234071

REDACTED – TO BE PLACED ON PUBLIC FILE

BEFORE THE
SURFACE TRANSPORTATION BOARD

INTERMOUNTAIN POWER AGENCY, Complainant, v. UNION PACIFIC RAILROAD COMPANY, Defendant.	Docket No 42136

REPLY EVIDENCE AND ARGUMENT OF DEFENDANT UNION PACIFIC RAILROAD COMPANY

NARRATIVE

GAYLA L. THAL
LOUISE A. RINN
DANIELLE E BODE
Union Pacific Railroad Company
1400 Douglas Street, Stop 1580
Omaha, NE 68179
(402) 544-3309

MICHAEL L. ROSENTHAL
CAROLYN F. CORWIN
EDWARD H. RIPPEY
MAUREEN M. JAPHA
MATTHEW J. CONNOLLY
SPENCER F. WALTERS
Covington & Burling LLP
1201 Pennsylvania Avenue, N.W
Washington, DC 20004
(202) 662-6000

Attorneys for Union Pacific Railroad Company

April 12, 2013

Contains Color Images

TABLE OF CONTENTS

ABBREVIATIONS

AAR	Association of American Railroads
AEI	Automatic Equipment Identifier
AEO	2011 Annual Energy Outlook Update Forecast.
All-LF	All-Inclusive Less Fuel Index, published by AAR
AREMA	American Railway Engineering and Maintenance-of-Way Association.
ATC	Average Total Cost.
ATF	Across-the-Fence
BNSF	The Burlington Northern and Santa Fe Railway Company and Predecessors.
CMS	Crew Management System.
CMM	Coal Marketing Module.
CMP	Corrugated Metal Pipe.
CTC	Centralized Traffic Control. A block signal system under which train and engine movements are authorized by block signals, whose indications supersede the superiority of trains for both opposing and following moves on the same track. A semi-automated means of ensuring the rapid and safe movement of trains.
CWR	Continuous Welded Rail.
DCF	Discounted Cash Flow.
DP	Distributed Power Configuration. Placement of locomotives at two or more locations in a train with acceleration and braking of all locomotives controlled from the head locomotive unit.
DPU	Distributed Power Unit. A locomotive unit equipped to be part of a distributed power configuration.
DRD	Disaster Recovery Dispatcher
DTL	Direct to Locomotive
ECP	Efficient component pricing.
EIA	Energy Information Administration
EOTD	End-of-Train Telemetry Device.
FAS-PAS	Fail Safe Audible Signal-Power Activated Switches
FED	Failed-Equipment Detector
FRA	Federal Railroad Administration.
GE	General Electric.
GTM	Gross Ton-Mile
GVWR	Gross Vehicle Weight Rating.
GWR	Gross Weight on Rail.
HDF	On-Highway Diesel Fuel Index
HP/TT	Horse power per trailing ton.
ICC	Interstate Commerce Commission.
IDC	Interest During Construction.

IGS	Intermountain Generating Station.
IPA	Intermountain Power Agency.
IPP	Intermountain Power Project.
IPSC	Intermountain Power Service Corporation.
IRR	Intermountain Railroad.
ISS	Interline Settlement System
LADWP	Los Angeles Department of Water and Power.
LUM	Locomotive Unit-Mile.
MACRS	Modified Accelerated Cost Recovery System.
MGT	Million Gross Tons.
MITA	Master Intermodal Transportation Agreement
MMM	Maximum Markup Methodology.
MOW	Maintenance of Way.
MTO	Manager of Train Operations
NEMS	National Energy Modeling System
PPI	Producer Price Index
PRB	Powder River Basin (includes Wyoming and Montana mines).
PTC	Positive Train Control.
R-1	Annual Report Form R-1
RCAF-A	Rail Cost Adjustment Factor, adjusted for productivity.
RCAF-U	Rail Cost Adjustment Factor, unadjusted for productivity.
RCP	Reinforced Concrete Pipe.
ROW	Right of Way
RSIA	Rail Safety Improvement Act of 2008
R/VC	Revenue-to-Variable Cost.
RTC	Rail Traffic Controller Model
SAC	Stand-Alone Cost.
SARR	Stand-Alone Railroad
STEO	Short-Term Energy Outlook
T&E	Train & Engine
TCS	Transportation Control System UP's computer system that supports the transportation product provided by the railroad.
TTD	Terminal Train Dispatcher.
TWC	Track Warrant Control. Authority to operate over track controlled by written orders (track warrants) and verbal communications with the dispatcher.
UP	The current Union Pacific rail system, including the former CNW and SP.
URC	Utah Railway Co.
URCS	Uniform Railroad Costing System.
USDA	United States Department of Agriculture.

CASE NAMES

AEP Texas North	*AEP Texas N Co. v. BNSF Ry*, STB Docket No. 41191 (Sub-No. 1) (STB served Sept 10, 2007)
AEPCO June 2011	*Ariz. Elec. Power Coop., Inc v BNSF Ry*, STB Docket No. 42113 (STB served June 27, 2011)
AEPCO November 2011	*Ariz Elec. Power Coop., Inc v BNSF Ry.*, STB Docket No 42113 (STB served Nov. 22, 2011)
Coal Rate Guidelines	*Coal Rate Guidelines, Nationwide*, 1 I.C.C 2d 520 (1985)
Coal Trading	*Coal Trading Corp v Balt. & Ohio R R*, 6 I.C.C.2d 361 (1990)
CP&L	*Carolina Power & Light Co v Norfolk S. Ry*, 7 S T B. 235 (2003)
Duke/CSXT	*Duke Energy Corp. v. CSX Transp Inc.*, 7 S.T B 402 (2004)
Duke/NS	*Duke Energy Corp v Norfolk S. Ry*, 7 S.T.B 89 (2003)
Duke/NS Reconsideration	*Duke Energy Corp v Norfolk S. Ry*, 7 S.T.B. 862 (2004)
FMC	*FMC Wyo Corp v. Union Pac R R*, 4 S.T B 699 (2000)
General Procedures for SAC Rate Cases	*General Procedures for Presenting Evidence in Stand-Alone Cost Rate Cases*, 5 S T.B. 441 (2001)
Major Issues	*Major Issues in Rail Rate Cases*, STB Ex Parte No. 657 (Sub-No. 1) (STB served Oct. 30, 2006)
McCarty	*McCarty Farms, Inc. v Burlington N., Inc*, 2 S.T B. 460 (1997)
Nevada Power I	*Bituminous Coal – Hiawatha, UT, to Moapa, NV*, 6 I.C.C.2d 1 (1989)
Nevada Power II	*Bituminous Coal – Hiawatha, UT, to Moapa, NV*, 10 I.C.C 2d 259 (1994)
OG&E	*Oklahoma Gas & Elec. Co v. Union Pac R R*, STB Docket No. 42111 (STB served July 24, 2009)
Otter Tail	*Otter Tail Power Co v. BNSF Ry.*, STB Docket No. 42071 (STB served Jan. 27, 2006)

PPL Montana	*PPL Montana, LLC v. Burlington N. & Santa Fe Ry*, 6 S T.B. 286 (2002)
PPL Montana Reconsideration	*PPL Montana, LLC v. Burlington N & Santa Fe RY*, 6 S T.B. 752 (2003)
PSCo/ Xcel I	*Pub Serv Co of Colo. D/B/A Xcel Energy v. Burlington N. & Santa Fe Ry*, 7 S.T.B 589 (2004)
PSCo/ Xcel II	*Pub Serv. Co. of Colo. D/B/A Xcel Energy v. Burlington N & Santa Fe Ry.*, STB Docket No 42057 (STB served Jan. 19, 2005)
RSAM Calculations 2013	*Simplified Standards for Rail Rate Cases – 2011 RSAM and R/VC $_{>180}$ Calculations*, STB Ex Parte 689 (Sub-No 4) (STB served Feb. 11, 2013)
TMPA	*Tex. Mun Power Agency v Burlington N & Santa Fe Ry.*, 6 S.T.B. 573 (2003)
TMPA Reconsideration	*Tex Mun. Power Agency v Burlington N. & Santa Fe Ry.*, 7 S.T.B. 803 (2004)
WFA I	*Western Fuels Ass'n, Inc & Basin Elec Power Coop v. BNSF Ry*, STB Docket No. 42088 (STB served Sept., 10, 2007)
WFA II	*Western Fuels Ass'n, Inc & Basin Elec. Power Coop. v BNSF Ry.*, STB Docket No 42088 (STB served Feb., 18, 2009)
WPL	*Wis Power & Light Co v Union Pac. R.R.*, 5 S.T.B 955 (2001)
WPL Reconsideration	*Wis. Power & Light Co v. Union Pac. R.R*, STB Docket No. 42051 (STB served May 14, 2002)
WTU	*West Tex Utils Co v. Burlington N R R.*, 1 S.T.B. 638 (1996)

I. COUNSEL'S ARGUMENT AND SUMMARY OF EVIDENCE

The Board must dismiss the complaint filed by Intermountain Power Agency ("IPA") because a Stand-Alone Cost ("SAC") analysis of the challenged rates shows that IPA is not entitled to any relief

A. INTRODUCTION

This proceeding is IPA's second challenge to the reasonableness of UP's common carrier rates for transporting coal in unit-train service from an interchange with Utah Railway Company ("URC") in Provo, Utah, to IPA's Intermountain Generating Station ("IGS") at Lynndyl, Utah. UP established the rates, which apply to coal moving in 286,000-pound and 263,000-pound capacity cars, in Item 6200-A of UP Tariff 4222, which became effective January 1, 2011.

IPA filed its first challenge to UP's rates on December 22, 2010. *See Intermountain Power Agency v. Union Pac. R.R*. STB Docket No. 42127 ("Docket No. 42127").[1] However, on May 2, 2012, IPA asked the Board to dismiss its complaint, recognizing that it could not show UP's rates were unreasonable.[2] IPA filed a new complaint on May 30, 2012.

What changed between May 2 and May 30? Nothing of substance But IPA apparently concluded that it could achieve a more favorable result by reconfiguring its stand-alone railroad ("SARR") to exploit weaknesses in the Average Total Cost ("ATC") method of allocating revenue from cross-over traffic to the SARR.

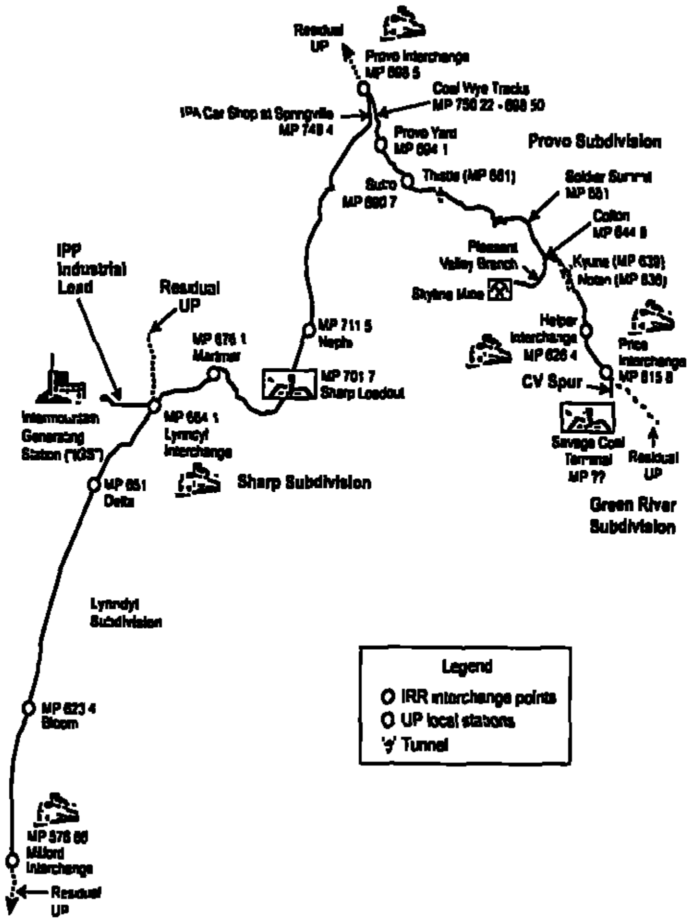
---

[1] UP's Reply workpapers include Highly Confidential versions of IPA's opening evidence and UP's reply evidence in Docket No. 42127

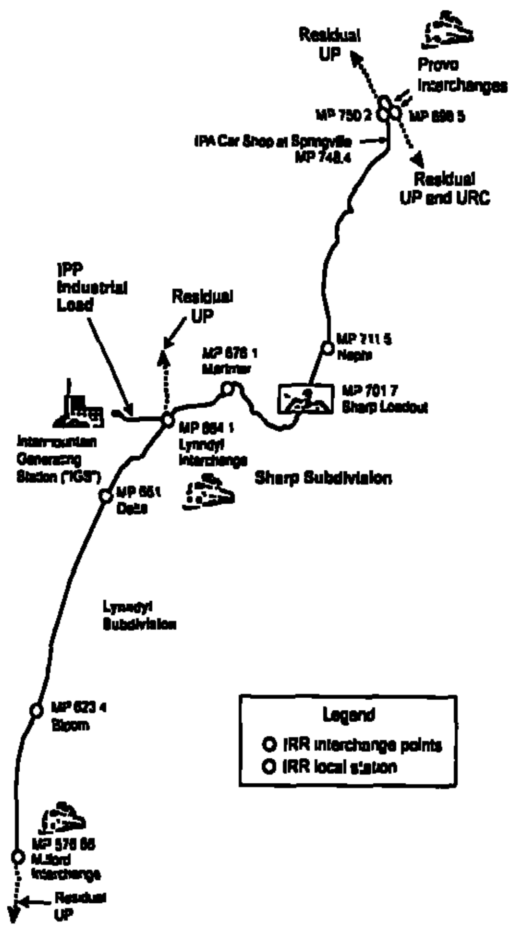
[2] IPA asked the Board to dismiss its complaint after UP filed its reply evidence in Docket No. 42127 UP's reply evidence showed that, when errors in IPA's opening evidence were corrected, SARR costs exceeded SARR revenues by a substantial margin. After reviewing UP's reply, IPA filed a petition to "supplement the record" by modifying its SARR. IPA asked the Board to dismiss its complaint shortly after the Board denied the petition. *See Intermountain Power Agency v. Union Pac R R.*, STB Docket No. 42127 (STB served Apr. 4, 2012).

Previously, in Docket No. 42127, IPA challenged not only UP's rates from Provo, but also UP's rates from two origins on UP lines east of Provo – the Skyline Mine and the Savage Coal Terminal. IPA's SARR served those two origins by replicating UP's route from Provo east to Price, Utah, where rail lines are relatively expensive to construct, operate, and maintain and there is relatively little traffic to share those costs. In its current complaint, IPA has abandoned its challenge to the Skyline and Savage rates, and its new SARR does not replicate UP's route from Provo to Price. Diagrams of the two SARRs are provided below.

Intermountain Stand-Alone Railroad ("IRR")
in Docket No 42127



Intermountain Stand-Alone Railroad ("IRR")
In Docket No. 42136



By reconfiguring the SARR, IPA was able to exploit ATC and cross-over traffic in two ways:

First, although IPA no longer accounts for the relatively high costs to construct, operate and maintain the Provo-Price segment, it continues to include traffic moving on that segment in the SARR traffic group, taking an ATC-based division of revenue for handling the traffic over the SARR. In other words, IPA uses ATC to benefit from traffic moving over the Provo-Price segment, while avoiding a SAC analysis that includes the higher costs its SARR would incur to handle that same traffic if IPA had constructed something closer to a true stand-alone railroad – that is, a SARR designed to provide origin-to-destination service for all of the traffic in the SARR traffic group.

