

Attachment Q6

Additional Information Requests

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March 21, 2008

BY E-MAIL (rutsonv@stb.dot.gov)

Ms. Victoria J. Rutson, Chief
Section of Environmental Analysis
Surface Transportation Board
395 E Street, S.W.
Washington, D.C. 20423-0001

**Re: Canadian National Railway Company and Grand Trunk Corporation –
Control – EJ&E West Company (STB Finance Docket No. 35087)**

Dear Ms. Rutson:

In our telephone conversation on Tuesday, March 18, 2008, you requested CN's revised design for the proposed improvement of the connection between the CN and EJ&E lines at Munger, Illinois. The enclosed PDF file (Munger SW Conn Alt.pdf) contains a diagram of the requested revision.

Very truly yours,

Paul A. Cunningham / jing

Paul A. Cunningham
Counsel for Canadian National Railway Company
and Grand Trunk Corporation

Enclosure

cc: John H. Morton
Normand Pellerin



Revisions		CHICAGO TERMINAL DIV.	
Date	By	Freepoint, IL	
		LOCATION	
APPROVAL		ALL 4 - 10 MPH SOUTHWEST CONNECTION	
		Freepoint Sub to Western Sub	
		Operating Company: CDP - EJ&E	
OFFICE OF		REGIONAL CHIEF ENGINEER	
Sheet	Drawn by: dsc	Scale: 1"=100'	Proj. No.
1 of 1	Checked by: dsc	Date: 3/05/08	File No.



SURFACE TRANSPORTATION BOARD
Washington, DC 20423

Section of Environmental Analysis

April 8, 2008

Normand Pellerin
Assistant Vice-President, Environment
935, rue de La Gauchetiere West
Floor 12
Montreal, Quebec H3B 2M9

Re: STB Finance Docket No. 35087, Canadian National Railway Company and Grand Trunk Corporation – Control – EJ&E West Company

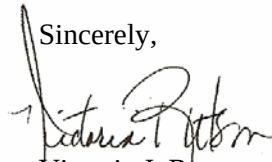
Dear Mr. Pellerin:

Enclosed please find two figures showing typical cross sections of the EJ&E. As you know, we have developed these figures using information provided by CN to assist us in conducting a thorough and informative environmental review. The Board's Section of Environmental Analysis (SEA) understands that CN does not have final design level information, and SEA intends to use the figures to represent our best understanding of the construction concepts that CN has provided to us. Once you have reviewed both figures and agree that they accurately reflect your construction concepts, we will use the figures to assist us in assessing the potential environmental impacts that may result from the constructions proposed by CN as part of its proposed acquisition of the EJ&E, and to provide the public with a clear understanding of the physical "footprint" proposed by CN for the new rail constructions. We request that CN review the two enclosed figures and, at your earliest convenience, verify that our understanding of your construction concepts is correct:

- Figure 1 entitled "Typical Cross Section for Areas with New Connections" shows a typical single and a typical double track cross section representative of those areas where CN proposes to build a new connection or add a second main track.
- Figure 2 entitled "Proposed Munger Connection" (enclosed) shows a typical cross section in the area where CN proposes to build a retaining wall.

Thank you for your assistance. I would appreciate it if you could provide a copy of your response as soon as possible to Phillis Johnson-Ball of my staff and to our independent third-party consultant, John Morton, at HDR, 8404 Indian Hills Drive, Omaha, Nebraska, 68114-4098.

Sincerely,



Victoria J. Rutson
Chief

Section of Environmental Analysis

Enclosures

Cc: John Morton, HDR Engineering, Inc.



CN | EJ&E

Environmental Impact Statement

Typical Cross-Sections for Areas with New Connections

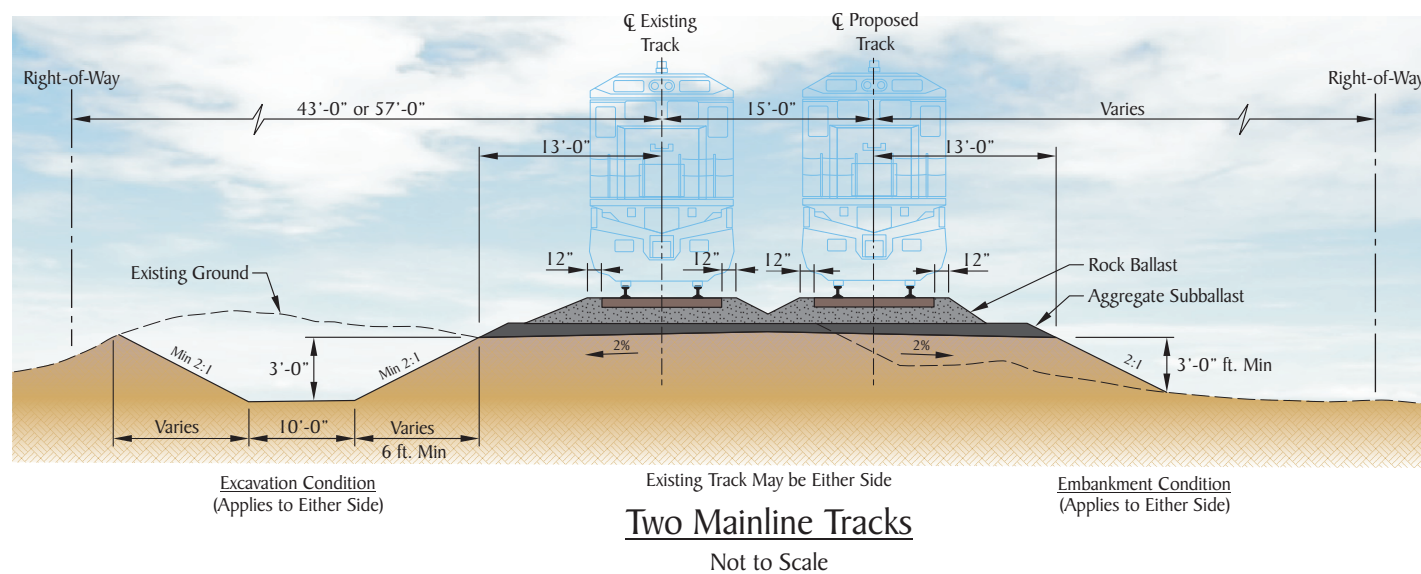
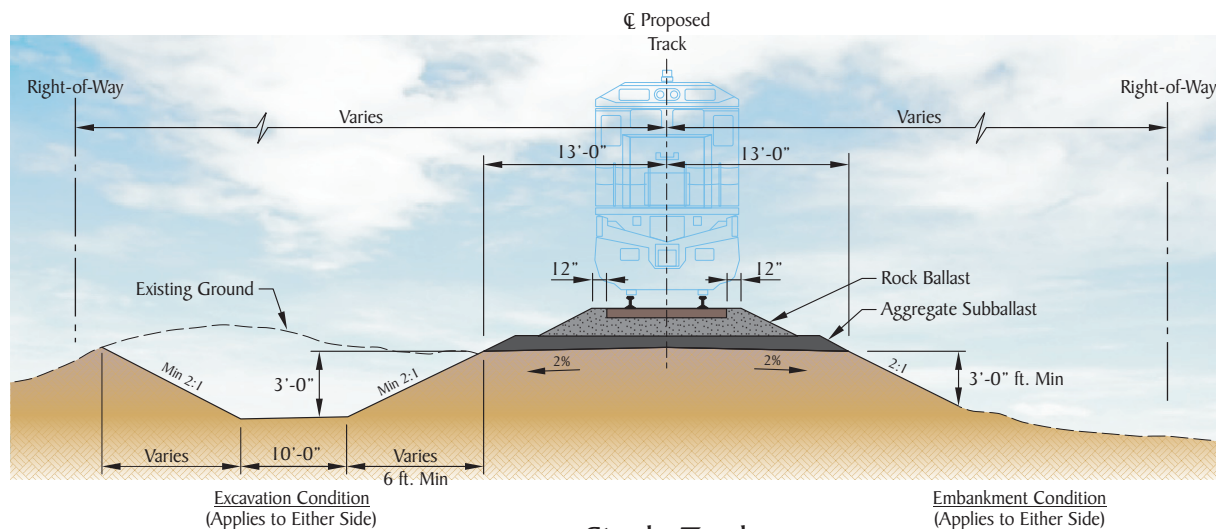


Figure 1



Environmental Impact Statement

The diagram illustrates a proposed track extension. It shows two tracks: a 'Proposed Track' on the left and an 'Existing Track' on the right. The centerlines of these tracks are marked with dashed lines and labeled 'C Proposed Track' and 'C Existing Track' respectively. The distance from the centerline of the proposed track to the centerline of the existing track is labeled 'Varies'. The distance from the centerline of the proposed track to the centerline of the existing track is also labeled '13'-0"'. The distance from the centerline of the proposed track to the centerline of the existing track is also labeled '12'-6" Min.'. The diagram shows a 'Guardrail' and a 'Retaining Wall' between the two tracks. The 'Proposed Grade' is shown as a dashed line, and the 'Existing Grade' is shown as a solid line. The slope of the existing grade is labeled '2:1'. The diagram also shows the 'Proposed Grade' and 'Existing Grade' with a '2%' slope. The diagram also shows the 'Proposed Grade' and 'Existing Grade' with a '2%' slope. The diagram also shows the 'Proposed Grade' and 'Existing Grade' with a '2%' slope.

Figure 2

From: Normand Pellerin
Sent: Friday, April 11, 2008 2:34 PM
To: Vicki Rutson
Subject: Re: Rail Cross Section

Miss Rutson

After review of the cross-section prepared by HDR, CN suggest the following changes to better reflect our engineering practices.

The following changes needs to be made to the typical cross-section plans:

1. The bottom of the ditches should read "varies 2ft min"
2. For the fill height which reads 3"-0" Min remove this and insert "varies as required"
3. The 2:1 slope on the right side of the fills should read "2:1 Min"

With those modifications, the cross-section will reflect CN construction practices.

N.



SURFACE TRANSPORTATION BOARD
Washington, DC 20423

Section of Environmental Analysis

April 18, 2008

Normand Pellerin
Assistant Vice-President, Environment
935, rue de La Gauchetiere Street West
Floor 12
Montreal, Quebec H3B 2M9

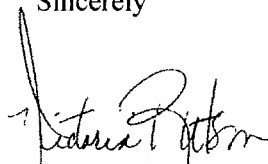
Re: STB Finance Docket No. 35087, Canadian National Railway Company and Grand Trunk Corporation – Control – EJ&E West Company

Dear Mr. Pellerin:

To ensure the accuracy of the information used in the Section of Environmental Analysis' environmental review for the above-referenced proceeding, I am requesting that the Applicants review the enclosed redacted draft description of the purpose of and the need for the proposed action.

Thank you for your continued assistance. Please provide a copy of your response as soon as possible to Phillis Johnson-Ball of my staff and to our independent third-party consultant, John Morton, at HDR, 8404 Indian Hills Drive, Omaha, Nebraska, 68114-4098.

Sincerely



Victoria J. Rutson
Chief

Section of Environmental Analysis

Cc: Phillis Johnson-Ball, STB
John Morton, HDR Engineering, Inc.

for com

Chapter 1

Purpose of and Need for the Proposed Action

1.1 Introduction

On October 30, 2007, Canadian National Railway Company and Grand Trunk Corporation (collectively, CN or the Applicants) filed an application with the Surface Transportation Board (the Board) seeking the Board's approval to acquire control of EJ&E West Company,¹ a wholly owned noncarrier subsidiary of Elgin, Joliet and Eastern Railway Company (EJ&E). The Applicants are proposing to acquire control of EJ&E West Company and to use the EJ&E rail line to connect all five of CN's rail lines in the Chicago area (the Proposed Action). The EJ&E rail line, located in northeastern Illinois and northwestern Indiana, extends in an arc around Chicago as follows:

- From Waukegan, Illinois, southward to Joliet, Illinois
- From Joliet eastward to Gary, Indiana
- From Gary northwest to South Chicago along Lake Michigan

Figure 1.1-1, Project Vicinity, shows the existing CN and EJ&E rail system.

Before the Applicants acquire control of EJ&E West Company, EJ&E would transfer all of its land, rail, and related assets located west of the centerline of Buchanan Street in Gary to EJ&E West Company. At that time, EJ&E West Company would become a rail common carrier. EJ&E would retain its land, rail, and related assets east of the centerline.² If the Board approves the Proposed Action, EJ&E would change its name to Gary Railway Company and EJ&E West Company would assume the Elgin, Joliet and Eastern Railway Company name. Therefore, this Environmental Impact Statement (EIS) refers to the proposed acquisition of EJ&E.

