transported by intermodal rail by other industry carriers.

Since freight transportation by truck is JB Hunt's core business, in the absence of the intermodal project, J.B. Hunt would have used their JBT truck fleet to haul the loads. This was the method of transportation used by Hunt and other carriers and represents a continuation of business as usual with no barriers to its continued implementation. There are no laws requiring the use of intermodal methods for freight transportation in the US.

Significant investments in infrastructure and changes in operation are required to accommodate the transportation of all long-haul freight by rail. This includes investments in containers and chassis, tractors, and software to create and build information and decision support systems required to effectively manage intermodal operations. There are significant financial, logistical, and institutional barriers for implementation of these systems across the industry.

Following Hunt's pioneering efforts to shift the transportation of over-the-road freight to intermodal, a few carriers have begun adopting this approach and have begun making investments in the infrastructure required to transport freight by intermodal rail. Assuming that the rest of the industry would have made these investments in the absence of Hunt's leadership, a portion of the over-the road freight can be expected to be transported by intermodal rail.

Of the three scenarios, Scenario 2 is not a plausible baseline scenario as it has significant financial and institutional barriers for its implementation. Both Scenarios 1 and 3 are plausible baseline scenarios with Scenario 1, which represents the business as usual case, with the lowest level of barriers. Since intermodal transport emissions are lower than over-the-road truck emissions, scenario 3 would have lower baseline emissions and result in lower emission reductions compared to Scenario 1. To be conservative, Scenario 3, where a portion of the freight would have been transported by rail was chosen as the baseline scenario for the project.

To calculate baseline emissions for the project, emissions from the transportation of a portion of Hunt's freight by intermodal rail were combined with the emissions from the transportation of the remaining freight by road.

Calculation of Industry Average Intermodal Percentages

Industry statistical data were used to determine the penetration of intermodal transportation by rail for the industry. The industry average value is expressed as,

$$I_{avg,y} = Rail_{,y} / (Rail_{,y} + Road_{,y}) \times 100 \qquad \text{Equation 4.1}$$

where,

$I_{avg,y}$ = Intermodal (rail) percentage for the industry during year y

$Rail_{,y}$ = Total no of intermodal loads/ transported by rail during year y

$Road_{,y}$ = Total no of long haul loads transported by road (500 miles or more) during year y

Table 4-1 shows the annual breakdown of US freight transportation by intermodal (rail) and by truck for 2006-2008 (FTR, 2008). The data for 2006 indicates about 12.3 million loads were transported intermodally by rail. During the same year 279.7 million dry van truck loads were transported, including 180.1 million long-haul loads (300 miles or greater). In the transportation industry, long-haul loads are usually transported by Class 8 trucks and have the greatest potential to be transported intermodally. Industry data indicate that the average train haul has reduced from 600 miles to 200 miles. (Area Development, 2008) To be conservative, only long-haul loads that travel more than 500 miles were assumed to be transported intermodally.

Table 4-1: U.S. Freight loadings by Mode (thousands)

Mode	**2006**	**2007**	**2008**
Rail (Intermodal)	**12,308.4**	**12,049.0**	**11,746.8**
Dry Van truck Total	279,734.3	280,152.1	272,340.2
Short-Haul Loads (0-125)	25,536.1	25,092.8	24,950.9
Medium-Haul Loads (125-300)	74,014.1	73,585.1	69,458.3
Long-Haul Loads (300+)	**180,184.2**	**181,474.2**	**177,931.0**

To determine the fraction of loads that are transported 500 miles or greater, data published by the American Trucking Association (ATA) were used (ATA, 2008). The distribution of Class 7 and 8 trucks operating in the US by range of operation is shown in Table 4-2. The data indicates that.68 percent of these trucks were used for transporting loads over relatively short distances (100 miles or less), about 8 percent travelled between 101 – 200 miles, and 20 percent were used to transport freight over a 200 mile range. About4 percent of trucks were classified as "Off-the-Road".