Second, because IPA's SARR no longer includes the Provo-Price segment, the outcome of the SAC analysis is driven even more than in the first challenge by ATC-based divisions of revenue from cross-over traffic that moves over the SARR between Milford and Lynndyl. But there was no need to construct the Milford-Lynndyl segment – the issue traffic uses only a 1.55-mile piece of that 89-mile segment. In fact, most of the traffic moving over the Milford-Lynndyl segment does not share any facilities with the issue traffic. Yet, the SARR takes an ATC-based division of revenue just for bridging that traffic between interchanges with the residual UP at Milford and Lynndyl. This artificial appropriation of cross-over traffic and the accompanying revenue is an abuse of the SAC methodology

UP's evidence and argument present several alternative approaches the Board could use to remedy IPA's exploitation of ATC and cross-over traffic. The Board has correctly expressed concern with the way complainants have used ATC and cross-over traffic in rate cases. *See Rate Regulation Reforms*, STB Ex Parte No 715 (STB served July 25, 2012), *Ariz. Elec Power*

Coop., Inc. v. BNSF Ry, STB Docket No 42113 (STB served June 27. 2011). The Board has also noted that parties are on notice that issues regarding the use of ATC and cross-over traffic may be raised in individual cases.[3] In denying UP's motion to hold this proceeding in abeyance while the Board considers changes to the rules regarding ATC and cross-over traffic in *Rate Regulation Reforms*, the Board made clear that the "use and application of cross-over traffic, as well as ATC revenue allocation methodologies, are potential issues in individual rate cases, and that parties are entitled to raise and respond to substantive arguments regarding those methodologies within those proceedings." *Intermountain Power Agency v. Union Pac R R*, STB Docket No. 42136, slip op. at 4 (STB served Dec. 14, 2012). UP discusses the use of ATC and cross-over traffic below and also incorporates by reference its comments in *Rate Regulation Reforms*.[4]

UP's evidence also identifies and corrects the various errors, flawed methods, and faulty assumptions in IPA's SAC analysis Because IPA's evidence in this proceeding incorporates many of the corrections UP made to IPA's evidence in Docket No. 42127, IPA's new evidence contains fewer errors than before. However, in redesigning its hypothetical SARR, which IPA again calls the Intermountain Railroad ("IRR"), IPA repeated certain errors and developed new ways of improperly skewing the SAC analysis to inflate SARR revenues and disregard various SARR costs. The result of IPA's efforts was to substantially overstate SARR revenues and substantially understate SARR costs.

---

[3] *See, e.g.*, *Rate Regulation Reforms*, slip op. at 6 ("A continuing issue in SAC cases is how to allocate the total revenues the railroad earns from that cross-over traffic between the facilities replicated by the SARR and the residual network of the railroad needed to serve that traffic.").

[4] UP's submissions in *Rate Regulation Reforms* are included in UP's workpapers UP Reply workpapers "UP EP 715 Opening.pdf." "UP EP 715 Reply.pdf," and "UP EP 715 Rebuttal pdf."

The evidence UP presents in this filing shows that, when IPA's errors are corrected and the SAC analysis is performed based on proper SAC methods and assumptions, the challenged rates do not exceed a reasonable maximum, and thus IPA is not entitled to any relief.

UP briefly describes some of the more significant flaws in IPA's SAC evidence in Section I B. In Section I.C, UP discusses alternative approaches for addressing IPA's manipulation of ATC and cross-over traffic.

B. IPA HAS FAILED TO SHOW THAT THE CHALLENGED RATES ARE UNREASONABLE

The challenged rates govern transportation of coal over a relatively low-density route. In 2011, UP's Provo-Lynndyl line carried 17.4 million gross-tons per mile, as compared with UP's system-wide average of 33 6 million gross-tons per mile.[5] Much of the issue traffic may well stop moving in 2025 The Los Angeles Department of Water and Power, which takes 45 percent of the power generated by IGS, recently approved a resolution to modify its contract with IPA to cease taking generation from IGS's coal-fired units by 2025, so it can shift to a gas-fired supply.[6] Notwithstanding these facts, IPA asks the Board to limit the challenged rates to 221.1 percent of UP's variable costs in 2013, a figure that will drop to 180 percent by 2020. Those markups are

[5] UP Reply workpapers "2011 Tonnage Map - System pdf" (produced in discovery as UP-IPA2-00001031) and "UP 2011 Density.xls."

[6] UP Reply workpaper "LADWP News Release 3 19 2013.pdf."

Recent reports indicate that other electric generating facilities to which UP transports coal over the Provo-Lynndyl route replicated by IPA's stand-alone railroad may be shut down within the next year or two, as gas-fired capacity replaces coal-fired capacity UP Reply workpaper "NV Energy Shutdown.pdf." UP has not attempted to account for these potential future events in its reply evidence. However, if the Board were to prescribe rates for the issue traffic as a result of this proceeding, such events may quickly undermine the factual underpinnings of the prescription and require a reopening of this proceeding substantially below the average markup UP would need to charge all traffic priced at or above 180 percent of variable costs for the railroad to earn adequate revenues [7]

IPA's conclusion that SARR revenues would exceed SARR costs over the ten-year SAC period rests on pervasive errors that infect IPA's analysis. A proper SAC analysis would show that SARR costs exceed SARR revenues by at least $267 million.

1. Stand-Alone Traffic Revenues

IPA overstated stand-alone revenues by overstating the traffic volumes that would move on IRR and the revenues IRR would earn from that traffic. For example, IPA overstates SARR traffic volumes and revenues by including UP's high-priority, service-sensitive intermodal "Z trains" in the IRR traffic group. *See* Section III.A.2.c.iii. The Z trains move between Southern California and points to the east of IRR. IPA assumed IRR would serve as a bridge carrier for this highly competitive traffic, replacing UP for the Milford-Lynndyl segment of UP's route. However, IRR cannot replicate the level of service UP provides today. *See* Section III C.2.b. IPA is aware of this issue: UP raised this same issue in Docket No 42127, and IPA asserts in this case that IRR 2022 peak-week transit times for Z trains "are equivalent to or faster than the real-world cycle times for the comparable trains."[8] However, IPA's analysis ignored the dwell time associated with interchanging the Z trains from IRR to UP at Lynndyl and compares cycle times from different time periods. *See* Section III.C.2 b. When IPA's proposed IRR operations are properly analyzed, it is evident that IRR service for Z trains would be significantly inferior to the service that UP provides and UP's customers expect and receive today. Because IPA did not

[7] According to the Board's calculations, UP would need to charge an average markup of 241 percent *See Simplified Standards For Rail Rate Cases – 2011 RSAM and R/VC>180 Calculations*, STB Ex Parte No. 689 (Sub-No. 4) (STB served Feb. 11, 2013).

[8] IPA Opening Nar. at III-C-38.

show that IRR would provide "service that is.equal to (or better than) the existing service" for the Z trains[9] or that "the affected shippers, connecting carriers, and receivers would not object" to the inferior service,[10] and because UP was unable to develop an alternative operating plan that would allow IRR to provide service at least equal to the existing Z train service, *see* Section III C.2.b, UP removes the Z trains from the SARR traffic group.[11]

IPA also overstated SARR volumes and revenues by including in the IRR traffic group certain traffic that originates or terminates on UP lines replicated by the SARR, but refusing to have IRR replicate the origination/termination service that UP provides in the real world. For example, IPA assumed that the residual UP would originate traffic at Bloom, a station between Lynndyl and Milford, and move the traffic south to Milford, where UP would switch it into a through train traveling north through Lynndyl and Provo. IRR would then handle the traffic in the intact train from Milford to Provo. *See* Section III.A.2 c.iv. In essence, IPA created a new type of cross-over traffic by relying on the residual UP to move the traffic from Bloom, a point

---

[9] *Tex Mun. Power Agency v. Burlington N & Santa Fe Ry*, 6 S.T.B 573, 589 (2003); *see also Duke Energy Corp. v. CSX Transp., Inc*, 7 S.T.B. 402, 414 (2004) ("[The operating] plan must be capable of providing, at a minimum, the level of service to which the shippers in the traffic group are accustomed."). As discussed in Section III.C.2 b below, if service levels cannot be maintained, this business will shift to truck or to BNSF Railway

[10] *Duke/CSXT*, 7 S T B. at 427 (citing *McCarty Farms, Inc v Burlington N., Inc*, 2 S.T.B 460, 476 (1997), *FMC Wyo. Corp v. Union Pac R R.*, 4 S.T.B. 699, 736 (2000)).

[11] Removal of the Z trains from the SARR traffic group is an appropriate step. *See TMPA*, 6 S.T.B. at 589 ("[T]he traffic group selected by the complainant is open to challenge "); *Coal Rate Guidelines – Nationwide*, 1 I.C.C 2d 520, 544 (1985) ("[T]he potential traffic draw and attendant costs and revenues that the hypothetical stand-alone provider could expect are open to scrutiny in individual cases The proponent of a particular stand-alone model must identify, and be prepared to defend, the assumptions and selections it has made "); *see also Duke Energy Corp. v Norfolk S. Ry.*, 7 S.T.B. 89, 100-101 (2003) ("[W]here on reply the railroad both (a) demonstrates that what the shipper presented is infeasible and/or unsupported and (b) offers feasible, realistic alternative evidence that avoids the infirmities in the shipper's evidence and that is itself supported. the Board will use the reply evidence for its SAC analysis.").

already on the SARR, to Milford.[12] The Board has justified the use of cross-over traffic as a shortcut that allows a complainant to avoid the burden and complication of extending its SARR to serve the origination and destination of cross-over traffic.[13] However. IPA's SARR already replicates the lines on which the traffic originates or terminates, so IPA had no justification for refusing to have IRR provide the origination/termination service.[14] IPA also gamed the system by inventing a formula to compensate UP for originating or terminating the traffic that provides IRR with an unduly large division of revenue for the limited service that IPA does provide for this traffic – an even larger division than IRR would obtain from applying ATC. *See* Section III.A.3.c. IPA did not show how IRR would provide all the service needed to handle this traffic on lines replicated by the SARR. To the contrary. IPA explicitly excluded similar origination/ termination service from its SARR operating plan.[15] Accordingly, UP concluded that the most feasible, realistic way to avoid the infirmity in IPA's evidence was to remove this traffic from the SARR traffic group.[16]

---

[12] Traffic originated at Bloom accounts for 53 percent of this "on-SARR UP-originated/ terminated traffic" that is discussed in Section III.A 2.c.iv.

[13] *See, e g., Rate Regulation Reforms*, slip op. at 7; *Pub. Serv Co. of Colo D/B/A Xcel Energy v. Burlington N & Santa Fe Ry.*, 7 S.T.B. 589, 603 (2004) (explaining that the use of cross-over traffic "provides a reasonable measure of simplification that allows SAC presentations to be more manageable" by "[c]urtailing the geographic scope of the SARR")

[14] IPA's approach flouts the Board's proposal in *Rate Regulation Reforms* to restrict the use of cross-over traffic "to movements for which the SARR would either originate or terminate the rail portion of the movement " *Rate Regulation Reforms*, slip op. at 16-17. IPA would not even need to extend its SARR to serve the origin or destination of the traffic at issue; IPA simply seeks to avoid providing the origination/termination service.

[15] IPA Opening Nar. at I-13 to I-15; *id.* at III-A-6 & n. 5; *id* at III-C-3 to III-C-4 & n 2.

[16] *See TMPA*, 6 S T.B. at 589; *Coal Rate Guidelines*, 1 I.C.C 2d at 544; *see also Duke/CSXT*, 7 S.T B at 430 (explaining that defendant railroad should present a realistic alternative when the complainant's operating plan is infeasible); *Duke/NS*, 7 S.T.B. at 100-01 (same). In this case, IPA offered no operating plan for originating or terminating traffic using local trains and claims efficiencies from operating almost entirely as a bridge carrier IPA Opening Nar. at I-14 to I-15 A defendant is not obligated to provide its own evidence regarding service that a complainant (continued..)

As part of its primary evidentiary submission,[17] UP also adjusts IPA's ATC calculations to mitigate the disconnect between IPA's assumptions used to calculate variable costs for the on-SARR portion of certain movements and IPA's handling of those movements under the SARR operating plan. Specifically, IPA calculated the on-SARR variable costs of all non-coal traffic as though the traffic would move in carload or multi-car service, but IPA's operating plan assumes that 99 percent of that traffic will move over the SARR as if it were in unit trains. The Board recognized this type of disconnect in the *AEPCO* case[18] and proposed two possible ways to address the disconnect in *Rate Regulation Reforms*.[19] As discussed in Section I.C below, the adjustment UP proposes here is the most limited change to the Board's current approach to ATC and cross-over traffic that the Board could adopt while still doing something to mitigate the disconnect it acknowledged in *Rate Regulation Reforms*.

2. <u>Stand-Alone Costs</u>

IPA understated SARR costs by understating certain SARR operating expenses and road property investment costs. For example, IPA understated the number of locomotives IRR will require for the traffic IPA selected, in several respects. Among other things, IPA calculated its

---

chooses not to provide. The most realistic alternative to IPA's infeasible operating plan is to exclude the traffic from the SARR traffic group

UP accepts IPA's decision not to provide local service for this traffic. But if the Board does not agree that this new type of cross-over traffic should be removed from the SARR traffic group, UP's evidence also includes an alternative, ATC-based calculation of more appropriate SARR revenues from this traffic *See* Section III A.3.c.

[17] As noted above and discussed in Section I B below, UP's workpapers contain alternative calculations reflecting several possible approaches the Board might take to address IPA's manipulation of ATC and cross-over traffic.

[18] *See Ariz. Elec Power Coop., Inc. v. BNSF Ry.*, STB Docket No. 42113, slip op. at 35 (STB served Nov. 22, 2011) (noting that "while a majority of AEPCO's traffic group moves in trainload service, most of the variable costs calculated for that group were costed assuming it moved in carload and multi-car service")

[19] *Rate Regulation Reforms*, slip op. at 16-17.

locomotive requirements based on understated running and dwell times, failed to account for its need for dedicated consists to power certain coal trains (including coal trains carrying the issue traffic), and ignored IRR's responsibility for a share of the cost of repositioning locomotives to address the imbalance in train and locomotive flows over the IRR lines. *See* Section III.C 1.c ii.

IPA also understated SARR costs to inspect and fuel coal trains, in several respects. IPA failed to provide for inspection and fueling of loaded and empty coal trains moving to and from Colorado origins and loaded trains originating in Utah and traveling to Southern California or Arizona. IPA improperly assumed IRR will provide no inspection personnel or facilities and instead will use IPA's Springville car facility. And, IPA improperly assumed UP would move over IRR tracks to the Springville car facility to pick up empty trains. *See* Section III C.2.c.vii.

In addition, IPA substantially understates the fuel expense that IRR would incur. IPA used UP fuel consumption records to estimate the amount of fuel that IRR locomotives would consume, but IPA also assumes that IRR will operate at higher speeds than UP trains (so it can claim the benefit of lower transit times) and will not follow UP's fuel conservation measures. IPA cannot have it both ways *See* Section III.D.1.d. IPA also understated IRR salaries by failing to provide commensurately higher wages to train and engine crews who work a very high number of shifts *See* Section III.D.2.a ii And, IPA understated fringe benefits that IRR would have to pay by relying upon outdated evidence regarding an appropriate fringe-benefit ratio. *See id* UP's evidence accounts for these costs.