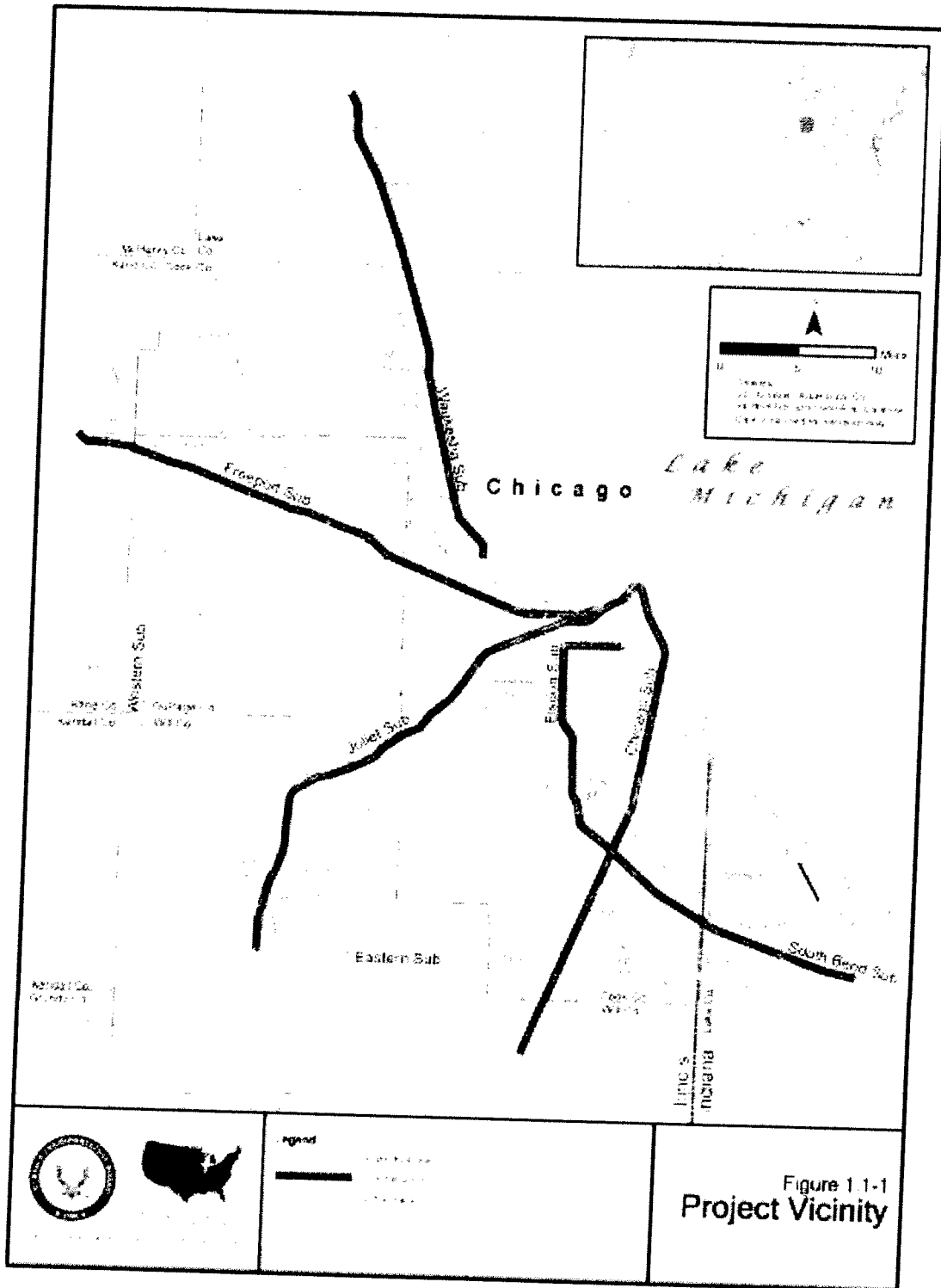
CN would shift much of the rail traffic currently moving over CN's rail lines in Chicago to the EJ&E rail line. Rail traffic on CN rail lines inside the EJ&E arc would generally decrease, and the number of trains operating on the EJ&E rail line outside Chicago would increase by approximately 15 to 24 trains per day. The Proposed Action would also involve construction of six new rail connections, siding extensions, and second mainline track (double track). The Applicants state that they do not anticipate any rail line abandonments in conjunction with the Proposed Action (Applicants 2007).

On December 21, 2007, the Board issued a Notice of Intent (NOI) to prepare, through its Section of Environmental Analysis (SEA), an EIS for this proceeding (Federal Register [FR] 2007). The Board determined that an EIS is warranted in accordance with the National Environmental Policy Act of 1969, as amended (NEPA) (Board 2007a; 42 United States Code [USC] 4321 et seq.). The President's Council on Environmental Quality (CEQ) regulations implementing NEPA and the Board's own environmental rules prescribe the level of documentation required for the environmental review process; actions that may significantly affect the environment generally require an EIS (40 Code of Federal Regulations [CFR] 1508.18; 49 CFR 1105.4(f); 49 CFR 1105.5). In the case of the Proposed Action, the projected increases in train traffic on certain rail line segments and at rail facilities would exceed the Board's thresholds for environmental analysis. The Board based its decision to prepare an EIS on the information provided in the Application and on a number of concerns expressed by communities potentially affected by the Proposed Action.

¹ EJ&E West Company is an Illinois corporation formed on August 16, 2007.

² Except for property associated with two lead tracks (the Dixie and hump leads) providing access to Kirk Yard at Gary.

Figure 1.1-1. Project Vicinity



1.2 Background

The following sections address the congested rail system in the Chicago area, the Applicants and the CN rail system, as well as EJ&E and its rail system.

1.2.1 The Rail System in the Chicago Area

Chicago is the only city in the United States where six Class I railroads (BNSF Railway Company [BNSF], CN, Canadian Pacific Railway Company [CPR], CSX Transportation, Inc. [CSX], Norfolk Southern [NS], and Union Pacific Railroad Company [UP]) meet to interchange freight. In Chicago, the railroads exchange freight between the East, West, and Gulf coasts and between the United States and Canada. In addition to the six Class I railroads with rail lines in Chicago, a seventh Class I railroad (The Kansas City Southern Railway Company [KCS]) operates by means of trackage rights, which allow KCS to operate its trains over another railroad's tracks. Thus, all seven of the North American Class I freight railroads converge in Chicago.

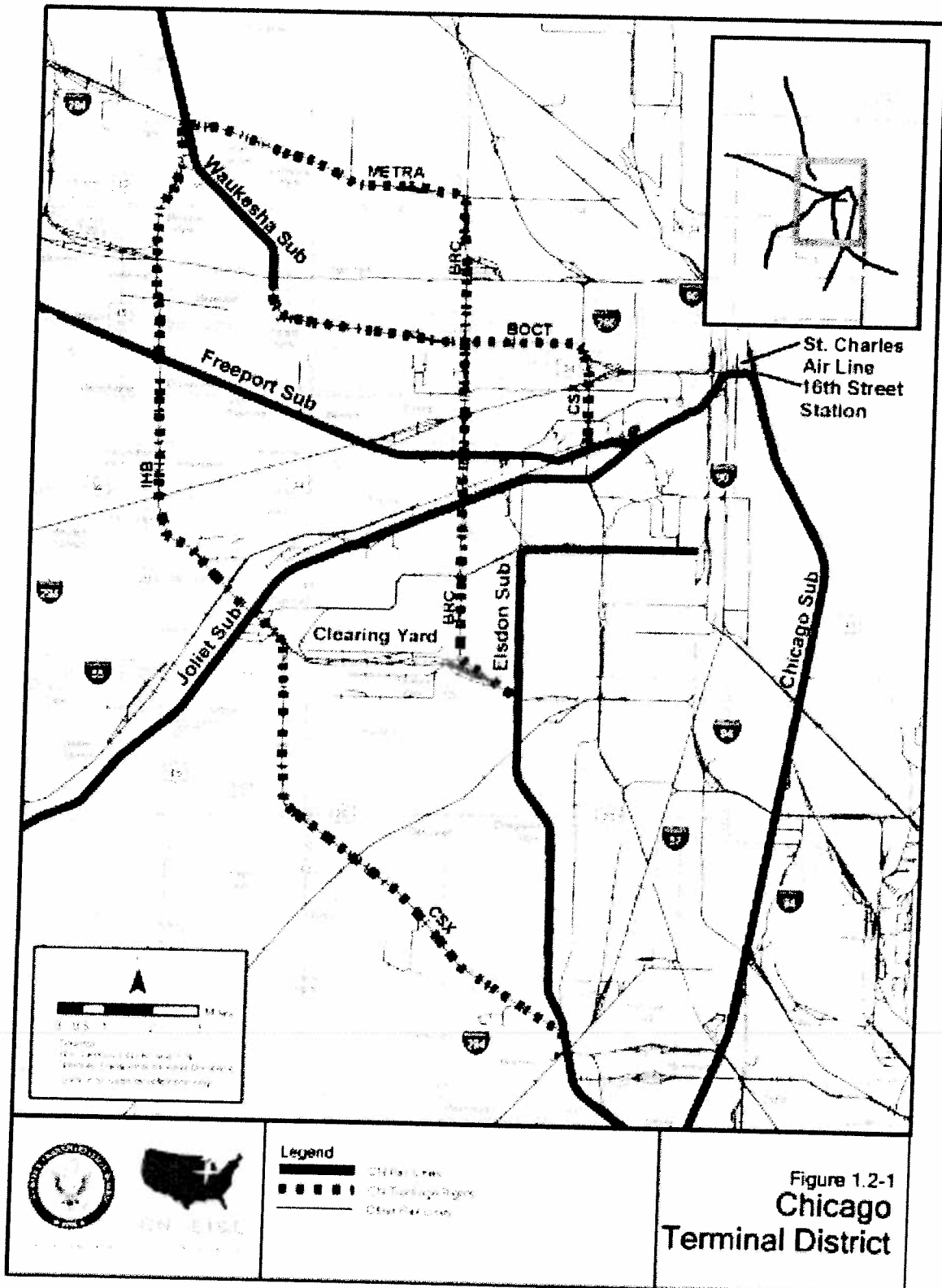
The major rail lines meet in the Chicago Terminal District, a 2,800-mile network of rail lines within the Chicago area (see Figure 1.2-1, Chicago Terminal District). The district comprises 70 yards and terminals (including 26 intermodal hubs, which provide for transfer of containerized cargo or truck trailers between two or more modes of transportation) and more than 1,950 at-grade crossings (Chicago Region Environmental and Transportation Efficiency [CREATE] 2005; Business Leaders for Transportation [BLT] 2002). The at-grade crossings include both rail/rail crossings, where rail lines intersect, and highway/rail crossings, where a rail line and a road meet at the same level.

Much of the Chicago rail network has been in place for over a century (Chicago Metropolis 2020, 2004). The rail lines of the Class I railroads, originally built to access the center of Chicago, do not facilitate movement of freight through the Chicago area because the railroads and the business leaders of Chicago did not foresee the need during the era of railroad construction (Conzen 2005). Numerous regional and switching carriers operating in Chicago connect Class I railroads and provide short-haul capacity within the Chicago Terminal District. The Class I railroads also use the rail lines of these switching carriers, by means of trackage rights, to connect from one rail line to another within the Chicago area (see Figure 1.2-1, Chicago Terminal District).

One-third of all rail freight in the United States moves to, from, or through Chicago (CREATE 2005). More than 600 freight trains operate within the Chicago Terminal District each day, transporting an average of 37,500 rail freight cars carrying about 2.5 million tons of freight (Chicago Area Transportation Study [CATS] 2000; BLT 2002).

Trains providing passenger service in the Chicago area and from Chicago to other cities also operate on the rail network within Chicago. Metra, the commuter rail division of the Regional Transportation Authority of Northeast Illinois (RTA), provides commuter service on its own rail lines and also has trackage rights on freight railroads (Metra 2007). Metra operates 720 trains per day and provided service to 82 million passengers in 2007 (Metra 2008; Metra 2007). The Northern Indiana Commuter Transportation District (NICTD) operates 41 trains per day (NICTD 2007). The National Railroad Passenger Corporation (better known as Amtrak) provides passenger service in the Chicago area by means of trackage rights granted by Class I railroads (BNSF, CN, and NS) and by Metra. In 2002, Amtrak served more than two million intercity passengers traveling to or from Chicago (CREATE 2005). Currently, Amtrak operates about 78 trains per day in the Chicago area (Amtrak 2008).

Figure 1.2-1. Chicago Terminal District



Metra's rail lines are intertwined with Class I freight rail lines through a series of parallel tracks, trackage rights granted to Metra on freight rail lines, and dozens of rail/rail at-grade crossings. Freight trains use many of the same tracks and critical junctions as the Metra trains. During each weekday rush hour, freight movements are substantially curtailed while Metra and Amtrak passenger trains take priority (Ryan 2007). The large volume of freight and passenger trains moving on these rail lines (more than 1,400 trains per day) and the use of the same rail lines by multiple rail companies result in delays as trains wait to cross other rail segments (Illinois Department of Transportation [IDOT] 2006; BLT 2002).

Delays also occur as Class I railroads wait to use switching rail lines and yards within the Chicago Terminal District. Because of rail traffic congestion, a CN freight train can take more than 24 hours to travel through an area about 30 miles in length, from near O'Hare International Airport to near Blue Island, Illinois (CN 2008a). Both freight and passenger train traffic is forecast to increase considerably within the Chicago Terminal District, further exacerbating the congestion and delays (BLT 2002).