Table 4-2 Distribution of Class 7 and 8 Trucks by Range of Operation (ATA 2008)

Range (miles)	Percentage
0 - 100	68.0
101 – 200	7.7
201 - 500	8.5
501 or more	11.5
Off-the-Road	4.3

The fraction of long haul loads that are transported more than 500 miles were calculated by assuming the long haul loads contained in Table 4-1 are distributed in proportion to the trucks operating range values contained in Table 4-2. Using this approach for the 2006 data in Table 4-1, the number of long haul loads that were transported more than 500 miles were calculated as (11.5/20) x 180,184,200 =103,606,000. This a conservatively low estimate as the 20 percent value is applicable to loads transported more than 200 miles and the ratio should be applied to the sum of both medium haul (125-300 miles) and long-haul loads (300+ miles).

Table 4-3 shows industry average intermodal percentages for 2006-2008, which were calculated using Equation 4-1. The data indicated that on average about 10 percent of the total loads transported by intermodal rail and truck were being transported by rail by the industry. Therefore, under the baseline for this project, about 10 percent of the loads are assumed to be transported by intermodal rail.

Table 4-3 Industry Average Intermodal (Truck/Rail) Percentages for 2006-2008

Year (y)	Rail, y (thousands)	Road,y (thousands)	Iavg,y, (%)
2006	12,308.4	103,606	10.6
2007	12,049.0	104,348	10.4
2008	11,746.8	102,310	10.3

Baseline Emissions Calculations

A review of the monthly load and mileage data for the JBI fleet indicated good correlation (r^2 = 0.71) between loads transported and miles travelled. Therefore the same percentage splits of loads transported between rail and road were applied to the total miles travelled by the JBI fleet to calculate emissions under the baseline.

Truck

The total amount of diesel that would have been consumed was calculated by dividing the baseline truck miles by the weighted average of JBT and independent contractor fuel economies. The monthly truck miles were calculated from the product of the Rand McNally loaded JBI miles and the industry intermodal average for truck. To determine the actual miles that would have been driven, the Rand McNally loaded miles for each year were multiplied by monthly loaded mile adjustment and variance factors. Baseline emissions were calculated by multiplying the fuel consumption by the GHG emission factors for the trucks.

Baseline Emissions$_{truck}$ = (Loaded JBI Miles x (1-Iavg, y/100) x Load Adjustment Factor x Variance Factor / JBT/IC weighted average fuel Economy) x GHG Emissions Factors

Where:
Loaded JBI Miles = Loaded Rand McNally Miles for the JBI fleet
JBT/IC Fuel Economy = Miles per US gal. Weighted average for the JBT and IC truck fleet.
GHG Emissions Factors = CO_2 Emissions Factor + CH_4 Emissions Factor + N_2O Emissions Factor

Using this equation, baseline truck emissions for October 2006 are calculated as,

Baseline Emissions$_{truck}$ = (115,725,381 miles x (1-10.62/100) x 1.1407 x 1.1071) / 6.02 miles/US gal. x ((0.01015 tonnes CO_2e/US gal) + (3.02×10^{-8} tons CH_4/US gal. x 21)+(2.84×10^{-8} tons N_2O/US gal x 310))

Baseline Truck Emissions (Oct. 2006) = 220,445 tonnes CO_2e

Train

In order to calculate the emissions from freight that would have been transported by rail an emission factor based on the project emissions was used. As intermodal mode of transportation uses rail as well as truck drayage transport, emissions from both modes have to be included. The calculated emission factor, which is expressed in tonnes CO_2e per ton-mile of freight transported, was multiplied by the fraction of intermodal baseline miles and average weight of the freight to get the baseline emissions from train.

The calculation for the emission factor is shown under Project Emissions in section 5.0. The monthly baseline is calculated using the following equation:

Baseline Emissions$_{rail}$ = (Loaded JBI Miles x (Iavg,/100) x Average Weight of Freight (tons) x Emission factor based on the total project emissions (tonnes CO_2e/ton-mile).

Using this equation, baseline train emissions for October 2006 are calculated as,

Baseline Emissions$_{rail}$ = (115,725,381 miles x 10.62/100) x 18.384 tonnes x 0.00004876 tonnes CO_2e/ baseline ton-miles.