Finally, IPA understated IRR's road property costs. Among its many errors, IPA used artificially low earthwork costs from an unrelated UP capacity expansion project in Wyoming. *See* Section III.F 2. IPA also significantly understated the material and transportation costs for rail by using unrealistic and outdated prices. *See* Section III.F.3. As another example, IPA erroneously asserted that various bridges can be replaced with culverts while also incorrectly assuming that a single bridge design with a relatively short span length could accommodate the range of bridge span lengths along the IRR route. *See* Section III.F.5. IPA's signal system ignored many essential pieces of equipment and was based on a design that did not correspond with the proposed track configuration. *See* Section III.F 6. Further, IPA based its structural costs for the locomotive facility on faulty specifications that fall far short of the standards needed to operate such a facility efficiently. *See* Section III.F.7 UP's road property evidence accounts for all of the costs that would be incurred to construct the SARR

3. Application of the DCF Model and Maximum Markup Methodology

IPA incorrectly claimed that its application of the DCF methodology was consistent with Board precedent. In fact, its DCF analysis departs from Board precedent in several ways

For example, IPA proposed to change the Board's long-standing practice of amortizing SARR debt over 20 years. IPA proposes to finance IRR with a single note with a 20-year term. But, at the same time, IPA assumes that IRR's cost of debt would reflect the railroad industry's average cost of debt. Because the industry's average cost of debt reflects instruments with both relatively short intervals to maturity (and correspondingly low yields) and relatively longer intervals to maturity (and correspondingly higher yields), IPA's paring of a 20-year term and the industry's average cost of debt is untenable. If IRR were financed as IPA suggests, IPA could not use the railroad industry's average cost of debt but would need to use an interest rate that reflected the long-term nature of the financing. *See* Section H.1.d.

As another example, IPA ignored the Board's June 27, 2011, decision in the AEPCO case regarding variable cost calculations used in the Maximum Markup Methodology ("MMM"). In *AEPCO June 2011*, the Board ordered the parties to revise their variable cost calculations for carload and multi-car shipments to account for the low-cost characteristics the complainant had posited for those movements over the portion of the through movement the SARR replicated.[20] As discussed above, IPA, like the complainant in *AEPCO,* designed its SARR so that carload and multi-car shipments would move in intact trainloads over the portion of the through movement replicated by the SARR UP's MMM calculations reflect the Board's order in *AEPCO June 2011*. *See* Section III.II.2.

As a final example of IPA's departures from precedent, IPA's DCF analysis omitted any test for cross-subsidies, despite IPA's conclusion that SARR revenues that exceed SARR costs. UP's evidence shows that SARR costs exceed SARR revenues, and thus there is no need for a cross-subsidy test. However, if the Board were to conclude (contrary to UP's evidence) that SARR revenues exceed SARR costs, it should not award IPA any relief before examining the Milford-Lynndyl segment for cross subsidies. The prospect that this segment will generate an impermissible cross-subsidy is heightened by the fact that a substantial amount of the traffic that IPA selected for the IRR traffic group – traffic that IRR bridges between Milford and Lynndyl – moves over the IRR system using only that segment and does not share any facilities with the issue traffic.

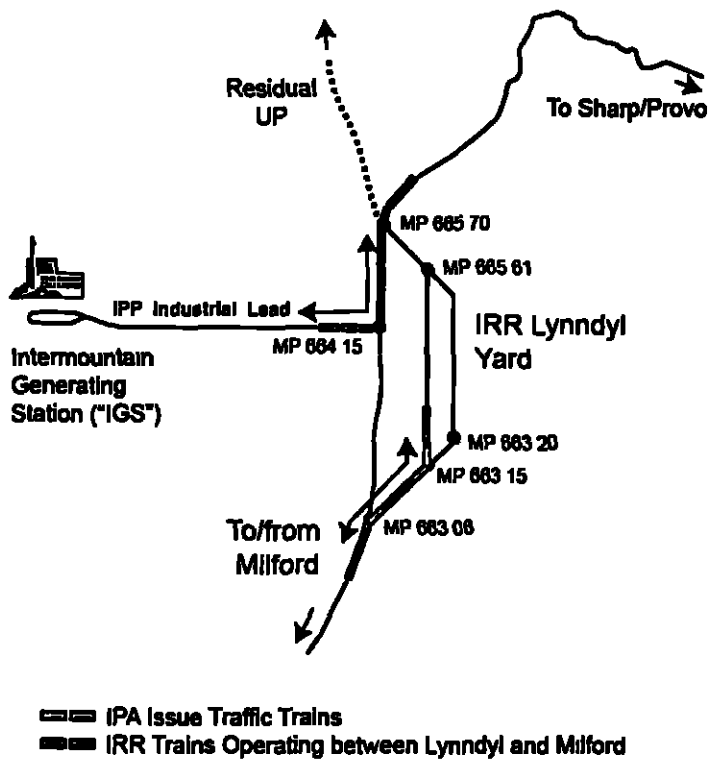
IPA implies that the cross-subsidy test cannot be applied to the Milford-Lynndyl segment because IPA designed the SARR so the issue traffic moves 1 55 miles south of Lynndyl to reach the IPP Industrial Lead.[21] However, as shown in the diagram below, the traffic that IRR bridges between Milford and Lynndyl never actually shares the 1.55 miles of track with the issue traffic. Rather, as shown in the diagram below, northbound bridged traffic moves into IRR's Lynndyl Yard, south of the point where the IPP Industrial Lead branches off the main line, for the

---

[20] *Ariz Elec Power Coop., Inc. v. BNSF Ry*, Docket No. 42113, slip op. at 2 (STB served June 27, 2011) ("*AEPCO June 2011*").

[21] IPA Opening Nar. at I-20.

interchange and crew change between IRR and the residual UP. The traffic then moves on the residual UP north of Lynndyl. Southbound bridged traffic does the same thing (in reverse).[22]



In any event, the Board would be rewarding gaming if it allowed complainants to avoid application of the cross-subsidy test by creating such a *de minimis* sharing of facilities.[23]

UP's evidence includes two variations on a cross-subsidy test First, UP illustrates the application of the *PPL Montana/Otter Tail* cross-subsidy test – a test the Board developed when

[22] This diagram is based on IPA's proposed IRR configuration and operations, which UP simulated with the Rail Traffic Controller Model. UP Reply workpaper "UP Reply RTC Case.zip

[23] IPA's SARR is being credited with $28 million in 2013 revenues from this traffic that, according to IPA, shares 1 55 miles of track with the issue traffic, and avoiding the application of the cross-subsidy test based on that 1.55 miles would remove the teeth from the rule that complainants cannot create cross-subsidies to benefit the SARR. *See PPL Mont*. *LLC v. Burlington N & Santa Fe Ry.*, 6 S.T.B. 286, 294 (2002) ("[Complainant's] contention that non-issue may be used to cross-subsidize the complaining shipper's rate is inconsistent with CMP principles.").

cross-over revenues were being allocated using a mileage-based prorate.[24] Second, UP illustrates the application of an alternate cross-subsidy test that is more appropriate in light of the Board's adoption of ATC

The *PPL Montana/Otter Tail* cross-subsidy test The *PPL Montana/Otter Tail* cross-subsidy test attempts to ensure that any rate reduction produced by applying MMM to IRR, including the substantial amount of traffic that IRR handles only as a bridge carrier between Milford and Lynndyl – does not reduce any prescribed rates to levels that would be insufficient to cover the costs of the Provo-Lynndyl portion of the SARR.[25] UP's evidence shows that, even accepting IPA's opening evidence regarding SARR revenues and costs, eliminating the cross-subsidization of the issue traffic by traffic using only the SARR's Milford-Lynndyl segment would leave prescribed maximum revenue-to-variable cost ratios more than 35.5 points higher than the ratios IPA calculated by the last year of the SAC analysis period. Thus, even if the Board accepted all of IPA's opening revenue and cost evidence, it could not prescribe the maximum rates calculated by IPA *See* Section III H.2

ATC-based cross-subsidy test. The Board's adoption of ATC provides the Board with a more direct means of testing for the presence of cross-subsidy than was possible when it adopted the *PPL Montana/Otter Tail* test, at least if the Board believes ATC accurately assigns revenue to line segments: the Board should determine whether the Provo-Lynndyl segment would be self-supporting based on the revenues allocated to that segment by ATC.

---

[24] *See Otter Tail Power Co. v BNSF Ry.*, STB Docket No 42071 (STB served Jan 27, 2006) ("*Otter Tail*"); *PPL Montana*, 6 S.T B. 286.

[25] *See Otter Tail*, slip op. at 11 ("[O]ur *PPL* cross-subsidy analysis serves as both a threshold inquiry and a limit on potential rate relief.")

Under the *PPL Montana/Otter Tail* test, the Board asks whether a SARR's core facilities (*i.e* . the facilities used by the issue traffic) rely on revenues from traffic that uses only the SARR's secondary facilities (*i.e.*, the facilities not used by the SARR traffic). In performing that analysis, the Board assigns all the contribution above SARR operating expenses from cross-over traffic that uses both core and secondary facilities to the core facilities, and it asks whether the contribution would be sufficient to cover the collective attributable costs of constructing the core facilities [26] The Board's assignment of all cross-over contribution to the core facilities arguably was justified at that time. The Board's then-existing method of allocating cross-over revenue between various portions of a movement – a modified mileage prorate – was not sensitive to the amount of traffic available to share the fixed costs of a particular segment. Thus, the Board's then-existing method could not reliably be used to allocate revenues in concert with attributable stand-alone costs for a particular segment. But ATC was adopted to address that very issue.[27] Indeed, in *Rate Regulation Reforms*, the Board reiterated the points that cross-over revenues should be allocated in accordance with the stand-alone costs for the facilities replicated by a SARR[28] and that it adopted ATC as the best method of performing that allocation short of

---

[26] *PPL Montana*, 6 S.T B. at 296

[27] *See Major Issues In Rail Rate Cases*, STB Ex Parte No. 657 (Sub-No. 1), slip op. at 24-36 (STB served Oct. 30, 2006) ("*Major Issues*")

[28] *See Rate Regulation Reforms*, slip op. at 6-7 ("Thus, to distribute revenues equitably in relation to the cost incurred to generate those revenues, the portion of the revenue allocated to those facilities replicated by the SARR ideally equals the total revenue from that movement, multiplied by the share of total SAC costs represented by the cross-over segments of the movement (i.e., multiplied by the ratio of the truncated SAC costs for the cross-over traffic to the Full-SAC costs for the cross-over traffic) ").

requiring a "Full-SAC" analysis.[29] Accordingly, ATC's allocation of revenues between SARR core and secondary facilities should be used when conducting a cross-subsidy analysis.

UP's evidence illustrates that, even accepting IPA's opening evidence regarding SARR revenues and costs, when a cross-subsidy test is performed using ATC-based revenue divisions, the Provo-Lynndyl segment of the SARR does not earn sufficient revenues to cover its attributable costs. *See* Section III.H.3.

C. THE BOARD SHOULD REJECT IPA'S INAPPROPRIATE EXPLOITATION OF ATC AND CROSS-OVER TRAFFIC

This case demonstrates the need to reform the rules governing use of cross-over traffic in rate cases. As discussed above, the most substantial difference between IPA's SAC analysis in Docket No. 42127 and in this case is that IPA restructured its SARR to place even greater weight on cross-over revenues and less weight on the costs to construct, operate, and maintain a "true" stand-alone railroad – that is, a SARR designed to provide origin-to-destination service for all the traffic in the SARR traffic group. In other words, IPA turned a SAC case that was a clear loser into one that is purportedly a closer call by building even less of a railroad that could truly stand alone Comparing the evidence in Docket No. 42127 to the evidence in this case provides compelling support for the conclusion that the use of cross-over traffic and ATC is a form of manipulation that produces results that fail to approximate the outcome of a SAC analysis performed on a true stand-alone railroad.

UP previously expressed concerns that complainants can use cross-over traffic and ATC to bias the outcome in SAC cases. In comments submitted in *Rate Regulation Reforms*, UP explained that the basic problem with using cross-over traffic is that there is no economically

[29] *See id* at 7 (explaining that the Board adopted ATC because requiring a "Full-SAC" analysis "would defeat the simplifying purpose of using cross-over traffic in the first place").

valid way to allocate cross-over revenue between the incumbent and the SARR, and that even the use of a facially neutral allocation method such as ATC can introduce bias when applied. UP further explained that, in relying on ATC as an "unbiased" method of revenue allocation, the Board overlooked complainants' ability to manipulate the revenue allocation results through their manipulation of the SARR design and traffic selection process. The end result is that complainants posit SARRs designed to ensure that the SARR is allocated revenues that are disproportionately large in relation to the actual costs of serving the SARR traffic group

This case provides an unusually clear illustration of such manipulation and its effects in relation to the results of a true SAC analysis. The Board has previously seen other examples of one element of IPA's manipulation – extension of the SARR from Lynndyl to Milford to capture (i) additional revenue from traffic that shares facilities with the issue traffic between Provo and Lynndyl and (ii) revenue from a large volume of traffic that does not share any facilities with the issue traffic [30] IPA's intent to manipulate is clear: if ATC accurately assigns cross-over revenue to the SARR, then IPA has no reason to extend the SARR to obtain an appropriate allocation of revenue from cross-over traffic that shares facilities with the issue traffic. But IPA's decision to construct the Lynndyl-Milford segment moves the SARR marginally closer to a true stand-alone

[30] *See Otter Tail*, slip op. at 8-11 The Board has said that such an extension of the SARR is permissible because traffic that uses only the extension shares those facilities with cross-over traffic that shares the core facilities with the issue traffic. According to the Board, the sharing among the non-issue traffic allows the traffic sharing facilities with the issue traffic to bear more of the core facilities' capital costs, "which will ultimately lower the rate the SARR would need to charge the captive shipper to earn a reasonable return on the core facilities" *Id.* at 10 But *Otter Tail* was decided *before* the Board adopted ATC, and the explanation it offers makes no sense if ATC is a valid method of allocating revenue among line segments in accordance with the SAC costs for the facilities being replicated: if ATC accurately assigns revenue to line segments in accordance with relative SAC costs, then the traffic sharing facilities with the issue traffic should be bearing the correct portion of the core facilities' capital costs by virtue of the application of ATC. That is, when ATC is properly used to allocate revenue from cross-over traffic, there should be no reason to consider potential revenue sharing from traffic that shares no facilities with the issue traffic. UP's new proposed test for cross-subsidies reflects this logic.

railroad, so it is difficult to criticize in the abstract – i e., without showing SAC results would be less favorable to IPA if IPA constructed even more of a true stand-alone railroad. What makes this case unusual is that, together with the record in Docket No. 42127, it provides the missing link. IPA achieved a more favorable outcome by not constructing the Provo-Price segment that was part of its SARR in Docket No. 42127, while retaining an ATC-based share of revenue from cross-over traffic that depends on that segment – that is, the record demonstrates that IPA would have obtained less favorable results by constructing more of a true stand-alone railroad. For example, the Provo-Price segment of IPA's SARR in Docket No. 42127 represented approximately 31 percent of that system's route miles, but because of the difficult terrain traversed, over 55 percent of the investment costs [31] However, traffic on the SARR that utilized both the Provo-Price segment and the Provo-Milford segments received an ATC allocation of only 42 percent for the more costly Provo-Price segment [32] In the current iteration of the IRR, IPA has effectively cut its SARR investment by more than half, yet it is being rewarded by ATC with 58 percent (100 percent - 42 percent for the Provo to Price segment) of the revenue for crossover traffic that uses both the Provo-Price and Provo-Milford segments This in itself shows how complainants can skew the use of ATC and cross-over traffic to their advantage.

Presumably, IPA hopes the Board will ignore the SAC evidence it presented in Docket No 42127 and its decision to make the SARR in this case less of a true stand-alone railroad than it proposed in the earlier proceeding In defending the idea that complainants should have an unlimited ability to use cross-over traffic, IPA explains its basic concern. it might lose this case

[31] UP Reply workpaper "IPA 1 Breakdown of Investment By Segment.xlsx."

[32] UP Reply workpaper "IRR Breakdown of ATC by Segment xlsx." This was not critical in Docket No. 42127 because the implied under-allocation of revenue to the more costly segment was overshadowed by the fact that overall SARR costs exceeded SARR revenues for that version of the IRR.

if it were required to construct a true stand-alone railroad because the lines it elected not to construct would be expensive to construct, operate and maintain.