1.2.2 The Applicants

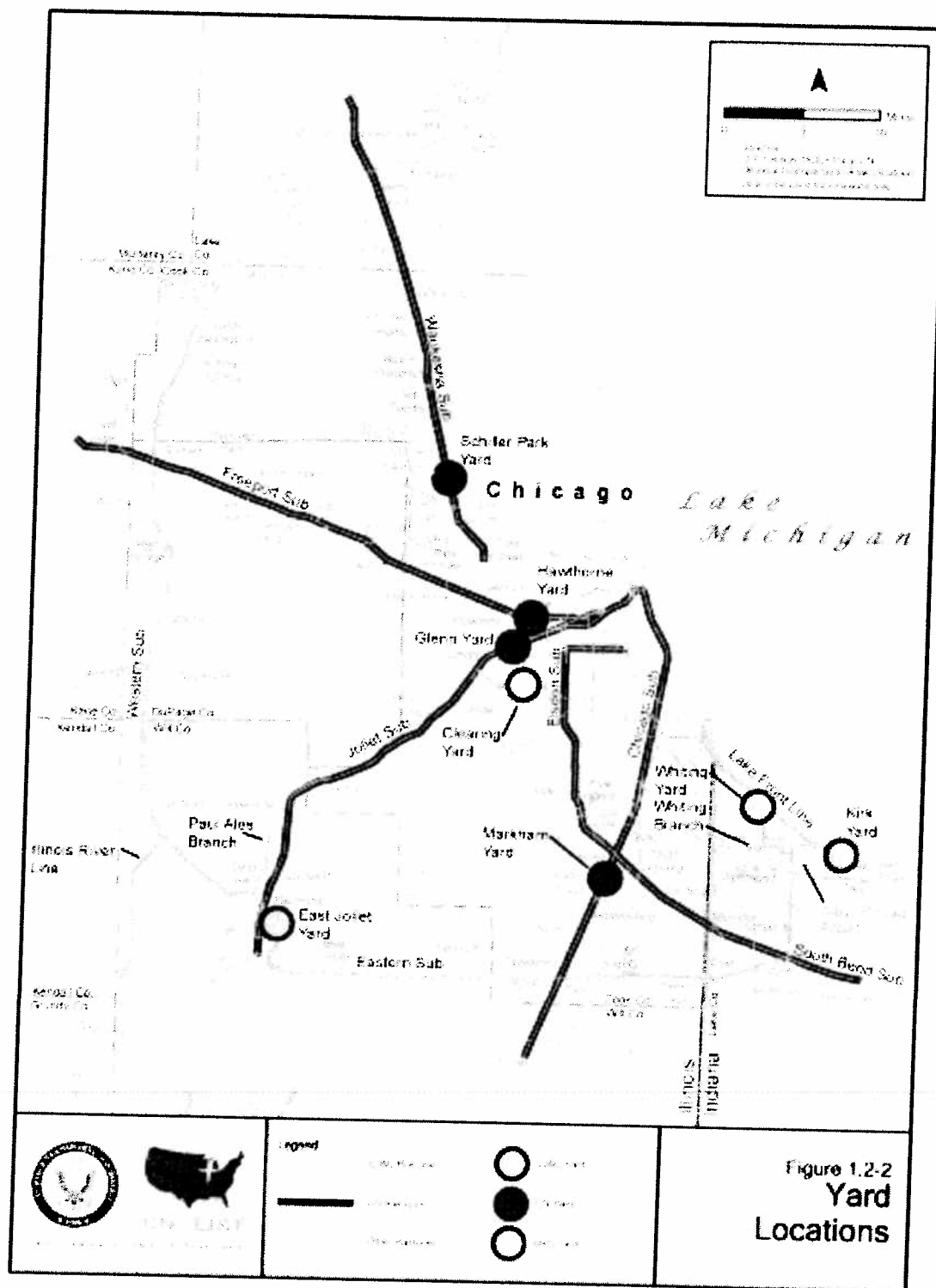
Canadian National Railway Company incorporated in 1919 as one of Canada's two transcontinental railroads. Today, together with its subsidiary Grand Trunk Corporation, it spans Canada and the central United States from the Atlantic and Pacific oceans to the Gulf of Mexico. In Canada, CN's rail lines extend from Halifax, Nova Scotia, to Vancouver and Prince Rupert, British Columbia. In the United States, CN extends from Chicago to Port Huron, Michigan; International Falls, Minnesota; and New Orleans, Louisiana. CN serves the ports of Vancouver and Prince Rupert; Halifax; Montreal, Quebec; New Orleans; and Mobile, Alabama. CN also serves the key cities of Toronto, Ontario; Buffalo, New York; Chicago; Detroit, Michigan; Duluth, Minnesota; Superior and Green Bay, Wisconsin; Minneapolis/St. Paul, Minnesota; Memphis, Tennessee; St. Louis, Missouri; and Jackson, Mississippi. In addition, CN has connections with other rail carriers to all points in North America. CN is part of the North American Free Trade Agreement (NAFTA) rail network, offering access to Kansas City Southern de México Railroad, S.A. de C.V. through a marketing alliance with KCS (CN 2008b).

CN owns and operates five rail lines that converge in Chicago (see Figure 1.1-1, Project Vicinity, above, and Section 1.4.1, Communities and Land Use near the CN Rail Lines, for more information on these rail lines):

- The Waukesha Subdivision approaches Chicago from the north.
- The Freeport Subdivision approaches Chicago from the west.
- The Joliet Subdivision approaches Chicago from the southwest (from Joliet).
- The Chicago Subdivision approaches Chicago from the south.
- The Elsdon Subdivision approaches Chicago from the southeast.

CN operates three major terminals in Chicago: Glenn Yard, Hawthorne Yard, and Markham Yard (an intermodal hub) (see Figure 1.2-2, Yard Locations). In addition, CN has smaller terminals, also located within the EJ&E arc, and uses the Belt Railway Company of Chicago (BRC) Clearing Yard for rail car switching. Chicago is a major CN junction for trains shipping freight from the Gulf Coast to eastern or western Canada; about two-thirds of the CN trains operating in the Chicago area are en route to other cities (Applicants 2007). Most of these trains must travel into Chicago for classification and switching at CN yards. To move from one CN rail line to another, CN trains must travel on other rail lines, primarily those of BRC, Baltimore and Ohio Chicago Terminal Railroad (BOCT), CSX, and Indiana Harbor Belt Railroad (IHB), and on segments of the EJ&E rail line (see Figure 1.2-1, Chicago Terminal District, above).

Figure 1.2-2. Yard Locations



1.2.3 Elgin, Joliet and Eastern Railway Company

EJ&E is a Class II railroad that is a wholly owned indirect subsidiary of United States Steel Corporation (USS), a noncarrier. USS owns all of the issued and outstanding stock of Transtar, Inc., a noncarrier holding company, which owns all of the issued and outstanding stock of seven common carrier railroads, including EJ&E.

EJ&E operates on slightly more than 198 miles of track in northeastern Illinois and northwestern Indiana. The EJ&E rail line, popularly known as "Chicago's Outer Belt" or "the J," consists primarily of a 120-mile arc of mainline track around Chicago, as described in Section 1.1, Introduction. The EJ&E rail line also includes double track and branch lines (see Section 2.1.3, EJ&E System, for further information about the EJ&E main line and branch lines). EJ&E has the following three main yards (see Figure 1.2-2, Yard Locations, above):

- Kirk Yard, an automated classification facility at Gary
- East Joliet Yard, a large flat-switching yard at Joliet, used primarily for rail car storage
- Whiting Yard, a small industrial support yard at Whiting, Indiana

EJ&E provides rail service to approximately 100 customers, including steel mills, coal utilities, plastics and chemical producers, steel processors, distribution centers, and scrap processors. In addition to operating local trains in the Chicago and northwest Indiana region, EJ&E connects customers to Class I rail lines. Inter-line rail connections with all major railroads entering Chicago give EJ&E customers access to the entire North American rail system. The rail connections include those with BNSF, CN, CPR, Chicago SouthShore & South Bend Railroad (CSSB), CSX, Iowa Interstate Railroad (IAIS), NS, and UP.

1.3 Purpose and Need

The Applicants give three primary purposes for seeking to acquire control of the EJ&E rail assets (FR 2007; Applicants 2007):

- To improve the Applicants' operations in and beyond the Chicago area by providing CN with a continuous rail route around Chicago, under CN's ownership, that would connect the five CN rail lines radiating from Chicago.
- To make EJ&E's Kirk Yard, as well as smaller facilities at Joliet and Whiting, available to the Applicants, thus enabling them to consolidate car classification work at Kirk Yard and East Joliet Yard and to reduce the use of the BRC Clearing Yard.
- To enable the CN system to benefit from an important supply line provided by EJ&E for North American steel, chemical, and petrochemical industries, as well as for Chicago-area utilities and others, thereby allowing the Applicants to develop closer and more extensive relationships with companies in and serving those industries.

According to the Applicants, the availability of a continuous CN route around Chicago and connection of the five CN rail lines radiating from Chicago would greatly improve the fluidity of intermodal and other CN traffic that must move into, from, or through Chicago (Applicants 2007). The Applicants maintain that the Proposed Action, if approved, would result in more efficient rail traffic flow by shifting much of CN's rail traffic in the Chicago Terminal District to the EJ&E rail line and reducing CN's use of congested switching rail lines to connect its rail lines. The Applicants state that shifting a large portion of the CN rail traffic to the EJ&E rail line would decrease the traffic density on CN, BRC, and IHB rail lines in Chicago's urban core.

The Applicants state that trains traveling within Chicago experience delays because of the congested rail lines and the reliance on the BRC Clearing Yard for switching traffic between rail subdivisions. Most of the Class I freight railroads in Chicago use the Clearing Yard for train classification. According to the Applicants, acquisition of Kirk Yard and other EJ&E yards would permit CN to use these yards, located along the EJ&E rail line and near the edge of the congested Chicago Terminal District, to classify and switch trains passing through the Chicago area. Approval of the Proposed Action by the Board would allow trains that are traveling through the Chicago area on the EJ&E rail line and are stopping in the Chicago area for crew changes, locomotive inspections, and set-outs to do so at Kirk Yard and East Joliet Yard. The Applicants expect this to reduce the number of CN trains that, though bound for other destinations, would need to travel into Chicago. This would also reduce classification work at CN's Glenn Yard, Hawthorne Yard, and Markham Yard and at the BRC Clearing Yard.

According to the Applicants, approval of the Proposed Action would enable CN to improve service to many companies in the Chicago area, as well as to companies shipping products through the Chicago area, by reducing congestion and providing for faster movement of shipments on CN rail lines. The Applicants maintain that shippers would benefit from shortened transit times through the Chicago Terminal District.

HARKINS CUNNINGHAM LLP

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May 20, 2008

BY E-MAIL (rutsonv@stb.dot.gov)

Ms. Victoria J. Rutson, Chief
Section of Environmental Analysis
Surface Transportation Board
395 E Street, S.W.
Washington, D.C. 20423-0001

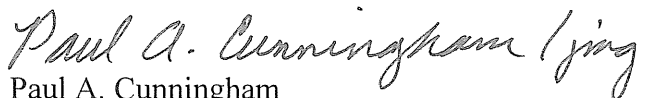
**Re: *Canadian National Railway Company and Grand Trunk Corporation –
Control – EJ&E West Company* (STB Finance Docket No. 35087)**

Dear Ms. Rutson:

Enclosed are the comments of Canadian National Railway Company and Grand Trunk Corporation (together, "CN") on the redacted draft description of the purpose of and need for the Transaction proposed in this proceeding, as provided in your letter of April 18, 2008, to Normand Pellerin of CN.

We appreciate the opportunity to review and comment on this draft.

Very truly yours,


Paul A. Cunningham
Counsel for Canadian National Railway Company
and Grand Trunk Corporation

Enclosure

cc: Phillis Johnson-Ball
John H. Morton
Normand Pellerin

**Comments on Chapter 1 (Purpose of and Need for the Proposed Action)
of Draft EIS, as Redacted for CN's Review (April 2008)**

Section 1.1, para. 1, lines 3-4: The draft states that CN's application sought STB approval "to acquire control of EJ&E West Company, a wholly owned noncarrier subsidiary of Elgin, Joliet and Eastern Railway Company (EJE)." This sentence is potentially confusing. We suggest revising it to refer to "EJ&E West Company, which today is a wholly owned noncarrier subsidiary" (While it is true that EJ&EW is today a noncarrier, the only reason regulatory approval is needed at all is that it will be a rail carrier when and if CN acquires it.)

Section 1.1, para. 1, lines 6-7: The draft states that "[t]he EJ&E rail line . . . extends in an arc around Chicago as follows:" We suggest changing this to refer to "EJ&E's principal rail line". (There are other EJ&E rail lines, including ones that CN proposes to acquire, besides the one extending from Waukegan to Gary, then along the Lake.)

Section 1.1, para. 2, lines 6-7: We recommend changing "this Environmental Impact Statement (EIS) refers to the proposed acquisition of EJ&E" to "this Environmental Impact Statement (EIS) refers to the proposed acquisition of EJ&E West Company." (CN does not propose to acquire EJ&E, although it anticipates that at the time of the acquisition, EJ&EW will be the owner of most of what are now most of EJ&E's assets.)