Baseline Train Emissions (Oct. 2006) = 11,016 tonnes CO_2e

Total Baseline Emissions

Total Baseline Emissions = Baseline Truck Emissions + Baseline Train Emissions

For Oct. 2006, total baseline emissions are calculated as,

Total Baseline Emissions (tonnes CO_2e) = 220,445+ 11,016

= 231,461tonnes CO_2e

5.0 Project Emissions

The project emissions are based on the emissions produced from trucks associated with the JBI truck fleet and the train locomotives hauling J.B. Hunt freight. The fuel economies of the trucks are reported as miles per gallon (mpg) and the fuel economies of the trains are derived from the reported energy intensities.

Truck

The JBI fuel consumption for project emissions was calculated using the following equation:

JBI Truck Fuel Consumption = (JBI Miles / JBI Fuel Economy) + (Independent Contractor Miles / I.C. Fuel Economy) + (Outsourced Truck Miles / Outsourced Truck Fuel Economy)

Where:
JBI Miles = Rand McNally Miles x Load Adjustment Factor x Variance Factor
Fuel Economy = Miles per US gal.

Using this equation, truck fuel consumption for October 2006 is calculated as,

JBI Fuel Consumed = ((7,233,327 miles x 1.5723 x 1.1071) / 6.17 miles/US gal.) + ((138,041 miles x 1.4311 x 1.1071) / 6.17 miles/US gal.) + ((1,754,714 miles x 1.0052 x 1.1071) / 5.42 miles/US gal.)

JBI Fuel Consumed = 2,040,741 + 35,447 + 716,173 US gal.
JBI Fuel Consumed = 2,792,360 US gal.

Train

The train fuel consumption was calculated using the following equation:

JBI Train Fuel Consumption US gal = (Energy Intensity by railway (Btu/ton-mile) x fuel intensity adjustment factor / 138,700 Btu/US gal.) x Average Weight of Freight (tons) x Actual (miles)

Actual= Rand McNally miles x PC rail and empty mile adjustment factors

Using this equation, train fuel consumption for October 2006 is calculated as,

Train Fuel Consumption $_{\text{Oct 2006}}$ = (304 Btu/ton-mile$_{\text{BNSF}}$ x1.22 /138,700 Btu/US gal.) x (18.384 tons x 92,117,420 x 1.161 miles$_{\text{BNSF}}$) + (370 Btu/ton-mile$_{\text{NS}}$ x 1.22 fuel inten. adj. factor/138,700 Btu/US gal.) x (18.384 tons x 20,056,768 x 1.161 miles$_{\text{NS}}$) + (318 Btu/ton-mile$_{\text{Class-1}}$ x fuel inten. 1.22 adj. factor /138,700 Btu/US gal.) x(18.384 tons x 11,824,052 x1.161 miles$_{\text{Class-1}}$)

Train Fuel Consumption $_{Oct\text{-}2006}$ = 5,257,399 + 1,393,215 +705,909 US gal.

Train Fuel Consumption $_{Oct\text{-}2006}$ = 7,356,524 US gal.

To calculate total project emissions, the diesel fuel consumption for both the truck and train components were then multiplied by their respective GHG emissions factors using the following basic equation:

Annual Project Emissions = (JBI Fleet Fuel Consumed + Train Fuel Consumed) x GHG Emissions Factors)

Using this equation, total project emissions for October 2006 are calculated as,

Project Emissions (Oct-2006) = 2,792,360 US gal. x [(1.015x10^{-2} tons CO_2/US gal.)+ (3.02x10^{-8} tons CH_4/US gal.)+(2.84x10^{-8} tons N_2O/US gal.)] +
7,394,923 US gal. x [(1.015x10^{-2} tons CO_2/US gal.)+ (8.00x10^{-7} tons CH_4/US gal.)+ (2.600x10^{-7} tons N_2O/US gal.)]