> Moreover, given the substantial uncertainty associated with constructing a vastly larger stand-alone system. the end result of such an analysis could well be an inability to demonstrate that the challenged rates are excessive (*e.g.*, some impediment to cost-effective SARR construction or operation of such a large system could exist well beyond the scope of the current IRR system) [33]

But the possibility a shipper "could well be [unable] to demonstrate that the challenged rates are excessive" using a true SAC analysis is the reason to *require* that analysis, not a reason to allow the use of cross-over traffic and ATC. And, there is no need to speculate about the possibility of "some impediment to cost effective SARR construction or operation" that exists "beyond the scope of the current IRR system" – the evidence the parties submitted in Docket No 42127 shows that IPA could not prevail if it were required to construct the Provo-Price segment used by a significant amount of cross-over traffic in the IRR traffic group.

In *Rate Regulation Reforms*, the Board acknowledged a feature of ATC that facilitates shipper manipulation of cross-over traffic in rate cases: there is often a disconnect between the hypothetical cost of providing service to carload and multi-carload cross-over traffic over the line segments replicated by a SARR and the revenue ATC allocates to those facilities. *See Rate Regulation Reforms*, slip op at 16. As the Board explained, "[w]hen the proposed SARR includes cross-over traffic of carload and multi-carload traffic, it generally would handle the traffic for only a few hundred miles *after* the traffic would be combined into a single train." *Id.* The SARR's cost to "simply hook up locomotives to the train" and "haul it a few hundred miles without breaking the train apart," then "deliver the train back to the residual defendant" is "very

---

[33] IPA Opening Nar at I-17.

low" compared with the residual defendant's "costs of originating, terminating, and gathering the single cars into a single train heading in the same direction." *Id* However, "when it comes time to allocate revenue to the facilities replicated by the SARR, URCS treats those movements as single-car or multi-car movements, rather than the more efficient, lower cost trainload movements that they would be." *Id* As a result, the SAC analysis allocates "more revenue to the facilities replicated by the SARR than is warranted." *Id*

The disconnect that the Board recognized in *Rate Regulation Reforms* is not the only feature of ATC that allows shippers to use cross-over traffic to manipulate SAC results, but it plainly had an impact on IPA's SAC analysis. IPA acknowledges that almost all of the cross-over carload and multi-carload traffic moving on its SARR is transported intact, with no classification or switching activities performed by the SARR:

> With the exception of a relatively small volume of general freight traffic that the IRR originates or terminates on its own system (and interlines with UP), the IRR's non-coal traffic consists entirely of overhead movements. Trains moving overhead on the IRR system are transported intact, with no classification or switching activities performed by the IRR at the interchange points except for the occasional switching of bad-order/repaired cars and the occasional pick-up or delivery of cars at intermediate points served by the IRR.[34]

More specifically, according to IRR's opening evidence, of the approximately 385,000 non-coal shipments IRR handles in the base year, which provide more than nearly 50 percent of IRR revenue, more than 374,000 are carload shipments that IRR would receive from UP in trainloads

[34] IPA Opening Nar. at I-14 to I-15. Indeed, IPA uses the limited service provided by IRR to justify its low operating costs. As discussed above, IPA even goes so far as to fail to provide for local service for traffic originating and terminating on the SARR, while attempting to claim a share of revenue for the linehaul movement of that traffic on the SARR.

at one end of the SARR and transport intact in overhead movements for delivery to UP at the other end of the SARR.[35]

As noted above, UP's evidence provides one way to mitigate the disconnect the Board recognized in *Rate Regulation Reforms* UP adjusts IPA's ATC calculations of the on-SARR variable costs of non-coal carload and multi-carload traffic to reflect the URCS costs of handling the traffic in trainload service. This means that when revenues are allocated to facilities replicated by the SARR, the allocations for this traffic reflect what the Board correctly described as "the more efficient, lower cost trainload movements" IPA assumes for the SARR. *Rate Regulation Reforms*, slip op. at 16.

UP recognizes that the Board is reluctant to accept adjustments to URCS costing, but in this situation, the Board has recognized that use of unadjusted URCS creates a "disconnect." Moreover, the Board's previously expressed concerns about allowing adjustments to URCS do not apply here:

- *First*, the adjustment is not "complex, expensive, and time consuming."[36] Instead, it involves a straightforward adjustment to reflect the number of cars in the trains that IRR moves as intact trainloads.
- *Second*, there is no risk that the adjustment will produce less accurate results than use of unadjusted URCS because of "piecemeal or incomplete adjustments."[37] Under UP's approach, the total variable costs of the affected movements do not change. Instead, the difference between costing the on-SARR portion of the movement as

[35] UP Reply workpaper "IRR Revenue Traffic Class and Freight Payer xlsx."

[36] *Major Issues*, slip op. at 50.

[37] *Id* at 51

carload versus trainload traffic is simply assigned to the off-SARR portion of the movement, where the more costly service is provided

- *Third,* there is no risk shippers will be disadvantaged because railroads "do not consistently keep certain types of information that shippers have relied on for favorable movement-specific adjustments."[38] UP's proposal involves a single, straightforward adjustment to respond to an issue identified by the Board, and the necessary information is equally available to railroads and shippers.

In fact, the Board has recognized that the adjustment UP proposes here is relatively simple and straightforward to perform: the Board required the shipper in the *AEPCO* case to make a similar adjustment to URCS variable costs used in the MMM calculations.[39] In addition, although the Board's proposals in *Rate Regulation Reforms* for addressing the disconnect (which are discussed next) are well-justified, other participants in that proceeding, including broad coalitions of chemical companies and coal shippers, suggested that adjustments to URCS would be a more straightforward response to the Board's concern about a costing disconnect.[40]

---

[38] *Id.* at 52. This adjustment also would not create a bias in favor of railroads, because it would potentially benefit complainants in rate cases to the extent they design SARRs that take responsibility for the costs of providing carload and multi-carload service.

[39] *AEPCO June 2011*, slip op at 2 (ordering AEPCO "to submit revised variable cost calculations, reflecting actual operating characteristics of the movements on the SARR, for the traffic group submitted on rebuttal" because "most of AEPCO's traffic group moves in trainload service, but most of the variable costs calculated for that group are costed assuming it is moved in carload and multi-car service").

[40] *See* Joint Opening Comments of The American Chemistry Council, The Fertilizer Institute, The National Industrial Transportation League, Arkema, Inc., The Dow Chemical Company, Olin Corporation, and Westlake Chemical Corporation at 12-13, *Rate Regulation Reforms*, STB Ex Parte No. 715 (Oct. 23, 2012); Opening Submission of Western Coal Traffic League, Concerned Captive Coal Shippers, American Public Power Association, Edison Electric Institute, National Rural Electric Cooperative Association, Western Fuels Association, Inc , and Basin Electric Power Cooperative, Inc. at 17-22, *Rate Regulation Reforms*, STB Ex Parte No. 715 at (Oct. 23. 2012).

UP's evidence includes workpapers that reflect other possible methods of addressing IPA's manipulation of ATC and cross-over traffic. These other methods include implementing the Board's proposal in *Rate Regulation Reforms* to restrict the use of cross-over traffic to movements (i) for which the SARR would either originate or terminate the rail portion of the movement, or (ii) where the entire service provided by the defendant railroad in the real world is trainload service.[41] Although it filed its opening evidence nearly five months after the Board advanced these proposals, IPA did not explain how it would have designed its SARR to incorporate those restrictions. UP provides SAC analyses that incorporate each of the proposed restrictions. UP's evidence shows that IPA would not prevail if its SARR were required to abide by either restriction the Board proposed in *Rate Regulation Reforms*.[42]

UP's evidence also includes workpapers that show the results of a SAC analysis performed using no cross-over traffic at all. This approach is consistent with UP's view, expressed in *Rate Regulation Reforms*, that the Board should entirely prohibit the use of cross-over traffic in SAC cases. As explained in *Rate Regulation Reforms*, UP supports the Board's effort to mitigate some of the issues associated with the use of ATC and cross-over traffic by focusing on the disconnect between SARR costs and ATC revenue allocations. However, UP believes the use of cross-over traffic has taken the SAC test far off course, and by complicating analyses, it contributes to the costs and delay associated with rate cases. As demonstrated in this case and others, including *AEPCO*. under the SAC test as currently applied, the reasonableness of a challenged rate will often depend on a shipper's ability to game ATC and cross-over traffic. If the Board continues to allow the use of cross-over traffic, it should adopt one of its proposals

[41] *See Rate Regulation Reforms*, slip op. at 16-17.

[42] UP Reply workpapers "Exhibit III-H-1 Reply EP 715 Prop 1 xlsm" and "Exhibit III-H-1 Reply EP 715 Prop 2.xlsm."

in *Rate Regulation Reforms* or at least correct the costing disconnect inherent in ATC. But a better solution would be a return to SAC first principles: complainants should be required to construct SARRs that truly stand alone. As UP's evidence shows, IPA would not prevail if it could not use large volumes of cross-over traffic.[43]

Finally, UP's evidence includes workpapers that show the results of a SAC analysis that uses efficient component pricing ("ECP") rather than ATC to allocate cross-over revenue. Under ECP, for each cross-over movement, the SARR is allocated revenue equal to the URCS variable costs of providing service over the on-SARR portion of the movement. UP's arguments for ECP are set forth in detail in UP's comments in *Rate Regulation Reforms*, included in UP's workpapers. In summary, the key practical advantages over ATC are (i) ECP is less susceptible to manipulation by complainants and not subject to manipulation by defendants, and (ii) ECP focuses the SAC analysis on the economics of the issue traffic because the revenues from the issue traffic play a larger role in the SAC analysis than revenue from cross-over traffic. UP's evidence shows that IPA would not prevail if ECP were used to allocate cross-over revenue.[44]

[43] UP Reply workpaper "Exhibit III-H-1 Reply No Crossover.xlsm."

[44] UP Reply workpaper "Exhibit III-H-1 Reply.xlsm."

D. CONCLUSION

For the foregoing reasons, the Board should dismiss IPA's claim that UP's rates in Item 6200-A of UP Tariff 4222 for transporting coal to IGS from an interchange with URC in Provo exceed maximum reasonable levels.

Respectfully submitted,

GAYLA L. THAL
LOUISE A RINN
DANIELLE E. BODE
Union Pacific Railroad Company
1400 Douglas Street, Stop 1580
Omaha, NE 68179
(402) 544-3309

MICHAEL L. ROSENTHAL
CAROLYN F CORWIN
EDWARD H RIPPEY
MAUREEN M. JAPHA
MATTHEW J. CONNOLLY
SPENCER F. WALTERS
Covington & Burling LLP
1201 Pennsylvania Avenue, N.W
Washington, DC 20004
(202) 662-6000

Attorneys for Union Pacific Railroad Company

April 12, 2013

CERTIFICATE OF SERVICE

I hereby certify that on this 12th day of April, 2013, I have caused both Highly Confidential and Public versions of the Reply Evidence and Argument of Defendant Union Pacific Railroad Company to be served by hand delivery upon.

C. Michael Loftus
Christopher A. Mills
Andrew B. Kolesar III
Daniel M. Jaffe
Stephanie M. Archuleta
SLOVER & LOFTUS LLP
1224 Seventeenth Street, N.W
Washington, D.C 20036

Spencer F. Walters

II. MARKET DOMINANCE

A. QUANTITATIVE EVIDENCE

UP agrees with the traffic and operating characteristics for the movements to which the challenged rates apply that are listed in IPA's Table II-A-1.

UP agrees with IPA's calculations of variable costs and R/VC ratios for the movements to which the challenged rates apply, as set forth in IPA's Table II-A-2.

B. QUALITATIVE EVIDENCE

For purposes of its reply evidence, UP does not dispute that it has market dominance over the transportation to which the challenged rates apply. As IPA recognized, UP had admitted in discovery that it could not prevail on this issue[1]

[1] IPA Opening Nar. at II-6

III. STAND-ALONE COST

A. TRAFFIC GROUP

IPA challenges the reasonableness of two UP common carrier rates for transporting unit-train movements of coal to IPA's Intermountain Generating Station ("IGS") at Lynndyl, Utah. The challenged rates apply to UP service to IGS from a point of interchange with the Utah Railway Company ("URC") in Provo, Utah. One rate applies to coal moving in 286,000-pound capacity cars; the other applies to coal moving in 263,000-pound capacity cars [1]

IPA constructed a hypothetical stand-alone railroad ("SARR"), called the Intermountain Railroad ("IRR"), which consists of two parts The first part of the SARR replicates UP's route from Provo to IGS at Lynndyl. This part includes all the core facilities needed to serve the issue traffic. The second part of the SARR extends southwest from Lynndyl to Milford, Utah. This part does not carry any issue traffic. A diagram of the IRR's system is provided in UP Reply Exhibit III.A-1. The SARR's configuration eliminates the Provo-Price segment that IPA included in its SARR in Docket No. 42127.

In many instances, IPA's evidence takes account of UP's criticisms of IPA's volume and revenue evidence in Docket No. 42127 and adopts UP's proposed methodologies for calculating SARR volumes and revenues. Accordingly, UP has fewer disagreements with IPA's methods of calculating volumes and revenues in this proceeding than in Docket No 42127. Nonetheless, UP identifies and corrects several significant errors committed by IPA and updates certain indices and forecasts used by IPA to account for more recent data.

---

[1] In addition, UP offers common carrier rates for service to IGS that cover coal originating at the Skyline Mine, the Savage Coal Terminal, and the Sharp Loadout. In this case, traffic moving under these common carrier rates is non-issue traffic. The Skyline and Savage rates were included in IPA's complaint in Docket No. 42127, but they are not included in IPA's complaint in Docket No. 42136 The rates from Sharp were not included in either complaint.

UP removes two categories of traffic from IPA's SARR:

(1) As explained in Section III.A.2.c.iii below, UP removes high-priority, service-sensitive intermodal "Z trains," because IPA's operating plan impermissibly provides a lower level of service for that traffic than UP currently provides, and IPA has not shown that the affected parties would not object to the inferior service.

(2) As explained in Section III.A.2.c iv below, UP removes traffic that originates or terminates at stations on UP lines replicated by the SARR where IPA refused to have IRR replicate the origination or termination service that UP provides in the real world. Instead, IPA assumed the residual UP would move the traffic between the on-SARR origins and destinations and Lynndyl or Milford. UP removes this traffic because (a) IRR does not provide the required origination and termination service for this traffic, (b) it represents a new use of cross-over traffic that is irreconcilable with reasons for allowing the use of cross-over traffic, and (c) IPA provides no justification for its unprecedented and nonsensical division of revenues for this traffic.[2]

UP discusses in detail its corrections to IPA's volume calculations in Section III.A.2 and its corrections to IPA's revenue calculations in Section III.A 3 UP's evidence is supported by Robert Fisher, a Senior Director in FTI's Network Industries Strategies group Mr. Fisher analyzed the flaws in IPA's volume and revenue assumptions, and he generated corrected traffic volume and revenue data for use in UP's reply evidence. Mr Fisher's qualifications and verification appear in Part IV.

---

[2] Although UP removes this traffic from the SARR traffic group. UP discusses IPA's proposed revenue allocation method for this traffic in Section III.A.3.c ii

1. Stand-Alone Railroad Traffic

IPA divided the IRR traffic group into three main categories, which it described as follows. IGS coal traffic, non-IPA coal traffic, and IRR non-coal traffic. IPA's terminology is unnecessarily confusing. UP divides coal traffic into "IPA coal traffic" and "non-IPA coal traffic" when discussing SARR volumes and revenues. All other traffic is "IRR non-coal traffic."

2. Volumes (Historical and Projected)

a. IPA Coal Traffic

"IPA coal traffic" consists of issue and non-issue coal traffic moving to IGS. The issue traffic consists of unit trains of coal that IRR receives from the URC in interchange at Provo and delivers to IGS. The non-issue traffic includes (i) unit trains of coal that originate on IRR at the Sharp Loadout and are delivered to IGS in single-line service, and (ii) a small number of unit trains of coal that UP originates at the Skyline Mine and IRR receives at Provo.