Section 1.1, para. 3, lines 4-5: We recommend changing "construction of six new rail connections, siding extensions, and second mainline track" to "construction of six improved rail connections, as well as to three extensions of sidings and installation of second mainline track". (As written, it appears that the number six applies to the siding extensions and double-trackings as well as to the connections. Also, CN prefers to describe the connections as improvements to existing connections rather than new ones. At all six locations, the existing connections could be used for the movements that the new construction is intended to facilitate, although much less efficiently, and CN therefore regards the proposed construction as improvements to those connections.)

Section 1.1, para. 3, line 7: We note that, in fact, CEQ and STB rules only require an EIS for actions "significantly affecting the quality of the human environment," 42 U.S.C. § 4332(2)(C), 49 C.F.R. § 1508.11, not those that only "may significantly affect the environment."

Section 1.2.1, para. 2, line 2: We note that the identification of Figure 1.2-1 as "Chicago Terminal District" may be misleading, as Figure 1.2-1 does not appear to show the entire Chicago Terminal District. (The CORA Chicago Terminal District Map, by way of contrast, extends as far as Waukegan in the north, West Chicago Yard and Eola Yard in the west, the Cook-Will county line in the south, and Kirk Yard in the east.) It may be more appropriate to identify the map as "Major Routes Used by CN Through Chicago."

Section 1.2.2, para. 1, line 5: We suggest changing "Port Huron, Michigan" to "Port Huron and Detroit, Michigan".

Section 1.2.2., para. 3, lines 7-8: We suggest changing “To move from one CN rail line to another, CN trains must travel on other rail lines” to “Most CN trains moving from one CN rail line to another must travel on other rail lines”. (Trains may move from the Joliet or Freeport Subdivisions to the Chicago Subdivision and vice versa without using any other railroads’ lines, although relatively few trains make this movement.)

Section 1.2.3, para. 2, line 2: We suggest striking the words “‘Chicago’s Outer Belt’ or”. To the best of our knowledge, EJ&E has not referred to itself as Chicago’s Outer Belt since about 1974.

LOCOMOTIVE EMISSIONS FACTORS

1. Introduction

In order to forecast the changes in railroad engine emissions of air pollutants that are expected to follow from the proposed CN/EJ&EW Transaction, CN used emissions factors (EF) that had been calculated, for the relevant locomotive models, by the Canadian rail industry for use in determining emissions from the various diesel locomotives in the Canadian fleet. These EFs are in turn used to calculate the yearly inventory of emissions reported by the Railway Association of Canada to Environment Canada. EFs specific to a locomotive engine model are needed to calculate emissions of each of the Criteria Air Contaminants (*i.e.*, oxides of nitrogen (NO_x), hydrocarbons (HC), carbon monoxide (CO), and particulate matter (PM)). In this paper, I explain the steps by which the relevant EFs were derived.

2. Background

Prior to the introduction of higher horsepower locomotives in the 1990s, the Canadian rail industry's calculations of emissions of NO_x and other pollutants were based on the EFs for the locomotives in mainline service at the time, namely the 3000 horsepower SD40-2 type locomotives. The data was generated by the Association of American Railroads and Southwest Research Institute (SwRI), from locomotive emissions tests it conducted in the late 1980s.

Higher horsepower locomotives were introduced into the Canadian railroads' fleets in the mid 1990s. By the early 2000s, it became clear that EFs based on SD40-2 locomotives would not produce accurate emission tonnages for the locomotives coming into service. In addition, the US EPA's Emission Standards for Locomotives and Locomotive Engines, promulgated in 1998, mandated lower emissions from new and remanufactured locomotives starting in year 2000, making EFs based on the SD40-2s even more unrepresentative of actual emissions. Determining fleet emission tonnages, therefore, required knowledge of the various locomotive emission profiles, using engine-specific EFs for each locomotive type.

A methodology for determining fleet average EFs was therefore developed. Locomotive emissions testing reports in the public domain were obtained, and a database of test results was created. However, little information was in the public domain about the emissions profiles of US EPA Tier level locomotives (*i.e.*, locomotives conforming to the standards set by EPA's Emission Standards for various tiers of locomotives).

Also, many locomotives types had not been tested; therefore, a methodology was developed to estimate emissions from such locomotives.

3. Estimating Emissions from US EPA Tier Level Locomotives

3.1 Emission Factors for HC, CO, and PM

Test results regarding emissions of criteria pollutants other than NO_x (*i.e.*, HC, CO, and PM) by Tier-level engines and locomotives are not publicly available. Emissions from Tier-level engines are unlikely to be any higher than those for non-Tier engines, however. In the absence of actual test results, therefore, emissions of HC, CO, and PM by Tier-level engines were conservatively assumed to be the same as emissions of those pollutants by non-Tier engines. A statistical method was developed, using publicly reported test data regarding emissions by non-Tier engines and locomotives, to compute

emission factors for HC, CO, and PM.¹ The principal steps in that method were the following:

3.1.1 Data Compilation

Data were compiled into a database from reports in the public domain of tests conducted by SwRI and Canada Allied Diesel – Engine Systems Development Centre (CAD-ESDC), Montreal, on locomotives not subject to EPA emission limits. The following information was collected for each locomotive tested: Source Reference, OEM, Locomotive Model, Engine, Rated Horsepower, Air supply, number of cylinders. For each discrete throttle setting, or “notch” (including idle and dynamic braking) the following information was collected: Notch, Flywheel Horsepower, Fuel Consumption in lbs/hr, NOx in g/hr, CO in g/hr, HC in g/hr, and PM in g/hr. An example is shown below.

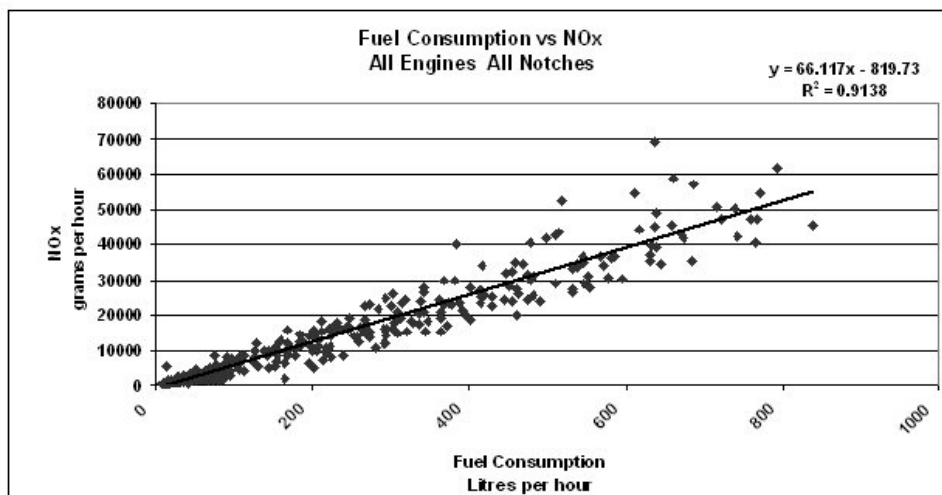
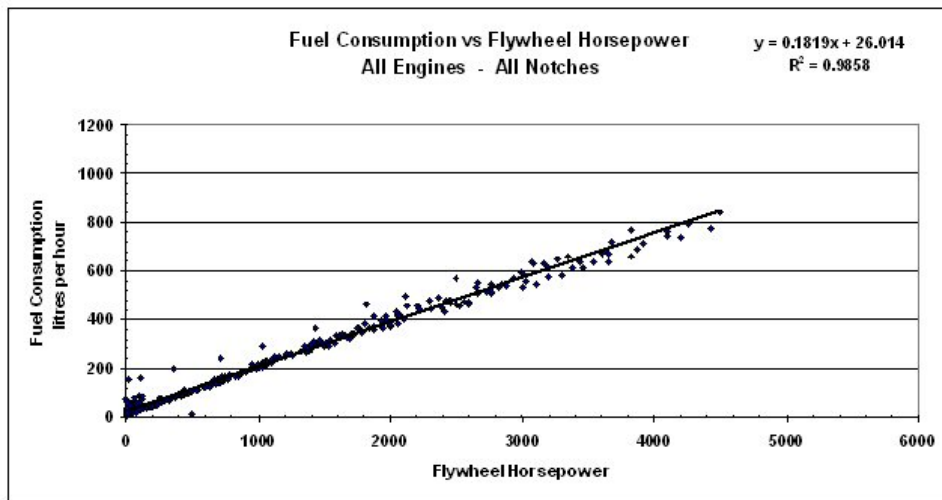
Field	Value
Source Code	2
Builder	GE
Service	
Locomotive Model	Dash 9
Engine	7FDL
EPA Tier Level	
Cylinders	16
Rated Horsepower	4400
Air Supply	Turbo
Number Tested	1
Notch	8
FHP	4496
Fuel Consumption, lbs/hr	1564
NOx, g/hr	45669
CO, g/hr	15485
HC, g/hr	964
PM, g/hr	748

Record: 56 of 330

3.1.2 Graphical Presentation of Data Set

Data from the database were exported to a Microsoft Excel spreadsheet (see tab, “DB Output,” on attached Excel file). From the data, curve fit equations were generated for Fuel Consumption as a function of Horsepower, and for Emissions Generated (NOx , CO, HC, and PM) as a function of Fuel Consumption, both for all engines tested and for individual models. The curves represented by those equations are presented graphically on the “All” and “Engine” tabs of the attached Excel file. The equations for EMD’s 645 engine (used in the SD-40-2 locomotives) and for GE’s 7FDL engine (used in the Dash 9 locomotives) are presented in the tab, “Emissions Equations” on the attached Excel file. The following is an example of the curve equation for Fuel Consumption and NOx emissions:

¹ Those test results show emissions of HC, CO, and PM for non-Tier engines at levels well below the EPA limits for Tier-level engines.



The NOx data shows that there is a variation in the test results of approximately 9 percent. In order to ensure that the locomotive emissions are below the maximum level set by regulation, the variation in test procedure must be taken into consideration. Thus, manufacturing engines to emit at 90 percent of the maximum EPA limit for NOx will ensure that NOx emissions will be below the regulated limit. (As noted above, OEMs have therefore manufactured Tier-level engines to specifications calling for emissions of NOx at no more than 90% of the EPA limit.)

The high variation of 9 percent in NOx data occurs because NOx creation is very sensitive to combustion temperature. Very small temperature variations in charge air from the turbocharger make large differences in NOx generation in the combustion chamber. As well, because ambient temperature and atmospheric pressure changes from day to day, correction factors are used in NOx test data reports to try to standardize temperatures and atmospheric pressure differences at

the time of locomotive testing from the EPA testing criteria. This may also add to imprecision in test data.

3.1.3 Locomotive Emissions Estimates

For each engine considered, the curve fit equations for fuel consumption as a function of horsepower were applied to the calculated horsepower at each notch setting, to yield fuel consumption at each notch setting. (See “Calculated Fuel Consumption L/hr” columns on the “GE Calculations” and “567 645 Calculations” tabs on the attached Excel spreadsheet.)

The curve fit equations for NO_x, CO, HC, and PM emissions as a function of fuel consumption were then applied to the fuel consumption numbers for each notch, to generate emissions, in gram per hour, for those pollutants at each notch setting. (See “Calculated Emissions” columns for “NO_x g/hr,” “CO g/hr,” “HC g/hr,” and “PM g/hr,” on the “GE Calculations” and “567 645 Calculations” tabs, on the attached Excel spreadsheet.)

Each notch’s percentage in the Canadian duty cycle for line-haul service (see “Duty Cycle” column, under “Freight Duty Cycle Emission Calculations,” on the “GE Calculations” and “567 645 Calculations” tabs on the attached Excel spreadsheet) was then applied to the calculated fuel consumption at each notch setting, to yield fuel consumption in liters per hour of fuel, weighted by the duty cycle percentages (see “dc FC L/hr” column, under “Freight Duty Cycle Emissions Calculations,” on the “GE Calculations” and “567 645 Calculations” tabs, on the attached Excel spreadsheet). The weighted fuel consumption numbers for each notch setting were added to yield fuel consumption, in liters per hour, for the engine over its entire duty cycle.

Each notch’s percentage in the Canadian duty cycle² for line-haul service was also applied to the calculated emissions for NO_x, CO, HC, and PM, to yield emissions per hour at each notch setting, weighted by the percentage of that notch setting in the overall duty cycle. (See “dc NO_x g/hr,” “dc CO g/hr,” “dc HC g/hr,” and “dc PM g/hr” columns, under “Freight Duty Cycle Emissions Calculations,” on the “GE Calculations” and “567 645 Calculations” tabs, on the attached Excel spreadsheet.) For each pollutant, the weighted emissions for each notch setting were added to yield emissions, in grams per hour, of that pollutant over the entire duty cycle of the engine being considered.

Finally, for each pollutant and each engine, the emission factors calculated (as grams per hour) for the entire duty cycle were divided by the fuel consumption calculated (as liters per hour) for the entire duty cycle, to yield emission factors in grams per liter for each pollutant. (See “NO_x g/L,” “CO g/L,” “HC g/L,” and “PM g/L” columns, under “Emissions Factors,” under “Freight Duty Cycle Emissions Calculations,” on the “GE Calculations” and “567 645 Calculations” tabs, on the attached Excel spreadsheet.)