= 103,011 tonnes CO_2 + (5.97 tonnes CH_4 x21_{GWP}) + (1.99 tonnes N_2O x 310_{GWP})

Project Emissions (Oct. 2006) = 103,754 tonnes CO_2e

Calculation of emission factor for intermodal train transport

The emission factor for calculating the baseline emissions from intermodal train transport is calculated by using the following equation:

Emission Factor= Total monthly project emissions/ (Average monthly weight of freight in tons x Total JBI Rand McNally miles)

Using this equation, the emission factor for October 2006 is calculated as,

Emission factor (October 2006) = 103,754 tonnes CO_2e/ (115,728,231 x 18.384)

Emission factor (October 2006) = 0.00004876 tonnes CO_2e/ baseline ton mile.

6.0 Emission Reductions

The following equation is used to determine the annual emissions reductions.

ERs = Baseline Emissions – Project Emissions

Monthly Emissions Reductions Sample Calculation

$ERs_{Oct\text{-}2006}$ = 231,461 tonnes CO_2e – 103,754 tonnes CO_2e
$ERs_{Oct\text{-}2006}$ = 127,707 tonnes CO_2e

7.0 Project Additionality and Validity

7.1 Real

For the J.B. Hunt intermodal expansion project, the emission reductions are real, resulting solely and specifically from JB Hunt's investments to support the intermodal shipment of goods. If the same shipments had been transported by the industry a small fraction would have been transported by rail and the remaining by truck. The difference in the emissions profile of these shipment methods result in real reductions in greenhouse gases.

7.2 Surplus

The investments made by JB Hunt to develop the infrastructure required for intermodal transport of freight was purely voluntary and was not required by any federal, state, or local regulations. There are no laws requiring the use of intermodal rail in lieu of over-the-road truck for the transportation of freight in the US. The company is not subject to any external requirements and does not have voluntary obligations to reduce greenhouse gases.

Since the project is not mandated by law and is not required to control GHG emissions, the project is purely voluntary and associated ERs generated by the project are deemed to be surplus in nature

7.3 Implementation Barriers

JB Hunt had to overcome significant barriers as it began to make significant investments in developing intermodal infrastructure instead of continued investments in its core business of over-the-road truck transport J.B. Hunt created JBI, a new business segment focused solely on growing and improving the efficiency of its intermodal operations JBI spent approximately 300 million US dollars in new equipment, purchasing additional containers and chassis, tractors, and software to expand their intermodal operations. There were financial risks in these investments as solid partnerships with major rail carriers were required for smooth and efficient intermodal transport of freight. J.B. Hunt's key role in infrastructure development is allowing more shippers to choose intermodal transport instead of long haul truck transport, reducing fuel use and providing significant greenhouse gas reductions.

7.4 Common Practice

The use of intermodal (truck/rail) for the efficient transportation of freight is not common practice in the US. Significant investments are required to develop, maintain, and operate the infrastructure required. As discussed in Section 4.0, only about 10 percent of the total freight that could potentially be transported by intermodal rail is currently being transported in that manner.

7.5 Quantifiable

The emission reductions are quantified using data from JB Hunt, Burlington Northern Santa Fe, and Norfolk Southern. Emission reductions are calculated using fuel based techniques and emission factors. Quantification methodology is discussed in depth in sections 4.0, 5.0 and 6.0.

7.6 Unique

Emission reductions from J.B. Hunt's intermodal expansion project during the period of October 2006-September 2008 have not previously been registered or claimed.

7.7 Verifiable

The data sources used to develop the emission reductions are readily verifiable by third party review. Data records (i.e. fuel consumption, loaded ton-miles) are managed by J.B. Hunt and are readily available for audit. Sample calculations for emission reductions are provided in Sections 4.0 – 6.0. These calculations are presented in a manner to facilitate external review. In addition, all assumptions are documented and data sources are referenced.

8.0 Summary of Emission Reductions

A summary of the calculated baseline emissions, project emissions, and emission reductions by month is shown in Table 8-1. Emission reductions totaled 3,189,841 tonnes of CO_2e between October 2006 and September 2008.