IPA used its own internal forecasts to determine IPA coal traffic tonnages for 2012 through 2022.[3] Because IPA's internal forecasts extended only through 2021, IPA used 2021 volumes for the first ten months of 2022 (adjusted *pro rata*).

UP accepts IPA's projected volumes for the issue traffic. The resulting volume projections for the IPA traffic are as follows

[3] IPA Opening Nar. at III-A-7. IPA Opening workpaper " IGS Coal Traffic Forecast.xlsx."

Table III.A.1
IPA Coal Traffic
(thousands of tons)

Year	Origin			Total
	Provo (URC)	Skyline	Sharp	
2012 (Nov-Dec)	{ }	{ }	{ }	{ }
2013	{ }	{ }	{ }	{ }
2014	{ }	{ }	{ }	{ }
2015	{ }	{ }	{ }	{ }
2016	{ }	{ }	{ }	{ }
2017	{ }	{ }	{ }	{ }
2018	{ }	{ }	{ }	{ }
2019	{ }	{ }	{ }	{ }
2020	{ }	{ }	{ }	{ }
2021	{ }	{ }	{ }	{ }
2022 (Jan-Oct)	{ }	{ }	{ }	{ }

Source: UP Reply workpaper "IPA Coal Traffic Forecast Reply.xlsx."

b <u>Non-IPA Coal Traffic</u>

"Non-IPA coal traffic" includes all coal traffic that moves on IRR other than the IPA coal traffic. Specifically, non-IPA coal traffic includes:

(i) overhead coal traffic that IRR receives in interchange from URC at Provo and interchanges to UP at Milford;

(ii) overhead coal traffic that IRR receives in interchange from UP at Provo and interchanges back to UP at Milford;

(iii) overhead coal traffic that IRR receives in interchange from UP at Lynndyl and interchanges back to UP at Milford; and

(iv) IRR-originated coal traffic from the Sharp Loadout that IRR interchanges with UP at Provo or Milford.

i. <u>2012 Non-IPA Coal Volumes</u>

IPA calculated IRR's 2012 non-IPA coal traffic volumes using UP's detailed first half of 2012 ("1H2012") records of traffic moving over the lines replicated by the SARR and volume estimates for the second half of 2012 ("2H2012") IPA developed the 2H2012 volume estimates by applying growth factors to UP's detailed third and fourth quarter of 2011 ("3Q2011" and "4Q2011" respectively) traffic records. To develop the growth factors, IPA summed UP's third quarter of 2012 ("3Q2012") publicly reported coal volumes (by region) and UP's "Prophecy" forecast of coal volumes (by region) for the fourth quarter of 2012 ("4Q2012") and compared the resulting sums to UP's publicly reported coal volumes by region for the second half of 2011 ("2H2011"). IPA then applied these growth factors to the coal traffic it selected from UP's detailed records for 2H2011 (For the November 2-December 31, 2012 non-IPA coal traffic volumes, IPA applied 4Q2012-only growth factors – developed by comparing the 4Q2012 Prophecy forecast to UP's 4Q2011 publicly reported volumes – to the non-IPA coal traffic selected by IPA from UP's detailed records during the November 2-December 2011 time period.)

IPA's approach recognizes that UP's actual quarterly data are a more accurate measure of growth than UP's Prophecy forecast, and IPA therefore relied on the publicly available 3Q2012 volumes that were released after discovery closed and before IPA filed its opening evidence. Accordingly, UP accepts IPA's general approach and updates it by using UP's publicly reported 4Q2012 coal volumes in place of the Prophecy forecast because the publicly reported 4Q2012 data became available shortly after IPA filed its opening evidence.

As Table III A.2 demonstrates, UP's actual coal volumes from Colorado/Utah and the PRB in 4Q2012 were significantly lower than those forecasted in Prophecy, and IPA's growth rates and volume forecasts were therefore overstated.

Table III.A.2
UP 4th Quarter 2012 Coal Volumes
(millions of tons)

Origin Region	Prophecy	Actual	% Difference
Utah/Colorado	{ }	7 90	{ }
PRB	{ }	40 60	{ }

Source UP Reply workpaper "IPA Coal Traffic Forecast Reply.xlsx."

ii. 2013-2022 Non-IPA Coal Volumes

For the non-IPA coal traffic, IPA calculated IRR coal traffic volumes for each year from 2013 to 2022 using data from the Energy Information Administration's ("EIA") 2012 Annual Energy Outlook ("AEO") forecast IPA applied the annual rates of change that EIA developed for coal moving from specified supply regions to specified demand regions to IRR's prior year coal movements based on each movement's supply and demand regions [4]

UP accepts IPA's approach and updates it by using EIA's 2013 AEO, the Early Release of which became available in December 2012 These forecasts reflect EIA's most current view of the U.S coal market.

[4] IPA Opening Nar. at III-A-10 to III-A-11. For 2013, IPA applied the EIA rate of change to the full-year 2012 non-IPA coal traffic volume, constructed as described above.

Table III.A 3 summarizes UP's revised non-IPA coal tonnages:

Table III.A.3
IRR Non-IPA Coal Tonnages
(thousands of tons)

Year	IPA	Reply	Difference
2012 (Nov-Dec)	{ . }	{ }	{ }
2013	{ }	{ }	{ }
2014	{ }	{ }	{ }
2015	{ }	{ }	{ }
2016	{ }	{ }	{ }
2017	{ }	{ }	{ }
2018	{ }	{ }	{ }
2019	{ }	{ }	{ }
2020	{ }	{ }	{ }
2021	{ }	{ }	{ }
2022 (Jan-Oct)	{ }	{ }	{ }

Source: UP Reply workpaper "IPA Coal Traffic Forecast Reply.xlsx."

c. <u>IRR Non-Coal Traffic</u>

UP updates IPA's calculations of IRR non-coal traffic volumes to develop more accurate estimates of IRR's 2012 volume levels. UP also updates the forecast used for its commodity-specific forecasts when projecting volume levels for 2013 to 2022. Finally, UP removes two groups of traffic from the SARR: (1) traffic moving on UP's Z trains, and (2) traffic that originates or terminates on lines replicated by the SARR and from which IPA takes cross-over revenue even though IRR does not provide the necessary origination or termination service.

i <u>2012 IRR Non-Coal Volumes</u>

IPA calculated IRR's 2012 non-coal volumes using UP's detailed 1H2012 records of traffic moving over the lines replicated by the SARR and volume estimates for 2H2012 IPA developed the 2H2012 volume estimates by applying growth factors to UP's detailed 3Q2011 and 4Q2011 traffic records. To develop the growth factors. IPA summed UP's 3Q2012 publicly reported non-coal volumes by commodity group and UP's Prophecy 4Q2012 forecast of non-coal volumes by commodity group and compared the resulting sums to UP's publicly reported non-coal volumes by commodity group for 2H2011. IPA then applied these growth factors to the non-coal traffic it selected from UP's detailed records for 2H2011 (For the November 2-December 31, 2012 non-coal traffic volumes, IPA applied 4Q2012-only growth factors – developed by comparing the 4Q2012 Prophecy forecast to UP's 4Q2011 publicly reported volumes – to the non-coal traffic selected by IPA from UP's detailed records during the November 2-December 2011 time period.) UP accepts IPA's general approach and updates it by using UP's now-available publicly reported non-coal volumes, rather than the Prophecy forecast to calculate 4Q2012 volumes.[5]

ii. 2013-2022 IRR Non-Coal Volumes

IPA calculated the rates of change in IRR traffic volumes for each year from 2013 to 2022 for traffic in UP business groups by using publicly available industrial forecasts from EIA and agriculture forecasts from U S. Department of Agriculture ("USDA") This commodity-specific approach is the same approach that UP used in its reply evidence in Docket No. 42127. UP updates the volumes to take into account updated forecasts and corrects certain implementation errors made by IPA

(a) Automotive Traffic

IPA classified as "automotive traffic" all of the traffic that it selected for IRR that falls within STCC 37. IPA calculated the rate of change in IRR automotive traffic volumes for each year from 2013 to 2022 using the annual forecasted change in new automobile and light truck

[5] UP Reply workpapers "IPA Coal and Non Coal 2011 and 2012 4Q Prophecy Data Reply xlsx" and "Non-Coal Revenue Forecast Reply.xlsx "

sales from EIA's AEO 2012 Transportation Equipment forecast[6] Because automobiles represent the majority of STCC 37 traffic on the SARR, UP accepts IPA's use of the forecasted change in new automobile and light truck sales and updates the forecast using the EIA's 2013 AEO, Early Release.

(b) Agricultural Products Traffic

IPA calculated the rate of change in IRR agricultural traffic volumes for each year from 2013 to 2022 by creating a basket of selected U.S. agricultural goods and using the forecasted change in production for those goods as estimated in the *United States Department of Agriculture Agricultural Projections to 2021* (OCE-201101).[7] Because the USDA's projections extend only to 2021, IPA assumed the 2021 growth rate for 2022.

UP accepts IPA's use of the USDA's forecasts, with one update and one correction. First, UP updates the volumes using USDA's most recent projections released in February 2013 Second, UP corrects IPA's implementation of the forecasts to properly align the forecasts with the appropriate time periods The USDA forecasts are not calendar-year forecasts: they reflect anticipated production over the course of the "marketing year" for the relevant crop. IPA applied growth rates generated from the USDA forecasted volumes to the SARR volumes based the calendar year in which the forecasts begin.[8] For example, IPA created a corn growth rate for the 2012 SARR year based on the 2012/2013 USDA corn forecast, but the forecast actually covers the period from September 1, 2012, through August 31, 2013. Because the USDA forecast is tied to the marketing year and the harvest season, rather than the calendar year, the effect of

---

[6] IPA Opening Nar at III-A-14.

[7] *Id* at III-A-15

[8] IPA Opening workpaper "EIA and USDA Forecasts.xlsx."

IPA's implementation is to accelerate a later period's forecasted volume (and growth rate) into an earlier period.

UP corrects this implementation of the USDA forecasts by apportioning the forecasted volumes to the correct time period before generating a growth rate UP prorates the volume forecasts based on the number of months in each marketing year for each crop. For example, for the corn example identified above, UP assigns one-third of the 2012/2013 Marketing Year forecast to 2012 and two-thirds to 2013, based on the corresponding number of months[9] UP generates the corrected calendar year growth rates following this approach and uses those growth rates to forecast the IRR agricultural traffic volumes[10]

(c) <u>Intermodal and Other Non-Coal Traffic</u>

For Industrial Products. Chemicals. and Intermodal traffic, IPA calculated IRR traffic volumes for each year from 2013 to 2022 using data from the Industrial Output forecasts from the EIA's 2012 AEO forecast The various industries in the AEO correspond very closely with 2-digit STCCs in the selected traffic group For broader categories of traffic. such as Intermodal, IPA used a "basket of goods" approach that aggregated the output of several industries. These approaches closely follow the approaches UP used in its reply evidence in Docket No. 42127

UP accepts these methods and updates the forecasts by using EIA's 2013 AEO Early Release These forecasts reflect the EIA's most current view of future industrial output.

---

[9] UP assigns these volumes to each month on a pro rata basis, which is a reasonable method because the actual shipments as reflected in UP's detailed records are evenly spread out across the year (*i.e* . they are not bunched at a particular point in the harvest season).

[10] UP Reply workpaper "EIA and USDA Forecasts Reply xlsx."

iii. Z Trains

In selecting traffic for its SARR, IPA included a substantial volume of intermodal traffic for which IRR would serve as a bridge carrier, replacing UP for the portion of the route between Milford and Lynndyl However, IPA's operating plan failed to replicate the level of service that UP provides for one important type of intermodal traffic. UP's high-priority Z trains. Accordingly, UP removed this traffic from the SARR traffic group.

UP's classifies its intermodal trains into three categories based on the level of service required UP provides "standard intermodal" service in trains with symbols beginning with an "I" (or "I trains"), "priority intermodal" service in trains with symbols beginning with a "K" (or "K trains"), and "premium intermodal" service in trains with symbols beginning with a "Z" (or "Z trains"). Intermodal traffic moving in Z trains is the most service-sensitive traffic on UP's network. As the traffic data produced in discovery show, this traffic moves for customers such as UPS, for whom rail service is a viable alternative only when the carriers can approach the transit time and reliability of truck service. UP's Z trains have the highest priority on UP's network after passenger trains (which must be given priority over all other trains by law). All other UP trains have a lower priority than Z trains UP produced information identifying the different service priorities in discovery [11]

IPA's operating plan is incapable of replicating the level of service UP currently provides for Z trains that move over its network between Milford and Lynndyl IPA selected for the SARR traffic group intermodal traffic that moves in Z trains from Los Angeles to Denver over IRR's Milford-Lynndyl segment. IPA's operating plan requires UP to interchange the trains at

[11] UP Reply workpaper "CAD train category characteristics pdf" (produced in discovery at UP-IPA-000037666).

Milford to IRR, which would hand the trains back to UP at Lynndyl IPA claims that "IRR's 2022 peak-week train transit times (and cycle times where available) for train movements over the various IRR line segments are equivalent to or faster than the real-world UP cycle times for the comparable trains moved during the 2012 peak week," and that "[t]his includes the premium intermodal or 'Z trains' that the IRR operates in bridge service between Milford and Lynndyl."[12] However, that statement is untrue and rests on a flawed analysis.

When total transit times for movements on the SARR are compared to UP's actual performance, it is clear that IRR's service for Z trains over the Milford-Lynndyl segment is dramatically inferior to the service provided by UP. trains spend approximately 40 percent more time on the segment. Further comparison of the inferior service provided by IRR for the Z trains and UP's unsuccessful attempts to identify operational changes to permit IRR to make up the difference in transit times are discussed in Section III.C 2 b below.

Under the circumstances, Board precedent compels the exclusion of Z train traffic from the IRR traffic group "The reasonableness of . . . the traffic group selected by the complainant is open to challenge. Thus, for example, the SARR must meet the transportation needs of the traffic in the group by providing service that is equal to (or better than) the existing service for that traffic."[13] In this case, IRR plainly would not be providing service equal to or better than the service provided by UP. Moreover, IPA made no effort to show that the affected shippers would

---

[12] IPA Opening Nar. at III-C-38

[13] *Tex Mun. Power Agency v Burlington N & Santa Fe Ry.*, 6 S T.B. 573, 589 (2003) (internal footnote omitted); *see also Duke Energy Corp v CSX Transp., Inc.*, 7 S T.B. 402, 414 (2004) ("[The operating] plan must be capable of providing, at a minimum, the level of service to which the shippers in the traffic group are accustomed"); *Bituminous Coal – Hiawatha, UT to Moapa, NV*, 10 I.C.C.2d 259, 273 (1994) (rejecting operating plan that "fail[ed] fully to account for the time-sensitive requirements . . of the shippers on the line. as well as the considerable additional switching and handling expense that would be entitled in interlining traffic in general freight (manifest) trains of the lengths envisioned [in the operating plan]").

accept the inferior level of service that IRR would provide instead of switching to BNSF or motor carriers who provide premium service in this market UP identified this same issue in Docket No. 42127 and Board precedent clearly places the burden on IPA· "A core SAC principle is that the SARR must meet the transportation needs of the traffic it would serve Thus, the proponent of a SARR may not assume a changed level of service . . unless it also presents evidence showing that the affected shippers, connecting carriers, and receivers would not object."[14]

In this case, UP was unable to modify the SARR operating plan in a way that would allow IRR to replicate the transit times that UP provides for Z trains.[15] *See* Section III C.2.b. Under the circumstances, which include the highly competitive nature of the traffic, the appropriate solution is to exclude the traffic from the SARR traffic group, which is what UP has done in its reply evidence.[16]

iv. On-SARR UP-Originated/Terminated Traffic

IPA included in the IRR traffic group on-SARR shipments for which IPA expects UP to originate or terminate the on-SARR portion movement. The majority of this traffic consists of movements that UP originates at stations between Lynndyl and Milford and then moves in a

---

[14] *Duke/CSXT*, 7 S T.B. at 427 (citing *McCarty Farms, Inc. v. Burlington N , Inc* . 2 S.T.B. 460, 476 (1997); *FMC Wyo Corp v Union Pac. R R* , 4 S T.B. 699, 736 (2000)).