² The Canadian duty cycle percentages were calculated in 2001 by consultants to the Canadian rail industry, using actual data from event recorders on trains of CN, CP, and Go Transit (a commuter railroad operating in the Toronto metropolitan area).

3.2 Emission Factors for NOx

One publicly available test result has been found for a locomotive meeting US EPA Tier levels standards.³ The test, conducted by SwRI on a Tier 0 locomotive,⁴ showed that the locomotive emitted NOx at a rate of 7.8 g/hp-hr, which is 82 percent of the EPA line-haul duty cycle NOx emission limit of 9.5 g/hp-hr for Tier 0 engines.

Although the above locomotive was found to have emissions significantly lower than the maximum for EPA Tier 0, it is our understanding that other locomotives of the same model type could have emissions closer to the EPA limits, because of variations between different engines of the same type. As discussed below, publicly available test data reporting NOx emissions by non-Tier-level locomotives indicate that actual test results vary by a range of 9% ($\pm 4.5\%$) around the mean.

Original Equipment Manufacturers (OEMs) have indicated, in private discussions with the Canadian railway industry's consultant, that, in order to ensure that Tier-level locomotives and engines do not exceed the EPA limits, the OEMs set internal development targets for NOx emissions at 90% of EPA limits, and manufacture locomotives and engines to meet that target. Accordingly, in the absence of model-specific test data in the public domain, and in light of the 9% variance observed in non-Tier locomotives, EFs of 90% of EPA regulated Tier limits were used for calculating NOx emissions for Tier-level locomotives.

Because the EPA emission limits are stated in terms of grams per horsepower-hour (*i.e.*, emission per unit of work), it was necessary to convert the EPA Tier 0 NOx limit into the equivalent, stated in terms of grams per liter or grams per gallon (*i.e.* emission per unit of fuel consumed), it was necessary to perform a conversion. This was done by determining fuel consumption and horsepower effort exerted over the line-haul duty cycle for each engine in the Canadian fleet, as reported in the database described above, then using those numbers to calculate a conversion factor of fuel consumption per horsepower-hour over that duty cycle for each engine. For each engine, 90% that conversion factor was applied to the EPA Tier 0 line-haul duty cycle NOx limit of 9.5 g/hp-hr and the EPA Tier 1 line-haul duty cycle NOx limit of 7.4 g/hp-hr, and the resulting Tier 0 and Tier 1 emission factors were averaged to yield Canadian fleet NOx emission factors of 40.59 g/L for Tier 0 and 28.43 g/L for Tier 1. (The calculations for the Canadian fleet Tier 0 NOx emission factor are shown on the "NOx Tier 0 EF Calc" tab on the attached Excel file.)

³ Fritz, S.G., *Locomotive Exhaust Emissions Test Report: BNSF 9476 / EMD SD70MAC* prepared for Transport Canada Railway Safety Branch, Southwest Research Institute, San Antonio, Texas, May 2004.

⁴ EPA Tier 0 standards apply to all locomotives originally built between 1973 and 2001.

4. Calculation of Emission Factors for CN Line-Haul Locomotives on Rail Lines Affected by CN/EJ&EW Transaction

A conversion factor of 3.785 liters per gallon was applied to the emission factors for NO_x, CO, HC, and PM to yield emissions in grams per U.S. gallon. (See "Emission Factors" tab on the attached Excel spreadsheet.)

Robert Dunn

Consultant in Railway Fuels, Lubricants
and Locomotive Exhaust Emissions

514-626-2860

514-882-2860 (mobile)

June 20, 2008

Attachment: Exhibit_to_Locomotive_Emission_Factors.xls

Sources

- 1 ESDC , Transport Canada 808-05-0364, 2006
- 2 AAR R892, 1996
- 3 AAR Report R-688 (March 1988)
- 4 SwRI Report No. 08-02062 (October 2000)
- 5 SwRI Report No. 08-5374-024 (August 1995)
- 6 SwRI Summary (Compiled for US EPA in 1997)
- 7 SwRI Report for Environment Canada 03.10493 (May 2004)
- 8 SwRI Report No 03-4171 (October 1994)
- 9 ESDC TC Report #: ETR-0356-R1 2007

All Notches

Source Code	Builder	Locomotive Model	Engine	Rated Horsepower	Air Supply	Notch	FHP	FC lbs/hr	NOx g/hr	CO g/hr
1	EMD	GP-35	567D3A	2250	Turbo	8	2365	917	23841	8860
4	EMD	SW1000	645E	1100	Roots Blower	8	1122	438	16745	3084
4	EMD	0	645E	1500	Roots Blower	8	1586	630	24028	5710
4	EMD	0	645E3C	1650	Turbo	8	1576	565	26036	1150
4	EMD	0	645E	2000	Roots Blower	8	2124	854	34748	3972
7	EMD	GP-38	645 E	2000	Roots Blown	8	2111	897	41808	2776
4	EMD	0	645E	2300	Turbo	8	2415	897	31274	6617
4	EMD	0	645E3B	2500	Turbo	8	2451	872	34436	5490
4	EMD	0	645F3B	2850	Turbo	8	2823	991	27440	3472
7	EMD	SD-40-2	645 E3B	3000	Turbo	8	2995	1070	30207	813
1	EMD	SD-40	645000	3000	Turbo	8	3267	1202	34611	6998
7	EMD	SD-40-2	645 E3B	3000	Turbo	8	3078	1135	35146	1189
4	EMD	0	645E	3000	Turbo	8	3159	1177	36928	5907
4	EMD	0	645E3B	3000	Turbo	8	3070	1186	45037	1596
4	EMD	0	645F3	3500	Turbo	8	3681	1345	47269	4565
9	EMD	SD 50	645 F3B	3600	Turbo	8	3624	1278	35478	3859
4	EMD	0	645F3B	3600	Turbo	8	3866	1281	57024	1816
4	EMD	0	645E	3800	Turbo	8	3819	1432	47127	2596
4	EMD	0	710G3	3200	Turbo	8	3023	1035	27660	2449
4	EMD	0	710G3A	3200	Turbo	8	3196	1077	30426	3931
4	EMD	0	710G3	3600	Turbo	8	4094	1383	42291	1596
4	EMD	0	710G3A	3600	Turbo	8	3916	1335	50515	3456
2	EMD	SD-70	710G3B	4000	Turbo	8	4204	1378	50191	4135
3	EMD	SD-75	710G3EC	4300	Turbo	8	4431	1439	54440	3724
4	GE	0	0	2500	Turbo	8	2500	862	26150	3425
4	GE	0	0	3000	Turbo	8	3000	991	33000	3000
4	GE	0	0	3000	Turbo	8	3000	1090	36390	6360
4	GE	0	0	3300	Turbo	8	3300	1082	36300	3300
4	GE	0	0	3600	Turbo	8	3600	1254	41616	3456
4	GE	0	0	4100	Turbo	8	4100	1415	47028	3034
6	GE	Dash 8	7FDL	4000	Turbo	8	4093	1427	40554	15508
2	GE	Dash 9	7FDL	4400	Turbo	8	4496	1564	45669	15485
7	GE	P-42DC	7FDL	4400	Turbo	8	4251	1423	61707	11672
1	EMD	GP-35	567D3A	2250	Turbo	7	1759	680	15275	4811
4	EMD	SW1000	645E	1100	Roots Blower	7	995	375	15915	1194
4	EMD	0	645E	1500	Roots Blower	7	1372	529	21897	2085
4	EMD	0	645E3C	1650	Turbo	7	1385	498	22410	1523
4	EMD	0	645E	2000	Roots Blower	7	1810	710	29611	1774
7	EMD	GP-38	645 E	2000	Roots Blown	7	1880	747	34069	2065
4	EMD	0	645E	2300	Turbo	7	2075	772	26954	5457
4	EMD	0	645E3B	2500	Turbo	7	2103	749	27655	7991
4	EMD	0	645F3B	2850	Turbo	7	2389	841	27975	2891
7	EMD	SD-40-2	645 E3B	3000	Turbo	7	2647	957	26511	982
1	EMD	SD-40	645000	3000	Turbo	7	2766	1020	28916	6483
4	EMD	0	645E	3000	Turbo	7	2661	994	31187	5030
4	EMD	0	645E3B	3000	Turbo	7	2492	1066	34240	1371
7	EMD	SD-40-2	645 E3B	3000	Turbo	7	2842	1020	35090	1249
4	EMD	0	645F3	3500	Turbo	7	3182	1150	44166	3532
9	EMD	SD 50	645 F3B	3600	Turbo	7	2662	952	28778	2552
4	EMD	0	645F3B	3600	Turbo	7	3454	1136	54573	1520
4	EMD	0	645E	3800	Turbo	7	3344	1227	45479	2173
4	EMD	0	710G3A	3200	Turbo	7	2534	848	23716	4333
4	EMD	0	710G3	3200	Turbo	7	2568	883	24142	2234
4	EMD	0	710G3	3600	Turbo	7	3541	1190	39163	1699

4	EMD	0	710G3A	3600	Turbo	7	3379	1142	54594	3286
2	EMD	SD-70	710G3B	4000	Turbo	7	3653	1190	48840	3504
3	EMD	SD-75	710G3EC	4300	Turbo	7	3824	1231	58836	3541
4	GE	0	0	2500	Turbo	7	2004	697	23553	4653
4	GE	0	0	3000	Turbo	7	2405	802	25103	3287
4	GE	0	0	3000	Turbo	7	2600	882	31538	5512
4	GE	0	0	3300	Turbo	7	2600	858	27196	2561
4	GE	0	0	3600	Turbo	7	3100	1014	36425	4650
4	GE	0	0	4100	Turbo	7	3440	1180	39766	3303
6	GE	Dash 8	7FDL	4000	Turbo	7				
2	GE	Dash 9	7FDL	4400	Turbo	7	3662	1251	42567	12285
7	GE	P-42DC	7FDL	4400	Turbo	7	3440	1145	68840	3872
1	EMD	GP-35	567D3A	2250	Turbo	1	125	68	1763	
4	EMD	SW1000	645E	1100	Roots Blower	1	28	19	597	155
4	EMD	0	645E	1500	Roots Blower	1	72	41	1239	183
4	EMD	0	645E3C	1650	Turbo	1	57	35	1725	96
7	EMD	GP-38	645 E	2000	Roots Blown	1	64	48	1561	445
4	EMD	0	645E	2000	Roots Blower	1	98	55	1824	241
4	EMD	0	645E	2300	Turbo	1	94	53	2476	232
4	EMD	0	645E3B	2500	Turbo	1	111	54	1466	95
4	EMD	0	645F3B	2850	Turbo	1	222	95	3039	251
7	EMD	SD-40-2	645 E3B	3000	Turbo	1	94	60	1703	119
4	EMD	0	645E3B	3000	Turbo	1	105	296	2069	343
7	EMD	SD-40-2	645 E3B	3000	Turbo	1	87	62	2357	330
4	EMD	0	645E	3000	Turbo	1	105	64	2807	267
1	EMD	SD-40	645000	3000	Turbo	1	106	83	3360	804
4	EMD	0	645F3	3500	Turbo	1	250	137	5838	302
4	EMD	0	645F3B	3600	Turbo	1	205	92	1105	59
9	EMD	SD 50	645 F3B	3600	Turbo	1	207	87	3177	290
4	EMD	0	645E	3800	Turbo	1	111	68	2749	316
4	EMD	0	710G3	3200	Turbo	1	197	90	2919	124
4	EMD	0	710G3A	3200	Turbo	1	209	91	3338	113
4	EMD	0	710G3A	3600	Turbo	1	233	100	3201	230
4	EMD	0	710G3	3600	Turbo	1	203	91	3820	105
2	EMD	SD-70	710G3B	4000	Turbo	1	205	91	2303	153
3	EMD	SD-75	710G3EC	4300	Turbo	1	264	108	3450	248
4	GE	0	0	2500	Turbo	1	114	52	830	198
4	GE	0	0	3000	Turbo	1	137	60	831	198
4	GE	0	0	3000	Turbo	1	150	66	1002	278
4	GE	0	0	3300	Turbo	1	100	50	830	198
4	GE	0	0	3600	Turbo	1	175	76	1170	325
4	GE	0	0	4100	Turbo	1	195	78	1299	361
6	GE	Dash 8	7FDL	4000	Turbo	1				
2	GE	Dash 9	7FDL	4400	Turbo	1	194	80	2166	109
7	GE	P-42DC	7FDL	4400	Turbo	1	191	78	2642	133
1	EMD	GP-35	567D3A	2250	Turbo	2	268	124	3161	302
4	EMD	SW1000	645E	1100	Roots Blower	2	72	36	1046	182
4	EMD	0	645E	1500	Roots Blower	2	233	95	2775	294
4	EMD	0	645E3C	1650	Turbo	2	220	91	4404	156
7	EMD	GP-38	645 E	2000	Roots Blown	2	242	111	2849	661
4	EMD	0	645E	2000	Roots Blower	2	333	137	4335	430
4	EMD	0	645E	2300	Turbo	2	291	123	4924	297
4	EMD	0	645E3B	2500	Turbo	2	417	159	4708	225
4	EMD	0	645F3B	2850	Turbo	2	339	134	8329	292
7	EMD	SD-40-2	645 E3B	3000	Turbo	2	390	161	4360	250
4	EMD	0	645E3B	3000	Turbo	2	363	361	5032	625
1	EMD	SD-40	645000	3000	Turbo	2	351	154	5754	425
4	EMD	0	645E	3000	Turbo	2	395	167	6040	292
7	EMD	SD-40-2	645 E3B	3000	Turbo	2	420	170	6190	569
4	EMD	0	645F3	3500	Turbo	2	444	203	8329	306
9	EMD	SD 50	645 F3B	3600	Turbo	2	441	170	6916	422
4	EMD	0	645F3B	3600	Turbo	2	475	176	7819	228
4	EMD	0	645E	3800	Turbo	2	435	187	5754	452
4	EMD	0	710G3	3200	Turbo	2	356	140	4998	231
4	EMD	0	710G3A	3200	Turbo	2	372	141	5598	127
4	EMD	0	710G3	3600	Turbo	2	439	171	6625	132
4	EMD	0	710G3A	3600	Turbo	2	475	186	6857	256
2	EMD	SD-70	710G3B	4000	Turbo	2	439	172	4324	254
3	EMD	SD-75	710G3EC	4300	Turbo	2	537	200	7390	276
4	GE	0	0	2500	Turbo	2	266	105	1770	422
4	GE	0	0	3000	Turbo	2	319	121	1420	339