Table 8-1. Summary of Baseline Emissions, Project Emissions, and Emission Reductions by Month (tonnes CO_2e)

Month-Year	BE	PE	ERs
Oct-06	231,479	103,801	127,679
Nov-06	223,114	100,000	123,114
Dec-06	205,990	92,305	113,685
Jan-07	212,274	94,518	117,756
Feb-07	205,278	91,185	114,092
Mar-07	235,325	104,899	130,426
Apr-07	205,984	96,302	109,682
May-07	224,639	103,980	120,659
Jun-07	232,802	107,905	124,897
Jul-07	232,137	105,529	126,608
Aug-07	264,562	119,013	145,549
Sep-07	243,206	108,621	134,585
Oct-07	287,254	125,376	161,878
Nov-07	273,427	119,029	154,398
Dec-07	230,913	101,842	129,072
Jan-08	251,330	109,582	141,749
Feb-08	247,308	108,567	138,741
Mar-08	250,017	111,529	138,488
Apr-08	247,665	114,651	133,013
May-08	254,927	118,266	136,661
Jun-08	250,987	116,335	134,652
Jul-08	266,587	121,913	144,674
Aug-08	262,100	120,806	141,293
Sep-08	269,195	122,706	146,489
TOTAL (Oct. -Dec. 06)	660,583	296,106	364,477
TOTAL (Jan. Dec 07)	2,847,801	1,278,199	1,569,602
TOTAL (JAN. -Sep. 08)	2,300,116	1,044,355	1,255,761

9.0 References

(AAR, 2008) Overview of America's Freight Railroads; Association of American Railroad, September 2008.

(Area Development, 2008,); Fueling Change in Intermodal Transportation, News paper Article, August/September 2008.
http://www.areadevelopment.com/logisticsInfrastructure/aug08/intermodal-fuel-cost-rail-water.shtml

(ATA, 2008): American Trucking trends; American Trucking Association.

(DIIRD, 2007) Victorian Rail Freight Network Review; August 2007.

(FTR, 2008) Freight transportation Research 2008.

(Hunt, 2008): RR Efficiency: Email communication; Lesley Johnson (J.B. Hunt) to Mahesh Gundappa (Blue Source), December 8th 2008.

(USEPA, 2008); Direct Emissions from Mobile Combustion Sources, Climate Leaders USEPA; May 2008

Appendix A

J. B. Hunt Data Supporting Calculations

Table A-1: Empty Rail mile and PC Railer adjustment factors (Percent)

Year	Empty mile adj.	PC railer adj.	Total adj.
2006	6	10.1	16.1
2007	7.1	9.65	16.75
2008	7.9	9.6	17.5

Above table

Table A-2: Energy Intensities of Freight Trains for 2006 – 2008* (Btu per revenue ton-mile)-(Hunt, 2008)

	2006	2007	2008
US Class 1 Railroad Average	318	318	318
Burlington Northern Santa Fe	304	304	295
Norfolk Southern	370	370	370
* Intermodal energy intensities was calculated by multiplying freight intensities by 1.22			

Table A-3: Loaded Mile and Variance Adjustment Factors by Truck Fleet for Jan 2006 – September 2008 (percent)