[15] *Duke/CSXT*, 7 S.T.B. at 430 ("When the [operating] plan presented in a SAC case by the complainant is infeasible, it is generally incumbent on the defendant railroad to present a realistic alternative so that the SAC analysis may be completed.").

[16] *TMPA*, 6 S.T.B. at 589 ("[T]he traffic group selected by the complainant is open to challenge."); *Coal Rate Guidelines – Nationwide*. 1 I C.C.2d 520, 544 (1985) ("[T]he potential traffic draw and attendant costs and revenues that the hypothetical stand-alone provider could expect are open to scrutiny in individual cases. The proponent of a particular stand-alone model must identify, and be prepared to defend, the assumptions and selections it has made ").

local train to Milford. At Milford, UP switches the traffic into a through train, which travels back north to UP destinations via Lynndyl or Provo.[17]

IPA cannot choose to include this on-SARR UP-originated/terminated traffic and then provide only part of the on-SARR movement needed to serve this traffic.[18] In essence, IPA is trying to include a type of cross-over traffic that is completely inconsistent with the Board's justification for the use of cross-over traffic. The use of cross-over traffic is supposed to be a simplifying device that allows a complainant to avoid the burden of adding or extending lines on its SARR that would be needed to serve the origin and destination of cross-over traffic.[19] But here, IPA built the necessary line, selected traffic originating or terminating on the line for the SARR traffic group, and then refused to have IRR provide the required on-SARR origination or termination service for the traffic. IPA thus left the higher-cost origination/termination service for the incumbent and took an unduly large division of revenue for IRR. In fact, IPA invented a

---

[17] In other instances, UP originates the traffic at stations on lines replicated by the SARR and moves it on a local train to Lynndyl, where it is switched into a through train that travels over portions of the SARR; in still other instances, the traffic first moves over the SARR in through-train service to Lynndyl or Milford, and UP uses a local train to move the traffic from Lynndyl or Milford to a destination on a line replicated by the SARR. The on-SARR UP-originated/terminated traffic amounts to approximately 7,700 shipments in the base year. IPA Opening Workpaper "ONSARR_NONCOAL_ORIGINAL_TERMINATED_BASE_PERIOD_TRAINS_v5.xlsx."

[18] In contrast, UP does not object to IPA's inclusion of the very small portion of non-coal traffic that originates or terminates on lines replicated by the SARR and that in the real world moves between Lynndyl or Milford and its origin or destination on a UP through train. For that traffic, when IRR uses its through trains to originate or terminate the shipments, IRR has provided the on-SARR movement necessary to serve the traffic in the same way that UP does in the real world.

[19] *See, e.g.*, *Rate Regulation Reforms*, STB Ex Parte No. 715, slip op. at 7 (STB served July 25, 2012); *Pub. Serv. Co. of Colo. D/B/A Xcel Energy v. Burlington N. & Santa Fe Ry.*, 7 S.T.B. 589, 603 (2004).

new and unsubstantiated revenue division methodology for the traffic, as discussed in Section III.A.3.c below, which provides IRR with an even larger division than ATC would provide.

UP considered whether it could adjust IPA's operating plan to have IRR provide the necessary local-train origination and termination service for this traffic. However, IPA explicitly excluded all such service from its SARR operating plan.[20] Since IPA chose as a fundamental criteria for its SARR to avoid pick-up and delivery of manifest traffic using local trains, UP concludes the most feasible way to avoid this infirmity in IPA's evidence is to remove the traffic from the SARR traffic group.

Table III.A.4 summarizes UP's reply non-coal tonnages:

Table III.A.4
IRR Non-Coal Tonnages
(thousands of tons)

Year	IPA	Reply	Difference
2012 (Nov-Dec)	2,287	1,983	-303
2013	13,187	11,932	-1,255
2014	13,585	12,403	-1,182
2015	13,984	12,754	-1,229
2016	14,311	13,065	-1,246
2017	14,566	13,398	-1,168
2018	14,732	13,703	-1,030
2019	14,973	14,032	-942
2020	15,195	14,295	-901
2021	15,450	14,550	-900
2022 (Jan-Oct)	13,144	12,342	-802

Source: UP Reply workpaper "Traffic Summary.xlsx."

d. Peak Year Traffic

Table III.A.5 compares total SARR volumes developed by IPA for IRR with total volumes developed by UP for IRR for each year of the discounted cash flow ("DCF") period.

---

[20] IPA Opening workpaper "Create All Views.sql."

Table III.A.5
IRR Total Annual Tonnages
(thousands of tons)

Year	IPA	Reply	Difference
2012 (Nov-Dec)	3,891	3,502	-388
2013	22,567	21.102	-1,465
2014	23,224	21,350	-1,873
2015	23,642	21,667	-1,975
2016	24,047	21,717	-2.330
2017	24,479	22.531	-1,948
2018	24,687	22,991	-1.696
2019	24.971	23,236	-1.734
2020	25.587	23,554	-2.034
2021	25,734	23.841	-1,894
2022 (Jan-Oct)	21,618	20.151	-1,467

Source: UP Reply workpaper "Traffic Summary.xlsx."

Table III.A.6 shows IPA's and UP's respective calculations of traffic volumes for the peak year, by commodity group.

Table III.A.6
IPA Peak Year Traffic
(thousands of tons)

Business Group	IPA	Reply	Difference
Agricultural Products	1,372	1.335	-37
Automotive	253	209	-44
Chemicals	2,524	2.529	4
Industrial Products	6,046	5.331	-716
Intermodal	5.523	5.364	-159
Coal	10,188	9.358	-830
Total	**25,907**	**24,125**	**-1,782**

Source. UP Reply workpapers "Non-Coal Revenue Forecast Reply xlsx" and "Coal Revenue Forecast Reply xlsx "

3. <u>Revenues (Historical and Projected)</u>

UP accepts many of IPA's methods for determining IRR revenues, but it also identifies several errors in IPA's evidence and corrects them as described below. UP then applies the corrected SARR revenues to the corrected SARR traffic volumes to derive SARR revenue estimates for the ten-year period from 2012 through 2022 UP also adjusts IPA's ATC calculations to mitigate the disconnect that occurs because IPA assigned revenues to IRR for non-coal traffic as though it moved in carloads or multi-car service, even though it moved over the SARR intact, with no classification or switching activities performed by the SARR

The differences between IPA's revenue estimates and those developed by UP are largely explained by differences in traffic volume calculations, clear errors in IPA's implementation of its methods, and UP's adjustment to IPA's ATC calculations. These issues and others are discussed in more detail below

a. Single-Line

Single-line traffic refers to traffic that the SARR handles entirely from origin to destination. IPA included very little single-line traffic in the IRR traffic group: only non-issue coal moving from the Sharp Loadout to IGS.[21] Single-line traffic accounts for 23 percent of IRR's 2013 coal traffic volume and only ten percent of IRR's total 2013 traffic volume[22]

b. Divisions – Existing Interchanges

Existing Interchanges traffic refers to traffic that UP interchanges with other carriers in the real world and that IRR would interchange with those other carriers at that location, and that IRR would originate or terminate on the other end. The issue traffic moving from the Savage Coal Terminal via Provo to IGS is the only traffic that is in this category The traffic in this category accounts for 28 percent of IRR's 2013 coal traffic volume and only eleven percent of IRR's total 2013 traffic volume.[23]

[21] UP Reply workpaper "Traffic Summary.xlsx."

[22] *Id.*

[23] *Id.*

c. Divisions – Cross-Over Traffic

The overwhelming majority of traffic that IPA included in the IRR traffic group is cross-over traffic – that is, traffic that IRR interchanges with the residual UP at a new, hypothetical interchange because IRR handles a shorter portion of the movement than the real-world UP. In 2013, cross-over traffic accounts for 49 percent of IRR's coal traffic, 79 percent of 2013 total IRR traffic volumes, and all of IRR's non-coal traffic (of which 99 percent moves in bridge service over the SARR).[24]

In calculating divisions of cross-over revenue, UP adjusts IPA's ATC calculations to reflect IRR's handling of the traffic as intact trainloads IRR acknowledges that almost all of the cross-over carload and multi-carload traffic moving on its SARR is transported intact, with no classification or switching activities performed by the SARR.[25] This adjustment to IPA's ATC calculations is explained in further detail in Section III A.3.c.i UP applies this method of allocating revenue to cross-over traffic after correcting IPA's rate and revenue calculations as described in Section III.A.3.d. .

In Section III.A 3.c.ii, UP addresses IPA's unprecedented and nonsensical method of allocating revenue from the on-SARR UP-originated/terminated cross-over traffic that IPA wrongfully includes in the IRR traffic group even though the SARR fails to provide the required on-SARR service for the traffic

[21] *Id* The remaining one percent of IRR's non-coal traffic consists of traffic that is originated or terminated at on-SARR stations by through trains, which UP does not remove from the SARR traffic group. IRR provides the entire on-SARR service for this traffic, including origination or termination IRR uses through trains to originate or terminate this traffic, just as UP does in the real world In short, IPA replicates UP's service for these carloads on IRR *See* note 18, *supra*.

[25] IPA Opening Nar. at I-14 to I-15.

In addition, UP makes a technical correction to IPA's implementation of ATC. IPA used erroneous density tables to calculate fixed costs per ton, even though IPA had elsewhere identified certain traffic for which certain routings in the density table were incorrect. IPA corrected certain misrouted shipments (traffic routing via Barstow, CA/ Stockton, CA/ Reno. NV, which would not touch the SARR) when selecting its SARR traffic, but IPA failed to make the corresponding correction when calculating fixed costs for ATC revenue calculations UP applies IPA's corrections consistently throughout and recalculates the fixed costs per ton.[26]

i Adjustment to IPA's ATC-Based Revenue Divisions

IPA indicates that "IRR's traffic group consists of coal, intermodal and general freight traffic that moves primarily in unit train or trainload service"[27] "With the exception of a relatively small volume of general freight traffic that the IRR originates or terminates on its own system [or that IRR tried to rely on UP to originate or terminate]. the IRR's non-coal traffic consists entirely of overhead movements. Trains moving overhead on the IRR system are transported intact"[28] Nonetheless. to determine the ATC-based revenues for IRR, IPA calculated on-SARR variable costs for IRR's intermodal and general freight traffic. as though the traffic moved in carload and multi-car service.[29]

[26] UP Reply workpaper "Updated_BIDIRDENSITY_FILE xlsx."

[27] IPA Opening Nar at III-C-1.

[28] *Id.* at I-14.

[29] *Id* at III-A-23; IPA Opening workpaper "IPA_ATC_URCS_VARIABLE_COST_INPUTS_2011-121212.xlsx"

UP performs its ATC-based revenue allocation in a way that recognizes IRR's handling of intermodal and general freight traffic as intact trainloads.[30] This approach is simple and straightforward, and it is more accurate than IPA's use of an unadjusted URCS costs.[31] To perform this adjustment, UP modifies two of the standard URCS costing inputs for the IRR's overhead non-coal traffic.[32] UP also ensures that URCS empty return ratio reflects the actual empty return ratio of the types of cars moving over the SARR.[33]

ii On-SARR UP-Originated/Terminated Traffic Adjustments

As discussed in Section III.A.2.c.iv above, IPA improperly included a new type of cross-over traffic in the IRR traffic group – on-SARR UP-originated/terminated traffic, for which IRR would serve as only a bridge carrier and expect UP to provide origination or termination service at on-SARR stations. Because including this traffic in the IRR traffic group is inconsistent with the purpose of cross-over traffic as recognized by the Board and because UP could not feasibly

---

[30] UP Reply workpapers "IPA_ATC_URCS_VARIABLE_COST_INPUTS_2011_121212_Reply.xlsx" and "EXPANDED_WAYBILL_DATA_ATC_PERCENTAGES_UP REPLY (With Lookups).xlsx."

[31] The Board required the complainant in *AEPCO* to make a similar adjustment to URCS variable costs in its Maximum Markup Method calculations, recognizing that the approach is simple and straightforward to perform. *See Ariz. Elec. Power Coop., Inc. v. BNSF Ry.*, STB Docket No. 42113, slip op. at 2 (STB served June 27, 2011).

[32] UP sets the Costed Movement Type to Trainload and uses the average train lengths for IRR general freight trains of 84 cars and the URCS trainload minimum of 50 cars for intermodal based on IPA's opening train statistics. IPA Opening workpaper "IRR Base Year Trains.xlsx."

[33] Without this step, URCS would automatically apply the unit train empty return ratio of 2.0 to trains with 50 or more cars per train.

In *AEPCO*, the complainant objected to a similar approach on the grounds that using the correct empty return ratio would constitute an improper movement-specific adjustment. Rebuttal of Complainant Arizona Electric Power Cooperative, Inc. to Defendant's Response to the Revised Variable Cost Calculations, *Ariz. Elec. Power Coop., Inc. v. BNSF Ry.*, STB Docket No. 42113 (July 21, 2011). However, using the correct empty return ratio does not require analysis of individual movements: the step applies systematically to all movements to reflect the actual empty return ratios for these car types.

modify IRR's operating plan to provide the necessary origination/termination service, UP excludes this traffic from the IRR traffic group However, in case the Board were to allow IPA to include this traffic in the IRR traffic group, UP explains in this section how IPA's attempt to allocate revenues for this traffic between UP and IRR vastly overstated the revenue to which IRR would be entitled.

In allocating revenues for this traffic between IRR and UP, IPA did not cost the shipments as SARR bridge movements, consistent with the service that IPA assumed IRR would perform. Rather, IPA costed the SARR portion as originated or terminated, even though IPA's SARR does not originate or terminate any of the traffic.[34] IPA's application of ATC therefore allocated revenues to IRR for originating or terminating the traffic, even though IRR does not provide that service for the traffic.[35]

Apparently recognizing that UP is entitled to revenue for originating or terminating the traffic, IPA seemingly concluded that UP should be allocated five percent of each movement's total revenue (the "OT Adjustment").[36] IPA's approach is unprecedented, and IPA's execution of its approach is deeply flawed

---

[34] IPA Opening workpaper "IPA_ATC_URCS_VARIABLE_COST_INPUTS_2011-121212.xlsx."

[35] UP's workpapers include calculations that follow an ATC-based approach to allocate revenues between UP and IRR for this traffic. UP Reply workpapers "IPA_ATC_URCS_VARIABLE_COST_INPUTS_2011_121212_Reply.xlsx" and "EXPANDED_WAYBILL_DATA_ATC_PERCENTAGES_UP REPLY (With Lookups).xlsx "

[36] IPA Opening workpapers "UP Revenue Factor for Local Service.xlsx" and "EXPANDED_WAYBILL_DATA_ATC_PERCENTAGES_IPAOPEN (With Lookups).xlsx." Neither IPA's workpapers nor its narrative provides an explanation or justification of IPA's approach, and, as the party with the burden of proof, IPA was obligated to address this unprecedented revenue allocation in its opening evidence.

IPA develops its factor to compensate UP as follows: First, IPA calculated UP's URCS variable cost per ton to originate or terminate a sample movement. Then, IPA calculated UP's actual average revenue per ton for the on-SARR UP-originated/terminated traffic. Finally, IPA divided the first figure by the second figure to conclude that UP's URCS *variable cost* per ton to originate/terminate the traffic is five percent of UP's *revenue* per ton for the traffic.[37] However, that factor is nothing more than a rough approximation of UP's URCS variable cost to originate or terminate the traffic at issue in relation to UP's revenues from the traffic, it is not a measure of an appropriate allocation of revenue from that traffic to UP for performing that service.[38] Even if that measure could be used to assign UP revenue to cover its variable costs, it would provide UP no contribution towards recovery of its fixed costs for the on-SARR origination or termination service, unlike an allocation developed by ATC.