4	GE	0	0	3000	Turbo	2	300	133	2001	556
4	GE	0	0	3300	Turbo	2	200	86	1450	338
4	GE	0	0	3600	Turbo	2	375	153	2816	436
4	GE	0	0	4100	Turbo	2	400	172	3000	464
6	GE	Dash 8	7FDL	4000	Turbo	2				
7	GE	P-42DC	7FDL	4400	Turbo	2	420	156	2064	221
2	GE	Dash 9	7FDL	4400	Turbo	2	499	191	5821	291
1	EMD	GP-35	567D3A	2250	Turbo	3	448	194	4790	372
4	EMD	SW1000	645E	1100	Roots Blower	3	231	90	2375	263
4	EMD	0	645E	1500	Roots Blower	3	440	167	5716	339
4	EMD	0	645E3C	1650	Turbo	3	420	162	8039	160
7	EMD	GP-38	645 E	2000	Roots Blown	3	497	24	5552	821
4	EMD	0	645E	2000	Roots Blower	3	589	226	8134	430
4	EMD	0	645E	2300	Turbo	3	497	198	8329	348
4	EMD	0	645E3B	2500	Turbo	3	597	223	6688	256
4	EMD	0	645F3B	2850	Turbo	3	735	274	10731	368
1	EMD	SD-40	645000	3000	Turbo	3	666	281	8304	587
7	EMD	SD-40-2	645 E3B	3000	Turbo	3	788	303	8350	281
4	EMD	0	645E3B	3000	Turbo	3	721	432	8717	851
7	EMD	SD-40-2	645 E3B	3000	Turbo	3	754	300	9900	663
4	EMD	0	645E	3000	Turbo	3	686	275	10180	329
4	EMD	0	645F3	3500	Turbo	3	725	305	11897	355
9	EMD	SD 50	645 F3B	3600	Turbo	3	903	337	12137	834
4	EMD	0	645F3B	3600	Turbo	3	1005	363	14060	744
4	EMD	0	645E	3800	Turbo	3	781	310	10817	453
4	EMD	0	710G3	3200	Turbo	3	684	256	8659	205
4	EMD	0	710G3A	3200	Turbo	3	717	258	9951	179
4	EMD	0	710G3	3600	Turbo	3	981	354	11154	314
4	EMD	0	710G3A	3600	Turbo	3	939	352	14214	420
2	EMD	SD-70	710G3B	4000	Turbo	3	979	360	9993	390
3	EMD	SD-75	710G3EC	4300	Turbo	3	1062	379	15318	453
4	GE	0	0	2500	Turbo	3	535	205	4065	1129
4	GE	0	0	3000	Turbo	3	700	259	5250	812
4	GE	0	0	3000	Turbo	3	642	236	5369	1491
4	GE	0	0	3300	Turbo	3	700	273	5369	1491
4	GE	0	0	3600	Turbo	3	850	298	6502	1071
4	GE	0	0	4100	Turbo	3	950	384	7266	1197
6	GE	Dash 8	7FDL	4000	Turbo	3				
7	GE	P-42DC	7FDL	4400	Turbo	3	951	351	6484	843
2	GE	Dash 9	7FDL	4400	Turbo	3	1032	398	16361	1437
1	EMD	GP-35	567D3A	2250	Turbo	4	702	277	6768	465
4	EMD	SW1000	645E	1100	Roots Blower	4	436	159	5811	192
4	EMD	0	645E	1500	Roots Blower	4	669	249	9794	355
4	EMD	0	645E3C	1650	Turbo	4	617	232	12081	234
7	EMD	GP-38	645 E	2000	Roots Blown	4	883	333	11465	980
4	EMD	0	645E	2000	Roots Blower	4	871	331	12412	479
4	EMD	0	645E	2300	Turbo	4	729	283	12254	401
4	EMD	0	645E3B	2500	Turbo	4	878	324	10448	571
4	EMD	0	645F3B	2850	Turbo	4	993	364	14607	526
1	EMD	SD-40	645000	3000	Turbo	4	992	389	10781	606
7	EMD	SD-40-2	645 E3B	3000	Turbo	4	1082	400	10918	296
4	EMD	0	645E3B	3000	Turbo	4	1030	528	11855	834
7	EMD	SD-40-2	645 E3B	3000	Turbo	4	1215	461	13936	524
4	EMD	0	645E	3000	Turbo	4	1034	404	15407	434
4	EMD	0	645F3	3500	Turbo	4	1131	445	19091	430
9	EMD	SD 50	645 F3B	3600	Turbo	4	1203	442	15600	917
4	EMD	0	645F3B	3600	Turbo	4	1353	480	18766	1082
4	EMD	0	645E	3800	Turbo	4	1219	468	16481	524
4	EMD	0	710G3	3200	Turbo	4	1025	372	11220	389
4	EMD	0	710G3A	3200	Turbo	4	1053	372	12644	305
4	EMD	0	710G3	3600	Turbo	4	1361	479	14767	517
4	EMD	0	710G3A	3600	Turbo	4	1353	491	23019	586
2	EMD	SD-70	710G3B	4000	Turbo	4	1520	546	15963	1932
3	EMD	SD-75	710G3EC	4300	Turbo	4	1531	529	24807	632
4	GE	0	0	2500	Turbo	4	857	320	8313	2516
4	GE	0	0	3000	Turbo	4	1050	405	8032	1323
4	GE	0	0	3000	Turbo	4	1024	368	9741	2949
4	GE	0	0	3300	Turbo	4	1000	368	9780	2960
4	GE	0	0	3600	Turbo	4	1250	466	12513	2475
4	GE	0	0	4100	Turbo	4	1400	526	14014	2772
6	GE	Dash 8	7FDL	4000	Turbo	4				

7	GE	P-42DC	7FDL	4400	Turbo	4	1402	504	10808	3079
2	GE	Dash 9	7FDL	4400	Turbo	4	1548	574	24093	4935
1	EMD	GP-35	567D3A	2250	Turbo	5	997	390	9299	904
4	EMD	SW1000	645E	1100	Roots Blower	5	628	228	9577	182
4	EMD	0	645E	1500	Roots Blower	5	885	332	14314	416
4	EMD	0	645E3C	1650	Turbo	5	827	304	15787	298
7	EMD	GP-38	645 E	2000	Roots Blown	5	1114	425	15646	853
4	EMD	0	645E	2000	Roots Blower	5	1161	442	16974	604
4	EMD	0	645E	2300	Turbo	5	1069	406	16644	716
4	EMD	0	645E3B	2500	Turbo	5	1105	404	14144	1282
4	EMD	0	645F3B	2850	Turbo	5	1322	484	17451	754
7	EMD	SD-40-2	645 E3B	3000	Turbo	5	1493	554	14735	434
1	EMD	SD-40	645000	3000	Turbo	5	1440	548	15645	1922
7	EMD	SD-40-2	645 E3B	3000	Turbo	5	1614	605	17548	697
4	EMD	0	645E3B	3000	Turbo	5	1438	657	19197	1160
4	EMD	0	645E	3000	Turbo	5	1461	556	20892	759
4	EMD	0	645F3	3500	Turbo	5	1635	615	26340	621
9	EMD	SD 50	645 F3B	3600	Turbo	5	1656	602	20338	1170
4	EMD	0	645F3B	3600	Turbo	5	1876	652	24388	1933
4	EMD	0	645E	3800	Turbo	5	1741	655	20822	1115
4	EMD	0	710G3	3200	Turbo	5	1353	491	13498	1043
4	EMD	0	710G3A	3200	Turbo	5	1402	491	15318	855
4	EMD	0	710G3	3600	Turbo	5	1787	623	18156	1108
4	EMD	0	710G3A	3600	Turbo	5	1718	615	27806	949
2	EMD	SD-70	710G3B	4000	Turbo	5	1984	702	21211	3901
3	EMD	SD-75	710G3EC	4300	Turbo	5	1944	663	29966	1023
4	GE	0	0	2500	Turbo	5	1256	455	14075	3574
4	GE	0	0	3000	Turbo	5	1550	576	15516	3069
4	GE	0	0	3000	Turbo	5	1507	523	16319	5520
4	GE	0	0	3300	Turbo	5	1500	532	16320	5520
4	GE	0	0	3600	Turbo	5	1850	662	23088	3517
4	GE	0	0	4100	Turbo	5	2050	756	25584	3895
6	GE	Dash 8	7FDL	4000	Turbo	5	2045	771	22576	16165
2	GE	Dash 9	7FDL	4400	Turbo	5	2222	803	31869	9282
7	GE	P-42DC	7FDL	4400	Turbo	5	2052	690	40192	3950
1	EMD	GP-35	567D3A	2250	Turbo	6	1348	524	11870	2230
4	EMD	SW1000	645E	1100	Roots Blower	6	776	285	12652	272
4	EMD	0	645E	1500	Roots Blower	6	1109	419	17999	677
4	EMD	0	645E3C	1650	Turbo	6	1039	378	18328	675
7	EMD	GP-38	645 E	2000	Roots Blown	6	1392	543	22603	1034
4	EMD	0	645E	2000	Roots Blower	6	1465	567	23235	923
4	EMD	0	645E	2300	Turbo	6	1429	563	19106	1372
4	EMD	0	645E3B	2500	Turbo	6	1517	549	18037	3838
4	EMD	0	645F3B	2850	Turbo	6	1704	615	21010	1261
7	EMD	SD-40-2	645 E3B	3000	Turbo	6	1882	670	17210	507
7	EMD	SD-40-2	645 E3B	3000	Turbo	6	1966	720	18771	950
1	EMD	SD-40	645000	3000	Turbo	6	1934	714	19531	3637
4	EMD	0	645E3B	3000	Turbo	6	1821	827	19994	838
4	EMD	0	645E	3000	Turbo	6	1971	740	26654	1912
4	EMD	0	645F3	3500	Turbo	6	2212	816	32362	1659
9	EMD	SD 50	645 F3B	3600	Turbo	6	2065	745	23570	1818
4	EMD	0	645F3B	3600	Turbo	6	2766	919	42569	1742
4	EMD	0	645E	3800	Turbo	6	2299	865	25703	2345
4	EMD	0	710G3	3200	Turbo	6	1719	617	15457	2114
4	EMD	0	710G3A	3200	Turbo	6	1696	587	18162	1408
4	EMD	0	710G3	3600	Turbo	6	2306	799	24213	2214
4	EMD	0	710G3A	3600	Turbo	6	2445	859	40356	3392
2	EMD	SD-70	710G3B	4000	Turbo	6	2883	967	34305	5462
3	EMD	SD-75	710G3EC	4300	Turbo	6	2767	926	43501	3656
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4	GE	0	0	3000	Turbo	6	1996	697	23589	4662
4	GE	0	0	3000	Turbo	6	2050	746	25215	4100
4	GE	0	0	3300	Turbo	6	2000	680	22980	4530
4	GE	0	0	3600	Turbo	6	2450	858	29719	5194
4	GE	0	0	4100	Turbo	6	2770	967	33600	5873
6	GE	Dash 8	7FDL	4000	Turbo	6				
2	GE	Dash 9	7FDL	4400	Turbo	6	2939	1020	36589	11669
7	GE	P-42DC	7FDL	4400	Turbo	6	2732	932	52438	4468
1	EMD	GP-35	567D3A	2250	Turbo	DB		102	2484	583
4	EMD	SW1000	645E	1100	Roots Blower	DB				
4	EMD	0	645E	1500	Roots Blower	DB	70	80	3415	350