	J.B.T Fleet		J.B.I Fleet		I.C		Outsourced Drayage	
Month/Year	L.M	Var.	L.M	Var	L.M	Var	L.M	Var
Jan-06	12.2	10.69	57.23	10.69	40.93	10.69	0.15	10.69
Feb-06	11.93	10.37	53.06	10.37	34.12	10.37	0.04	10.37
Mar-06	11.72	10.23	52.25	10.23	27.14	10.23	0.26	10.23
Apr-06	12.47	10.52	52.65	10.52	36	10.52	0.21	10.52
May-06	12.27	10.45	51.19	10.45	36.68	10.45	0.11	10.45
Jun-06	12.98	10.41	54.91	10.41	42.09	10.41	0.21	10.41
Jul-06	12.74	10.87	55.05	10.87	37.7	10.87	0.31	10.87
Aug-06	12.95	10.93	55.8	10.93	37.66	10.93	0.24	10.93
Sep-06	14.04	10.96	55.24	10.96	35.41	10.96	0.07	10.96
Oct-06	14.07	10.71	57.23	10.71	43.11	10.71	0.52	10.71
Nov-06	14.56	11.1	56.33	11.1	48.43	11.1	0.08	11.1
Dec-06	16.3	10.76	60.02	10.76	50.87	10.76	0.82	10.76
Jan-07	14.19	10.89	58.96	10.89	47.19	10.89	0.04	10.89
Feb-07	14.24	10.76	52.85	10.76	35.24	10.76	0.02	10.76
Mar-07	13.81	10.16	51.91	10.16	43.84	10.16	0.21	10.16
Apr-07	13.36	10.2	51.81	10.2	44.92	10.2	0.29	10.2
May-07	13.44	10.12	51.88	10.12	49.42	10.12	0.24	10.12
Jun-07	14.01	9.91	52.52	9.91	47.81	9.91	0.43	9.91
Jul-07	14.43	10.29	53.34	10.29	38.57	10.29	0.84	10.29
Aug-07	14.45	10.35	51.62	10.35	37.98	10.35	0.2	10.35
Sep-07	15.1	10.41	51.22	10.41	39.88	10.41	0.56	10.41
Oct-07	16.39	10.27	51.13	10.27	40.23	10.27	0.83	10.27

	J.B.T Fleet		J.B.I Fleet		I.C		Outsourced Drayage	
Month/Year	L.M	Var.	L.M	Var	L.M	Var	L.M	Var
Nov-07	15.95	10.56	51.34	10.56	35.93	10.56	0.2	10.56
Dec-07	16.21	10.5	53.1	10.5	51.02	10.5	0.17	10.5
Jan-08	15.38	10.31	54.72	10.31	59.19	10.31	0.55	10.31
Feb-08	14.63	9.82	50.87	9.82	44.47	9.82	0.24	9.82
Mar-08	13.36	9.69	51.41	9.69	43.34	9.69	0.11	9.69
Apr-08	13.14	9.76	51.11	9.76	42.78	9.76	0.05	9.76
May-08	13.96	9.84	51.15	9.84	51.66	9.84	0.43	9.84
Jun-08	14.37	10.19	51.97	10.19	50.64	10.19	0.09	10.19
Jul-08	14.77	10.33	49.54	10.33	56.54	10.33	0.21	10.33
Aug-08	14.94	10.14	51.51	10.14	52.33	10.14	0.49	10.14
Sep-08	15.84	10.04	49.87	10.04	39.72	10.04	0.73	10.04

Table A-4: Fuel Economies by Truck Fleet for Jan 2006 – September 2008 (miles per US gal.)*

Quarter/Year	JBT Trucks	JBT IC	JBI Trucks	JBI IC	Outsourced Drayage
1Q06	5.88	5.8	6.12	5.98	5.37
2Q06	6.19	6	6.31	6.25	5.56
3Q06	6.07	5.97	6.31	6.05	5.56
4Q06	6.03	5.91	6.17	6.17	5.42
1Q07	5.83	5.8	5.96	5.9	5.21
2Q07	6.13	5.97	6.21	6.37	5.46
3Q07	6.05	5.96	6.23	6.35	5.48
4Q07	6.01	5.94	6.09	6.23	5.34
1Q08	5.76	5.78	5.85	6.09	5.1
2Q08	6.11	5.95	6.09	6.33	5.34
3Q08	6.07	5.87	6.14	6.25	5.39

*data provided by J.B. Hunt Engineers

Table A-5: Greenhouse Gas Emission Factors for Heavy Duty Diesel Trucks and Railroad Locomotives (Kg/gallon of fuel) (USEPA, 2008)

	CO_2	CH_4	N_2O
Heavy Duty Diesel Trucks	10.15	3E-05	2.8E-05
Railroad Locomotives	10.15	0.0008	0.00026
Global Warming Potentials	1	21	310