IPA's actual implementation of the OT Adjustment is even more problematic, and it results in UP receiving much less than five percent of the total revenue from a movement for the origination/termination service it provides. To implement the OT Adjustment on each shipment for which UP provides the on-SARR origination/termination service, IPA first reduces the total revenue for the movement by five percent and sets aside that amount for UP. But the revenue for

[37] Again, IPA's evidence is not clear, and the costs used in the percentage calculations in IPA's various workpapers are inconsistent. IPA Opening workpapers "UP Revenue Factor For Local Service.xlsx" and "Additional move - 12-12.pdf."

[38] In fact, review of the details underlying IPA's calculation of the five percent adjustment factor indicates that the factor does not account for the costs of the origination and termination services that would be required. IPA used a unit-train shipment as the sample movement for developing the share of revenues that it would leave for the residual UP to originate or terminate the traffic. A unit train, however, is not representative of the service UP must perform because the variable costs for unit trains do not include way train miles or the make-whole adjustments that account for the relatively costlier operations required to originate or terminate carload traffic. Even if IPA's methodology had any merit, which it does not, the sample movement's variable costs significantly understate UP's typical costs to perform the origination/termination services at issue, so IPA's five percent factor falls far short of allocating appropriate revenues to UP.

the movement consists of both on-SARR and off-SARR revenue, and UP is entitled all the off-SARR revenue because it provides all the off-SARR service for the movement. Therefore when IPA reduces the revenue for the entire movement by five percent to set aside money allegedly to compensate UP for UP's on-SARR origination/termination service, IPA is really requiring UP to pay itself for the origination/termination service. As discussed above, when IPA allocates the remaining 95 percent of the revenue using ATC, IPA claims the origination/termination credit for this traffic by costing the movements as Originated/Delivered or Received/Terminated by IRR (even though UP originates or terminates the traffic) Thus, UP's five percent of revenue for originating or terminating the traffic should come out of only IPA's share of the revenue for the movement – not the total revenue. Because IPA essentially compensates UP for originating or terminating the traffic using revenue to which UP is entitled for performing its off-SARR linehaul service, UP never actually receives the promised five percent of the total revenue for originating or terminating the traffic – which would be insufficient in any event.

d. <u>Projected Revenues</u>

IPA used different methodologies to calculate IRR revenues from 2012 through 2022 for the different categories of traffic included in the IRR traffic group. In the sections below, UP identifies errors in IPA's methodologies and the corrections that must be made for each category of traffic.

i <u>IPA Coal Traffic</u>

IPA assumed that the rates for IPA issue coal traffic and IPA non-issue coal traffic would not increase above the levels in Item 6200-A of UP's Common Carrier Tariff 4222 in the period from 2012 through 2022.[39] IPA also assumed that the fuel surcharge in the Item 695-series of UP's Tariff 6007-series would be applied to those rates.[40]

UP's corrections to IPA's calculation of revenues from IPA coal traffic are described below

(a) IPA Coal Traffic – Base Revenues

IPA assumed that base rates for IPA coal traffic would not increase above their current levels from 2012 through 2022 because UP's tariff governing transportation of IPA coal traffic contains no rate escalation provision.

UP accepts IPA's assumption to reduce the number of disputes between the parties and because it will have no impact on UP's future ability to set rates for IPA coal traffic. If the Board finds the challenged rates to be reasonable, UP's future rates will not be subject to regulation; if the Board finds the challenged rates to be unreasonable, UP's future rates will be based on UP variable costs and a prescribed revenue-to-variable cost ratio in each year.

(b) IPA Coal Traffic – Fuel Surcharge Revenues

UP accepts IPA's assumption that UP's mileage-based fuel surcharge that currently applies to IPA coal traffic will apply to IPA coal traffic from 2012 through 2022. IPA blended EIA's short-term and long-term fuel price forecasts to create a "hybrid" projection of fuel prices for the period from 2013 through 2020. While such an approach that combines separate forecasts covering different periods can distort fuel surcharge projections, UP accepts IPA's general approach in this case to reduce the number of disputes between the parties. However, UP updates IPA's approach to take into account more recent EIA forecasts

---

[39] IPA Opening Nar at III-A-27.

[40] *Id*

IPA used EIA's November 2012 Short Term Energy Outlook ("STEO") to determine actual and forecasted Highway Diesel Fuel ("HDF") prices for 2012 through 2013 and used EIA's Annual Energy Outlook 2012 ("2012 AEO") to determine forecasted HDF prices for 2014 through 2022.[41] UP updates these forecasts using the April 2013 STEO, which extends through 2014, and using the 2013 AEO, Early Release for 2015 to 2022

Table III.A.7 summarizes UP's revised revenue projections for IPA coal traffic.

Table III.A.7
IPA Coal Revenues
(millions)

Year	IPA	Reply	Difference
2012 (Nov-Dec)	{ }	{ }	{ }
2013	{ }	{ }	{ }
2014	{ }	{ }	{ }
2015	{ }	{ }	{ }
2016	{ }	{ }	{ }
2017	{ }	{ }	{ }
2018	{ }	{ }	{ }
2019	{ }	{ }	{ }
2020	{ }	{ }	{ }
2021	{ }	{ }	{ }
2022 (Jan-Oct)	{ }	{ }	{ }

Source. UP Reply workpaper "Coal Revenue Forecast Reply xlsx."

ii. <u>Non-IPA Coal Traffic</u>

IPA developed revenues for non-IPA coal traffic using UP traffic data produced in discovery and the contract terms under which the traffic moves. IPA calculated base revenues – that is, revenues excluding fuel surcharges – and then adjusted the base revenues pursuant to the terms of each contract until its expiration.[42] For time periods after contracts expired, IPA

[41] *Id* at III-A-26 to III-A-27.

[42] *Id* at III-A-29.

projected the estimated rate in the last year of the contract through the end of the DCF period based on EIA's Coal Transportation Rate Escalator.[43]

IPA developed fuel surcharge revenues for non-IPA coal traffic based upon the corresponding fuel surcharge formulas prescribed/set forth by the contracts.[44] It continued to apply these same fuel surcharge formulas for time periods after the contracts expired. For movements in which IPA could not ascertain a specific fuel surcharge in the pricing authority, IPA applied UP's standard mileage-based fuel surcharge for coal trains and IPA's "hybrid" of EIA's HDF forecasts.[45]

UP updates IPA's calculations as follows:

First, for contracts with rate adjustment mechanisms that used the All Inclusive Index Less Fuel (error adjusted) ("AII-LF") or the RCAF-U, IPA adjusted rates using either actual AII-LF or RCAF-U values or forecasts of those values included in the September 2012 Global Insight Rail Cost Adjustment Factor Forecast.[46] UP uses Global Insight's more recent December 2012 forecast.

Second, UP updates the EIA's Coal Transportation Rate Escalator using the EIA's AEO 2013 Early Release.

Table III A.8 summarizes UP's revised revenue projections for non-IPA coal in the traffic group:

---

[43] *Id.*

[44] *Id.* at III-A-30.

[45] *Id.* As explained in Section III.A 3.d.i.(b), to reduce the number of disputes between the parties, UP accepts IPA's "hybrid" approach of EIA's HDF forecasts.

[46] *Id.* at III-A-29.

Table III.A.8
Non-IPA Coal Revenues
(millions)

Year	IPA	Reply	Difference
2012 (Nov-Dec)	{ }	{ }	{ }
2013	{ }	{ }	{ }
2014	{ }	{ }	{ }
2015	{ }	{ }	{ }
2016	{ }	{ }	{ }
2017	{ }	{ }	{ }
2018	{ }	{ }	{ }
2019	{ }	{ }	{ }
2020	{ }	{ }	{ }
2021	{ }	{ }	{ }
2022 (Jan-Oct)	{ }	{ }	{ }

Source: UP Reply workpaper "Coal Revenue Forecast Reply.xlsx."

iii. <u>Intermodal Traffic</u>

IPA developed revenues for intermodal traffic using the rate adjustment mechanisms from intermodal contracts that UP produced in discovery to escalate base rates on a year-over-year basis during the terms of the existing contracts.[47] For time periods after expiration of the contracts, IPA adjusted rates by AII-LF.[48] UP fixes two relatively minor errors made by IPA in implementing this approach and updates AII-LF using Global Insight's more recent December 2012 forecast.

The two minor errors that UP corrects were as follows. First, IPA did not include the most recent contract amendments for one UP customer. { } in its contract

---

[47] *Id.* at III-A-31.

[48] *Id.*

summary spreadsheet.[49] Second, IPA incorrectly assumed that the contract for another UP customer, { } expired in { }.

With regard to fuel surcharge revenues, IPA calculated fuel surcharge revenues using the terms of the fuel surcharge specified in the applicable pricing authority through the term of the contract, and used its "hybrid" of EIA's HDF forecasts for years after expiration.[50] However, IPA made an errant assumption in its calculation of the MITA fuel surcharge, which applies to most of the intermodal traffic IPA selects for its SARR. According to UP's MITA2 Terms and Conditions, "Fuel Surcharge will be calculated by determining the percentage change between the base index and the most recent monthly average of the Retail On-Highway Diesel Price Index multiplied by UP's fuel weight." The base index of 1.253 and the HDF Index are available on both the EIA's and UP's websites. For fuel weight, however, IPA relied upon the industry's fuel weight in the All Inclusive Index of Railroad Input Costs from the Board's recent RCAF decision (December 20, 2012), which was 22.5 percent. The actual fuel weight that UP uses in the fuel surcharge calculation is 16.5 percent.[51] As a result IPA's fuel surcharge percentage and revenues are significantly overstated throughout the SARR period.

Table III.A.9 summarizes UP's revised revenue projections for intermodal traffic in the traffic group:

[49] UP Reply workpapers "Evergreen 18th (UP-IPA2-1177).pdf" (produced in discovery at UP-IPA2-000001177) and "Evergreen 4th Amendment (UP-IPA2-5019).pdf" (produced in discovery at UP-IPA2-000005019).

[50] IPA Opening Nar. at III-A-31. As explained in Section III.A.3.d.i.(b), to reduce the number of disputes between the parties, UP accepts IPA's "hybrid" approach of EIA's HDF forecasts.

[51] UP Reply workpaper "FSC Percent Revenue History.xls."

Table III.A.9
Intermodal Revenues
(millions)

Year	IPA	Reply	Difference
2012 (Nov-Dec)	$2.3	$1 6	-$0 7
2013	15.1	10.1	-5.0
2014	18 3	11.4	-6.9
2015	20.3	12 5	-7.8
2016	21.6	13.3	-8 3
2017	23.0	14.3	-8 7
2018	24 2	15 3	-8 9
2019	25.6	16.4	-9.2
2020	27.0	17.5	-9.5
2021	28.6	18 7	-9.9
2022 (Jan-Oct)	25.4	16 6	-8 8

Source: UP Reply workpaper "Non-Coal IRR Traffic Forecast Reply.xlsx "

iv <u>Automotive, Agricultural, and Other Non-Coal Traffic</u>

IPA used the rate adjustment mechanisms from pricing authorities that UP produced in discovery to escalate base rates for automotive, agricultural, and other non-coal traffic on a year-over-year basis during the terms of the existing contracts, and for subsequent periods adjusted the rates using AII-LF.[52] Again, UP updates AII-LF using Global Insight's more recent December 2012 forecast.

UP generally accepts IPA's approach to developing fuel surcharge revenues for automotive, agricultural, and other non-coal traffic by dividing the traffic into separate categories for mileage-based and rate-based fuel surcharges and applying UP's standard fuel surcharges [53] However, UP corrects minor errors IPA made in implementing its approach:[54]

---

[52] IPA Opening Nar. at III-A-32.

[53] As explained in Section III A 3.d.i.(b). to reduce the number of disputes between the parties, UP accepts IPA's "hybrid" approach of EIA's HDF forecasts for time periods after the expiration of the contracts.

[54] UP Reply workpaper "IPA_UP NonCoal Summarized Contracts Reply.xlsx "

- IPA incorrectly assumes that all automotive traffic moves have a revenue-based fuel surcharge. { } have a mileage-based fuel surcharge.[55]

- IPA did not identify the contract number for one movement ({ }) in its contract summary spreadsheet. UP updated this spreadsheet so that the contract number could be linked to the appropriate moves.

Table III.A.10 summarizes UP's revised revenue projections for automotive, agricultural, and other non-coal traffic in the traffic group.

Table III.A.10
Automotive, Agricultural, and
Other Non-Coal Revenues
(millions)

Year	IPA	Reply	Difference
2012 (Nov-Dec)	$5.9	$3.5	-$2.4
2013	36.6	23.6	-13.0
2014	39.3	25.2	-14.1
2015	42.1	26.7	-15.4
2016	44.5	28.3	-16.2
2017	46.7	29.9	-16.8
2018	48.8	31.5	-17.3
2019	51.1	33.3	-17.7
2020	53.3	35.0	-18.3
2021	55.8	36.6	-19.2
2022 (Jan-Oct)	48.4	31.8	-16.7

Source: UP Reply workpaper "Traffic Summary.xlsx."

v. Traffic Summary

Table III.A.11 presents a summary of the differences in IRR total revenues assumed by IPA and IRR total revenues calculated by UP after making the corrections described above.

[55] Furthermore, for these customers the surcharge is based on { } that IPA incorrectly assumed.

Table III.A.11
Comparison of IPA's IRR Revenues
and UP's IRR Revenues
(millions)

Year	IPA	Reply	Difference
2012 (Nov-Dec)	$18.0	$14.3	-$3.7
2013	107.7	88.2	-19 5
2014	116.2	90.1	-26.1
2015	121.9	92.9	-29 0
2016	126.7	94 1	-32.6
2017	132.7	100 0	-32 7
2018	137.2	104 7	-32 5
2019	142 2	107.9	-34.3
2020	150 9	112.0	-38.8
2021	155.0	115 9	-39 1
2022 (Jan-Oct)	132 6	100 5	-32 2

Source. UP Reply workpaper "Traffic and Revenue Summary Reply xlsx."

4. *Rate Regulation Reforms* Adjustments to Volumes and Revenues

UP also develops adjustments to IPA's IRR volume and revenue evidence to show the consequences of applying the alternative methods of addressing IPA's exploitation of ATC and cross-over traffic in designing its SARR that UP describes in Section I C above.[56]

First. UP provides a series of SAC analyses that implement the Board's proposals in *Rate Regulation Reforms* to restrict the use of cross-over traffic to movements (i) for which the SARR would either originate or terminate the rail portion of the movement, or (ii) where the entire service provided by the defendant railroad in the real world is in trainload service.[57]

To calculate traffic and revenues for a SAC analysis based on the Board's first proposal. UP excludes traffic that the SARR neither originates nor terminates. This excludes the vast majority of the non-coal traffic that IPA selected for its SARR. A large portion of the coal traffic

[56] In Section III.H below. UP presents the results of these alternatives and explains how it develops operating expenses and construction costs for each alternative method.