4	EMD	0	645E3C	1650	Turbo	DB				
7	EMD	GP-38	645 E	2000	Roots Blown	DB	21	43	1170	742
4	EMD	0	645E	2000	Roots Blower	DB	82	103	2803	699
4	EMD	0	645E	2300	Turbo	DB	79	113	3855	612
4	EMD	0	645E3B	2500	Turbo	DB	36	76	591	81
4	EMD	0	645F3B	2850	Turbo	DB	15	33	1113	262
7	EMD	SD-40-2	645 E3B	3000	Turbo	DB	17	44	1054	188
7	EMD	SD-40-2	645 E3B	3000	Turbo	DB	10	49	1208	435
4	EMD	0	645E3B	3000	Turbo	DB	64	142	1413	95
1	EMD	SD-40	645000	3000	Turbo	DB	0	132	3804	740
4	EMD	0	645E	3000	Turbo	DB	69	114	4134	660
4	EMD	0	645F3	3500	Turbo	DB	74	94	4588	536
9	EMD	SD 50	645 F3B	3600	Turbo	DB	22	37	1056	214
4	EMD	0	645F3B	3600	Turbo	DB	36	91	2873	407
4	EMD	0	645E	3800	Turbo	DB	95	157	4430	851
4	EMD	0	710G3A	3200	Turbo	DB	64	142	1413	95
4	EMD	0	710G3	3200	Turbo	DB	22	110	2317	291
4	EMD	0	710G3A	3600	Turbo	DB	12	32	946	155
4	EMD	0	710G3	3600	Turbo	DB	11	107	2187	183
2	EMD	SD-70	710G3B	4000	Turbo	DB	19	48	1249	153
3	EMD	SD-75	710G3EC	4300	Turbo	DB	14	34	1020	167
4	GE	0	0	2500	Turbo	DB	98			
4	GE	0	0	3000	Turbo	DB	96	98		
4	GE	0	0	3000	Turbo	DB	117	130	1335	1849
4	GE	0	0	3300	Turbo	DB	62			
4	GE	0	0	3600	Turbo	DB	117	150	1335	1849
4	GE	0	0	4100	Turbo	DB	117			
6	GE	Dash 8	7FDL	4000	Turbo	DB				
2	GE	Dash 9	7FDL	4400	Turbo	DB	22	41	1024	376
7	GE	P-42DC	7FDL	4400	Turbo	DB	19	49	2679	258
1	EMD	GP-35	567D3A	2250	Turbo	Idle	14	42	1433	561
4	EMD	SW1000	645E	1100	Roots Blower	Idle	13	13	322	300
4	EMD	0	645E	1500	Roots Blower	Idle	15	26	987	181
4	EMD	0	645E3C	1650	Turbo	Idle	9	17	687	113
7	EMD	GP-38	645 E	2000	Roots Blown	Idle	11	34	1033	581
4	EMD	0	645E	2000	Roots Blower	Idle	15	32	1247	283
4	EMD	0	645E	2300	Turbo	Idle	16	30	1366	432
4	EMD	0	645E3B	2500	Turbo	Idle	11	28	891	349
4	EMD	0	645F3B	2850	Turbo	Idle	8	18	637	161
7	EMD	SD-40-2	645 E3B	3000	Turbo	Idle	12	39	998	146
7	EMD	SD-40-2	645 E3B	3000	Turbo	Idle	9	39	1394	415
1	EMD	SD-40	645000	3000	Turbo	Idle	18	42	1395	672
4	EMD	0	645E	3000	1635	Idle	17	40	1635	564
4	EMD	0	645E3B	3000	Turbo	Idle	17	279	8716	1532
4	EMD	0	645F3	3500	Turbo	Idle	15	66	3024	617
9	EMD	SD 50	645 F3B	3600	Turbo	Idle	13	18	625	96
4	EMD	0	645F3B	3600	Turbo	Idle	9	22	999	99
4	EMD	0	645E	3800	Turbo	Idle	17	47	1541	1017
4	EMD	0	710G3A	3200	Turbo	Idle	8	19	889	55
4	EMD	0	710G3	3200	Turbo	Idle	6	35	1175	137
4	EMD	0	710G3A	3600	Turbo	Idle	11	24	843	131
4	EMD	0	710G3	3600	Turbo	Idle	6	26	1809	136
2	EMD	SD-70	710G3B	4000	Turbo	Idle	19	48	1249	153
3	EMD	SD-75	710G3EC	4300	Turbo	Idle	13	26	909	141
4	GE	0	0	2500	Turbo	Idle	15	18	245	283
4	GE	0	0	3000	Turbo	Idle	15	18	306	354
4	GE	0	0	3000	Turbo	Idle	25	24	310	493
4	GE	0	0	3300	Turbo	Idle	12	17	306	354
4	GE	0	0	3600	Turbo	Idle	25	28	314	500
4	GE	0	0	4100	Turbo	Idle	25	32	309	492
6	GE	Dash 8	7FDL	4000	Turbo	Idle	13	22	472	970
7	GE	P-42DC	7FDL	4400	Turbo	Idle	11	25	501	55
2	GE	Dash 9	7FDL	4400	Turbo	Idle	10	24	637	247

Adjusted PM

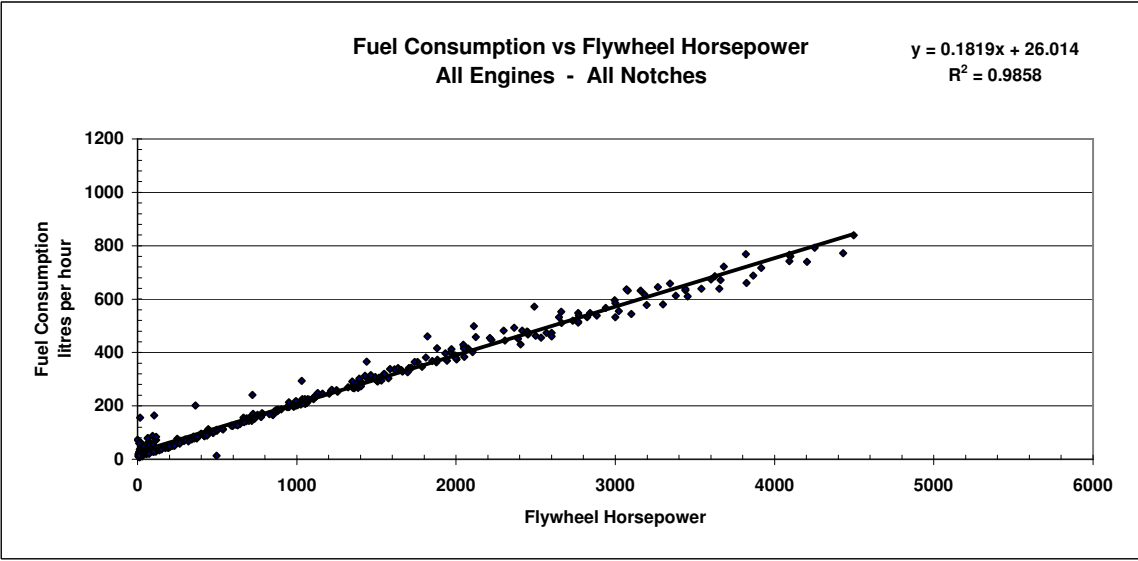
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807	608	458.421136	608
1096	3598	499.166029	deleted
1087	638	481.503231	638
490	620	468.083408	620
762	665	531.961763	665
295	645	595.437738	645
1223	868	645.225065	868
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1169	837	631.805243	837
307	809	636.636379	809
1138	958	721.98645	958
1644	859	686.021325	859
1082	911	687.631704	911
1375	1018	768.687432	1018
847	707	555.580651	707
351	749	578.125953	749
1351	945	742.38458	945
1087	1135	716.618521	1135
1026	1106	739.700615	1106
1171	1223	772.444982	1223
725	350	462.715479	350
750	420	531.961763	420
810	540	585.10426	540
462	462	580.809917	462
864	612	673.138296	612
983	698	759.561953	698
2077		766.003467	
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692	162	791.876543	deleted
655		365.019172	
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522	345	283.963444	345
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652	463	381.122959	463
929	1530	415.693449	deleted
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259	581	532.555061	581
1034		547.528757	
878	648	553.144964	648
249	602	572.221231	602
115	533	547.528757	533
850	749	617.311834	749
1001	656	511.02684	656
993	740	609.796734	740
1171	799	658.644888	799
228	541	455.200379	541
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511	307	374.144651	307
695	336	430.507905	336
702	468	473.451337	468
364	364	460.568308	364
775	510	544.308	510
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799	448	671.527917	448
607	148	637.174028	deleted
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74	30	30.0501288	30
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22	8	34.5019998	8
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343		46.188161	
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39	51	51.1965158	51
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164	38	37.840903	38
73	33	50.083548	33
84	35	50.6400319	35
146	59	55.6483867	59
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147	42	50.6400319	42
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124	108	28.9371611	108
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204	118	42.2927739	118
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94	57	43.4057416	57
205		69.0039995	
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140	98	68.4475156	98
204	89	88.4809349	89
159	102	74.5688382	102
45	111	89.5939026	111
254	123	200.890676	123
224		85.6985155	
201	133	92.9328058	133
34	29	94.6022574	29
103	162	112.966225	162
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92	110	77.9077414	110
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192	140	95.7152251	140
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170	89	106.288419	89
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145	138	92.9328058	138
139	125	90.1503865	125
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179	163	110.183806	163
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46	72	166.94516	72
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387	251	169.727579	251
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122	213	143.572838	213
304	289	196.995289	289
317	253	195.882321	253
279	266	200.334192	266
342	273	210.907386	273
207	270	114.079193	270
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357	357	151.920096	357
323	382	165.832192	382
361	427	213.689805	427
347	141	195.325837	141
354	202	221.480579	202
282		154.146031	
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194	159	138.564483	159
173	140	129.104257	140
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233	181	157.484934	181
193	207	180.300773	207
387	225	202.560128	225
395		216.472224	
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319	255	293.823482	255
52	169	256.539063	169
320	258	224.819482	258
409	284	247.635321	284
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352	306	267.112256	306
378	299	260.43445	299
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408	305	266.555772	305
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246	280	178.074837	280
399	472	225.375966	472
289	329	204.786063	329
330	330	204.786063	330
262	300	259.321482	300
294	336	292.710514	336

405	174	280.467869	174
395	264	319.42174	264
396		217.028708	
188	144	126.878322	144
274	201	184.752644	201
292	174	169.171096	174
607	602	236.505643	deleted
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310	245	225.93245	245
254	244	224.819482	244
476	278	269.338192	278
146	350	308.292062	350
524		304.953159	
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286	332	365.609901	332
424	336	309.40503	336
471	372	342.237578	372
612	474	335.003288	474
488	394	362.827481	394
522	402	364.496933	402
311	286	273.233579	286
168	296	273.233579	296
500	384	346.689449	384
496	489	342.237578	489
433	628	390.651675	628
535	527	368.948804	527
350	300	253.200159	300
325	372	320.534707	372
345	330	291.041062	330
330	330	296.049417	330
536	315	368.39232	315
594	348	420.701803	348
526		429.049061	
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706	672	302.17074	deleted
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334	404	305.509643	404
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167	420	372.844191	420
73	294	400.668384	294
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622	600	454.090835	600
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735	636	481.358545	636
430	426	343.350546	426
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627	776	538.119899	776
671	723	515.304061	723
379	363	328.325482	363
514	308	387.869255	308
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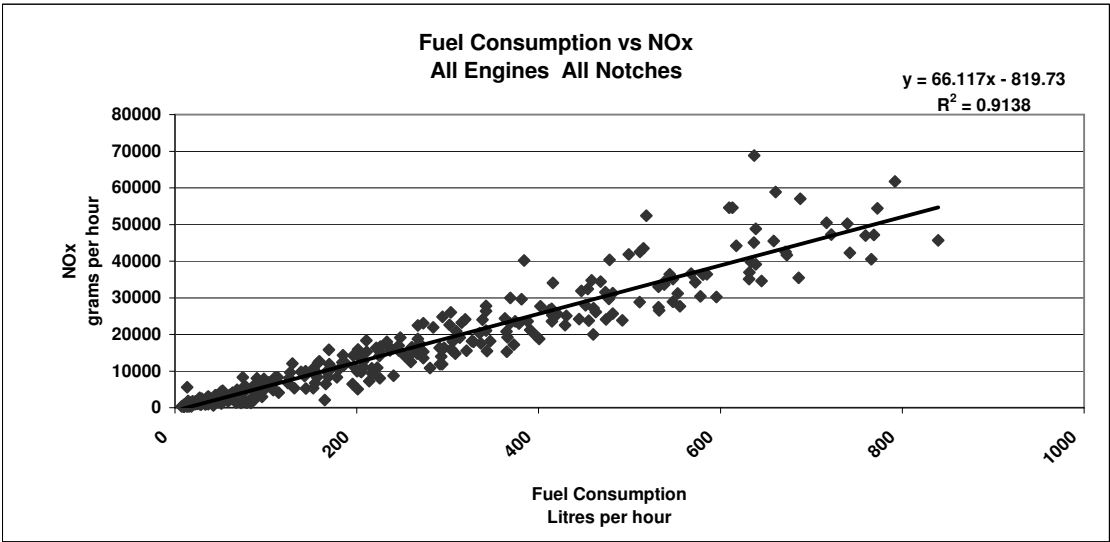
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322		73.4558704	
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279	64	50.6400319	64
327	110	87.3679671	110
70	50	79.0207091	50
353	59	61.2132254	59
137	32	17.8074837	32
151	94	59.5437738	94
183	47	26.7112256	47
148	35	18.9204515	35
		54.535419	
1400	622	72.3429027	deleted
1400	622	83.4725801	deleted
182	35	22.8158385	35
134	168	27.2677095	deleted
189	74	23.3723224	74
104	23	7.23429027	23
99	31	14.4685805	31
48	19	9.46022574	19
248	208	18.9204515	deleted
124	38	17.8074837	38
95	32	16.694516	32
103	33	15.5815483	33
53	18	10.0167096	18
44	399	21.7028708	deleted
23	10	21.7028708	10
222	75	23.3723224	75
185	48	22.2593547	48
601	44	155.258999	44
228	83	36.7279352	83
112	15	10.0167096	15
76	26	12.2426451	26
242	55	26.1547417	55
54	31	10.5731935	31
78	24	19.4769353	24
116	36	13.3556128	36
107	46	14.4685805	46
183	47	26.7112256	47
125	39	14.4685805	39
207	52	10.0167096	52
259	65	10.0167096	65
479	229	13.3556128	229
259	65	9.46022574	65
486	232	15.5815483	232
478	228	17.8074837	228
354		12.2426451	
30	15	13.9120967	15
152	23	13.3556128	23



N8
 $y = 0.1655x + 79.967$
0.1655
79.967
 $R^2=0.9558$

N8&7
 $y = 0.1682x + 64.293$
0.1682
64.293
 $R^2=0.953$

All Notches
 $y = 0.1819x + 26.014$
0.1819
26.014
 $R^2=0.9858$



N8

$$y = 58.361x + 2764.5$$

58.361

2764.5

$$R^2 = 0.6738$$

N8&7

$$y = 62.009x + 1410.2$$

62.009

1410.2

$$R^2 = 0.6763$$

All Notches

$$y = 66.117x - 819.73$$

66.117

-819.73

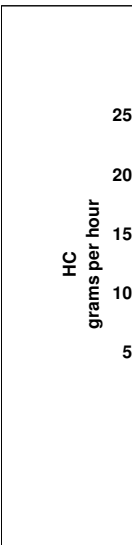
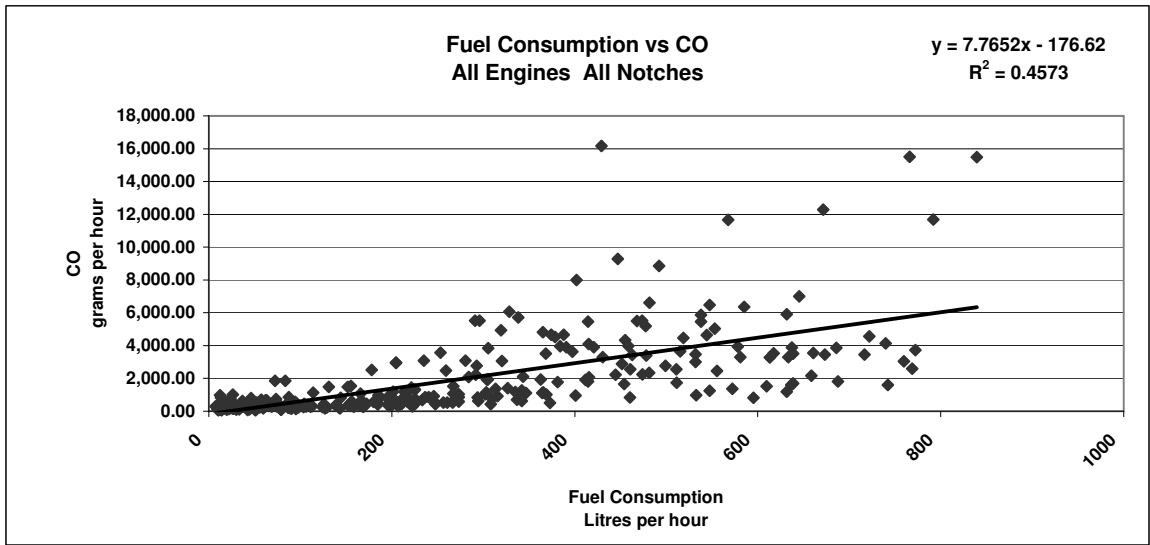
$$R^2 = 0.9138$$

N8

4697 881.606061

N8&7

4129.29231 784.815385



N8

$$y = 7.432x + 213.34$$

7.432

213.34

$$R^2=0.0924$$

N8&7

$$y = 5.8333x + 796.76$$

5.8333

796.76

$$R^2=0.0843$$

All Notches

$$y = 7.7652x - 176.62$$

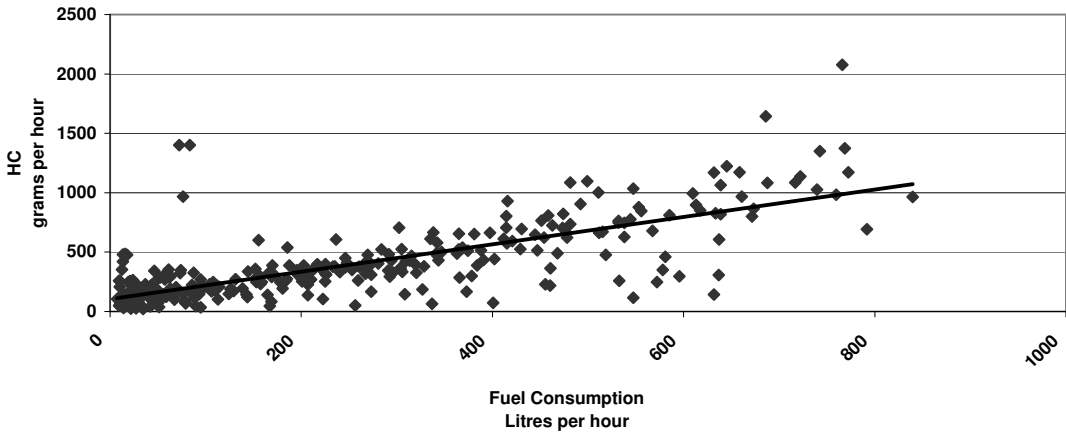
7.7652

-176.62

$$R^2=0.4573$$

Fuel Consumption vs HC
All Engines All Notches

$y = 1.1505x + 105.76$
 $R^2 = 0.5858$



PM
grams per hour
40
35
30
25
20
15
10
5

N8

$$y = 1.4507x + 6.4154$$

1.4507

6.4154

$$R^2 = 0.2638$$

N8&7

$$y = 1.4293x + 1.5555$$

1.4293

1.5555

$$R^2 = 0.3162$$

All Notches

$$y = 1.1505x + 105.76$$

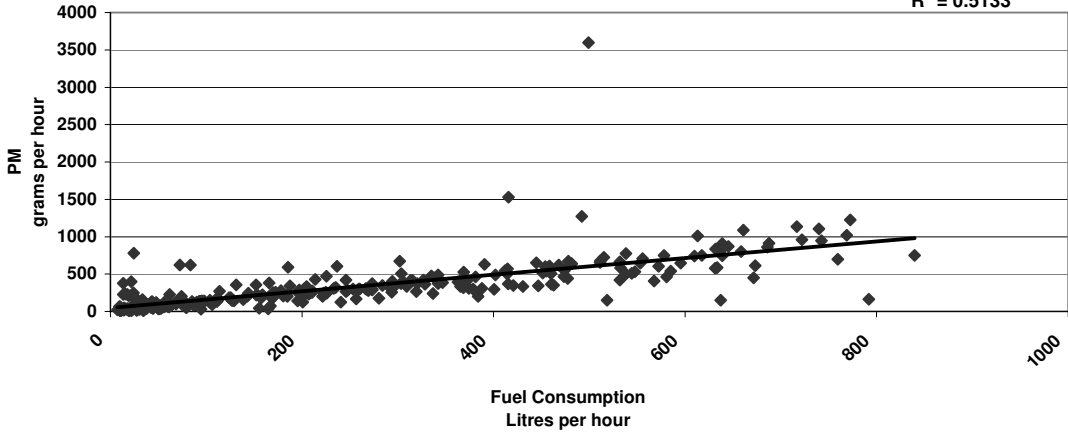
1.1505

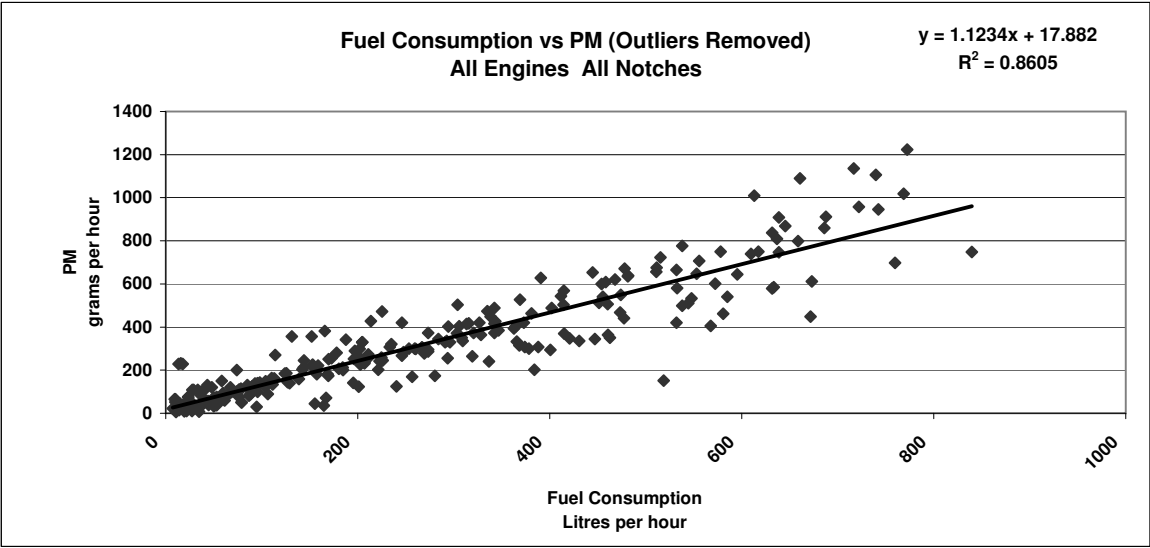
105.76

$$R^2 = 0.5858$$

Fuel Consumption vs PM
All Engines All Notches

$y = 1.1096x + 47.198$
 $R^2 = 0.5133$





N8
 $y = 1.2767x - 45.276$
1.2767
-45.276
 $R^2 = 0.6104$

N8&7
 $y = 1.3075x - 73.937$
1.3075
-73.937
 $R^2 = 0.6462$

All Notches
 $y = 1.1234x + 17.882$
1.1234
17.882
 $R^2 = 0.8605$

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July 9, 2008

BY HAND

Ms. Victoria J. Rutson, Chief
Section of Environmental Analysis
Surface Transportation Board
395 E Street, S.W.
Washington, D.C. 20423-0001

**Re: *Canadian National Railway Company and Grand Trunk Corporation –
Control – EJ&E West Company (STB Finance Docket No. 35087)***

Dear Ms. Rutson:

On June 26, 2008, the Gary/Chicago International Airport ("GCIA") announced that it had signed a confidential Preliminary Memorandum of Understanding ("PMOU") with CSX Transportation, Inc. ("CSX"), Norfolk Southern Railway Company ("NS"), and the Elgin, Joliet & Eastern Railway Company ("EJ&E"), providing for the relocation of an EJ&E rail line that will enable a planned expansion of the principal runway of the GCIA and the shift of CSX operations to the NS Gary Branch commonly known as the "Sugar Track" that will allow GCIA eventually to extend its crosswind runway.

The PMOU culminated several years of negotiations among the parties. While further definitive agreements will be required, the PMOU sets forth the core understandings of the parties on the elements of the relocation plan and underlying obligations that will enable the Airport to proceed with its expansion plans, while protecting and improving rail operations in northwest Indiana.

In its scoping comments filed February 15, 2008 (incorporating comments previously filed with the STB on January 24, 2008), GCIA expressed safety concerns regarding CN's application to acquire control of the principal lines of the EJ&E, should the EJ&E line not be relocated. With the PMOU executed and the EJ&E rail line relocation moving forward, GCIA's concerns have now been addressed. Although CN is not a party to the PMOU, as it does not own or control EJ&E or otherwise have a direct interest in the PMOU, CN cooperated with EJ&E and GCIA on the development of the PMOU and is committed to honoring its terms. CN is also committed to working with EJ&E and GCIA to complete the necessary agreements between

HARKINS CUNNINGHAM LLP

Attorneys at Law

Ms. Victoria J. Rutson, Chief

July 9, 2008

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those parties to implement the PMOU. If and when the STB approves CN's application and CN acquires control of the EJ&E, CN, as a successor in interest to EJ&E, will be bound by the agreements entered into by EJ&E.

As noted, the PMOU is a confidential document. Should you require any further information, we will endeavor to work with the other parties to the PMOU to provide that to you.

Sincerely,

A handwritten signature in black ink, appearing to read "D. Hirsh", written over the word "Sincerely,".

David A. Hirsh

Counsel for Applicants Canadian National
Railway Company and Grand Trunk Corporation

cc: Phillis Johnson-Ball
John H. Morton
Normand Pellerin