[57] *See Rate Regulation Reforms*. slip op. at 16-17

is excluded as well, leaving the IPA traffic and Sharp-originated traffic. UP includes traffic that UP receives from the URC at Provo regardless of the destination.[58]

To calculate traffic and revenues for a SAC analysis based on the Board's second proposal to limit cross-over traffic, UP uses waybill and train data to determine whether shipments traveled on UP in trainload service. For non-coal traffic, UP excludes shipments that traveled on M trains (standard manifest trains) and most shipments on I trains (standard intermodal trains). UP does not exclude the small portion of I train traffic that traveled in trainload service.[59]

Second, UP provides a SAC analysis that it performs using no cross-over traffic at all, consistent with UP's view that the Board should entirely prohibit the use of cross-over traffic in SAC cases. The scenario using no cross-over traffic is very straightforward. The only traffic is the issue traffic and IPA shipments from the Sharp Loadout. All other shipments on the SARR are cross-over traffic.[60]

Finally, UP provides a SAC analysis that uses efficient component pricing ("ECP") to allocate cross-over revenue, as UP proposed in its comments in *Rate Regulation Reforms*.[61] UP divides the URCS variable costs calculated for the on-SARR portion by the through revenue to calculate the ECP revenue division. UP replaces the ATC percentage with this ECP percentage to calculate the SARR revenues in each year. In cases where the R/VC for the through movement is less than 1.00, UP assigns SARR revenues on the basis of the through R/VC

[58] UP Reply workpapers "Coal Revenue Forecast Reply.xlsx" and "Non-Coal IRR Traffic Forecast Reply.xlsx."

[59] *Id.*

[60] *Id.*

[61] *Id.*

III B STAND-ALONE RAILROAD SYSTEM

In analyzing the IRR system, UP relies on experts who are highly familiar with the routes at issue.

Thomas Murphy was a long-time employee of UP and the Chicago and North Western Railway Company. From 1999 to 2009, Mr Murphy served as Assistant Vice President for UP's Western Region. His responsibilities in that position included the territory between Provo, Lynndyl, and Milford, which includes all the UP lines IPA has replicated for IRR. Prior to holding that position, Mr. Murphy served for approximately 18 months as the General Manager of UP's Harriman Dispatch Center.

David Wheeler, President of Rail Network Analytics, held a number of positions with UP before starting his own railroad consulting business. Among other positions, Mr. Wheeler served as UP's General Director, Capacity Planning and Analysis He also led teams within UP's Finance, Network and Capital Planning, and Network Design and Integration Departments. Mr. Wheeler has extensive experience with use of the Rail Traffic Controller ("RTC") model, both in connection with submission of evidence in Board rate complaint proceedings and in conducting analysis related to railroad decision-making on capacity and operations issues. Mr. Murphy worked with Mr. Wheeler to identify the operating requirements for IRR so that Mr Wheeler could perform an accurate simulation of peak-period operations for IRR using the RTC model.[1]

In advising Mr. Wheeler about the proper track, yard, and interchange configurations, Mr. Murphy drew on his years of experience with the UP lines and facilities located on these routes. In addition, in September 2011, in connection with his work in Docket No. 42127,

[1] More detailed statements of the qualifications of Mr. Murphy and Mr. Wheeler and their verifications appear in Part IV below

Mr. Murphy took a hi-rail trip over the entire IRR route, visiting key locations on the route[2] He also drove along parts of the IRR route (in the Provo area and on the Sharp Subdivision) in March 2011 On these trips, Mr. Murphy conducted interviews with UP operating personnel. Mr. Murphy conducted follow-up interviews and correspondence with several of these employees in February and March 2013[3] Based on information he gathered on his trips and through these other contacts, as well as his long experience with the relevant routes and locations. Mr. Murphy advised Mr. Wheeler about the track configurations, yard facilities, and other facilities that would be needed for IRR operations.

1. Route and Mileage

The SARR posited by IPA consists of 175 route miles It is located entirely within the State of Utah, extending from Provo on the east to Milford on the west.[4] UP accepts IPA's figure for constructed route miles. A schematic showing the IRR network appears in UP Reply Exhibit III A-1

a Mainline

UP accepts IPA's proposed mainline and the connection to the mainline of the spur to IPA's Intermountain Generating Station ("IGS") southwest of Lynndyl.[5] The spur, known as the IPP Industrial Lead, extends 9.5 miles from Lynndyl to IGS.[6]

[2] UP Reply workpaper "Murphy Trip Summary2011.pdf"

[3] UP Reply workpaper "Murphy notes 2013.pdf."

[4] IPA Opening Nar. at III-B-1.

[5] *Id*

[6] *Id*

b. Branch Lines

IRR has no branch lines. UP accepts IPA's proposal for IRR ownership of 0 19 miles of the IPP Industrial Lead.[7]

c. Interchange Points

IPA proposes interchanges between IRR and the residual UP at Provo, Lynndyl, and Milford. At Provo, IPA assumes that IRR would interchange trains with the residual UP at three locations: (1) the eastern end of the Coal Wye tracks adjacent to UP's Provo Subdivision (at the Ironton crossover) for westbound loaded coal trains coming from mines and loadouts to the east of Provo; (2) IPA's Springville railcar maintenance facility (the "Springville car facility") for eastbound empty coal trains destined to the same mines/loadouts, and (3) UP's Provo Yard at MP 750.22 on UP's Sharp Subdivision for trains traveling to/from UP's Provo Yard and Salt Lake City[8]

In addition, IPA proposes IRR interchanges with URC at two locations in Provo.[9] Westbound loaded trains would be interchanged with URC on the Coal Wye tracks. Eastbound empty trains would be interchanged with URC at the Springville car facility.

UP accepts these interchange points for the IRR traffic, except that, for reasons described in section III C.2.c.vii below, UP rejects IPA's assumption that IRR would interchange empty coal trains with the residual UP at the Springville car facility. UP instead provides for interchange of these trains on the Coal Wye tracks.

UP shows the track configuration at each interchange point in UP Reply Exhibits III.B-1 and III B-2

[7] *Id.*

[8] *Id* at III-B-2, III-C-6

[9] *Id.* at III-B-2.

d. Route Mileage

UP agrees with IPA's route mileages for IRR. Table III.B.1 below shows route mileage for IRR line segments.

Table III.B.1
IRR Line Segments and Route Mileage

Segment	UP Subdivision	Miles
Main Lines		
Provo to Lynndyl	Sharp	85.77[1/]
Lynndyl to Milford	Lynndyl	89.00
Total mainline miles		174.77
Other		
IRR portion of IPP Industrial Lead		0.19
Total route miles		174.96

[1/] Includes 1.25 route miles for segments replicating the Coal Wye tracks connecting UP's Provo and Sharp Subdivisions at Provo

Source: IPA Opening Nar at III-B-3 (Table III-B-1).

e. Track Miles and Weight of Track

UP generally agrees with IPA's track miles for IRR and accepts IPA's proposed weight of rail. As described in more detail below and in Section III.C, Mr Murphy's most significant track change is the addition of 2.7 miles of mainline track on the Sharp Subdivision near IPA's Springville car facility, supplementing construction proposed by IPA Mr. Murphy also adds set-out and lead tracks at the Provo, Lynndyl, and Milford interchanges, and lead tracks at the east end of the Coal Wye tracks In addition, he provides for set-out track on both sides of three Failed-Equipment Detectors ("FED") where IPA provided for set-out track on only one side UP's engineering experts add three FEDs to those proposed by IPA and provide set-out tracks on both sides for each FED.

UP Reply Exhibit III.B-1 contains UP's detailed schematic track and yard diagrams for the entire IRR system. Table III B 2 below lists the IRR constructed track miles.

Table III.B.2
IRR Constructed Track Miles

	IPA	Reply	Difference
Mainline track—Single first main track[1/]	174 96	174.96	0.00
—Other main track[2/]	24.02	26 73	2 71
Total mainline track miles	198.98	201 69	2 71
Set-out and MOW equipment tracks	1.60	3.60	2.00
Yard tracks[3/]	12.50	15.25	2.75
Total track miles	**213.08**	**220.53**	**7.45**

[1/] Single track miles equal total constructed route miles, including branch lines and industrial leads (spurs)
[2/] Equals total miles for second main tracks and passing sidings
[3/] Includes all tracks in yards, such as relay tracks, leads, locomotive inspection tracks, and MOW equipment storage tracks, and tracks used to interchange trains with other railroads

Source: UP Reply workpaper "IRR Miles UP Reply.xlsx "

i. Mainlines

The principal difference between the mileage calculated by IPA and UP relates to the "mainline – other main track" category.

Mr Murphy concluded that approximately 2.7 miles of additional mainline track is needed on IRR's Sharp Subdivision between MP 746 7 and MP 749 4. This additional track – a short extension of the double-track segment that IPA constructed from the Coal Wye Tracks to the Springville car facility – would facilitate movement of trains to/from all three of the interchange locations IPA identifies for Provo. This section of IRR is dark territory, and adding a second main track south (railroad west) of the Springville car facility would allow trains coming to/from UP's Provo Yard or the Coal Wye tracks to move without being impeded by trains that are being switched from the mainline into the Springville car facility.

UP accepts the proposed use of new 136-pound continuous welded rail ("CWR") for all constructed mainline track[10] In addition, UP accepts IPA's proposed use of 115-pound CWR for the IPP Industrial Lead, as well as for "yard and other tracks."[11] UP also agrees with IPA's specification that track and structures be designed to accommodate a gross weight on rail ("GWR") of 286,000 pounds per car

ii. Branch Lines

IRR has no branch lines. There are no differences between IPA's and UP's calculations of mileage and their track configuration for the IRR portion of the IPP Industrial Lead.

iii. Sidings

IPA treats sidings as part of IRR's mainline tracks.

iv. Other Tracks

IPA has provided insufficient set-out tracks for the FEDs on IRR For three of the FEDs IPA provided for the Sharp Subdivision, it constructed a single set-out track for each FED.[12] Because trains will be traveling in both directions on the single-track IRR, there must be set-out tracks on both sides of each FED. If they are installed on only one side, a train would pass the set-out track before the FED alerted the crew to a problem, and there would be no safe and efficient way to set out a car with a bad axle or wheel The train crew would have to stop the train, shove it backwards, and then set out the bad-order car IPA argues that this would not be a problem on the Sharp Subdivision because traffic is relatively light on that segment[13] In fact,

[10] IPA Opening Nar. at III-B-6.

[11] *Id*

[12] *Id.* at III-B-7 For one FED on the Lynndyl subdivision, IPA did not construct a set-out track to the west based on the assumption that any bad-order car identified by the FED could be set out at Milford Yard. *Id* UP accepts this assumption.

[13] *Id*

such an operation would raise both efficiency and safety concerns. Shoving the train backwards would increase transit time for the train (shoving movements may not exceed 20 miles per hour[14]), and it could interfere with the movement of other trains, which could be held while this operation was performed In addition, federal regulations require that an employee protect (or monitor) the shoving movement for the engineer, who is operating the locomotive at the head end of the train. This employee – usually the conductor – must disembark and walk beside the rear end of the train as it is shoved backward.[15]

Moreover, and more importantly, because the FED has identified an equipment failure, there are safety issues. There is a significant risk that the train would derail while being shoved backwards, particularly in the case of some types of equipment defects. For that reason, IRR would want an employee to monitor the movement of the car with failed equipment Unless this car was at the rear of the train, however, the employee protecting the shove could not monitor the failed equipment at the same time. Ordinarily IRR trains will operate with a two-person crew, so a third employee might not be available to protect the failed equipment. Moreover, an employee protecting either the movement or the failed equipment would be at risk of injury if the train derailed. In short, such an operation would be both unsafe and highly impractical: a rational railroad management would look for an alternative

In order to avoid these problems, UP has provided for two 1,000-foot set-out tracks per FED, located 10,000 feet from either side of each detector. Mr. Murphy determined that the set-out tracks should be longer than the 860 feet for which IPA provided, so that there will be room to store some maintenance-of-way ("MOW") equipment on these tracks In addition, in all cases

---

[14] UP Reply workpaper "UP System Special Instructions – Shoving Movements.pdf" (provided in discovery at UP-IPA2-000000256 to 258).

[15] *See* 49 C F R. § 218.99(b)(3)

IPA provided insufficient distance between an FED and a set-out track. The tracks must be at least 10.000 feet from the FED because IRR's traffic group includes several 10,000-foot trains; with a shorter distance, the train could pass the set-out track before the FED alerted the crew to a problem with a car at the rear of the train. A much longer distance would be undesirable because the failed equipment should be removed as soon as possible for safety reasons

In addition, as discussed in Section III.F below, UP's engineering experts concluded that IPA did not provide sufficient FEDs for IRR under current rail engineering standards. To comply with current standards and industry practice, UP's engineering experts added three FEDs and also two set-out tracks for each additional FED.

UP accepts IPA's proposed use of 115-pound CWR for set-out tracks and MOW equipment storage tracks.[16]

2. <u>Yards</u>

a <u>Locations and Purpose</u>

IPA proposed "two small interchange yards" at Lynndyl and Milford and asserts that "there is no need for an interchange yard at Provo."[17] As explained below, each interchange location requires construction of additional tracks so that IRR can efficiently perform the functions IPA designated for these locations.

b. <u>Lynndyl and Milford</u>

IPA acknowledges that "[s]ome of the IRR's through (overhead) non-coal trains interchanged at Lynndyl and Milford change consists at one or both of those locations" and adds dwell time for these trains, "[b]ecause the interchange of these trains occurs in the IRR's yard at

[16] IPA Opening Nar. at III-B-8.

[17] *Id* at III-B-8 to III-B-9.

Milford and Lynndyl."[18] UP rejects IPA's assumption that these operations will require no additional track facilities.[19] IPA has chosen for the IRR traffic group only overhead traffic and certain cars picked up or set out by through trains on the IRR route, and excluded any traffic that moves on local trains Thus, as IPA recognizes, it will be necessary for residual UP crews to switch a number of cars on or off the UP trains when they arrive at Milford or Lynndyl [20] These are cars that UP moves on local trains to or from on-SARR points IPA itself excluded over 5,000 of these cars per year from the IRR traffic group As discussed in Section I.A above, UP believes approximately 7,700 additional shipments should be excluded because IRR fails to provide local service to and from on-SARR locations.

Thus, there would be a significant number of cars that UP crews would need to remove or attach at Lynndyl and Milford. The switching for these cars, which occurs in an IRR yard,[21] will take some time, and IRR will need space to store the cars until a UP local crew picks them up UP adds one 5,000-foot interchange track[22] at each of Lynndyl and Milford, so that the interchange and switching operations will not interfere with movements on the mainline.

c. Provo

IPA did not include IRR interchange facilities at Provo. UP agrees that interchanges could occur at Provo in the ways IPA describes without the need for an interchange yard. However, as discussed below, UP adds track and facilities that would be needed for IRR

[18] *Id* at III-C-25 to III-C-26.

[19] *Id* at III-C-26.

[20] *Id* at III-C-25.

[21] *Id.* at III-C-25 to III-C-26.

[22] A length of 5,000 feet is typically sufficient to allow a train to pull up past the switch and remove a car without interfering with the mainline.

operations in this area, to avoid interference with mainline movements and to accommodate inspection activities.

UP accepts IPA's location of the Springville car facility As discussed above, Mr. Murphy has concluded that an extension of IPA's proposed second mainline track is needed on the west side of the facility. IPA proposed adding a second mainline track extending to MP 749.4 on IRR's Sharp Subdivision [23] Mr. Murphy has determined that this second track should extend to MP 746.7, in order to facilitate movement of trains to and from the Coal Wye tracks connecting with UP's Provo Subdivision This additional track will allow trains to move on and off the UP Sharp Subdivision or the Coal Wye tracks without interference from activity at the car facility.[24]

IPA proposes that IRR will interchange trains with the residual UP at UP's Provo Yard UP accepts this proposal, but corrects two faulty assumptions IPA made. First, IPA failed to include IRR expenses associated with interchanging the trains at UP's Provo Yard, namely taxiing the IRR crews between UP's yard and their home base on IRR.[25] Second, as explained in Section III C.2.c.vii below, this interchange would require a time-consuming track warrant process due to IPA's decision to designate IRR track at Provo as dark territory. While UP does not require IRR to construct an interchange yard at Provo, these operating considerations require additional track capacity in this area, further contributing to the need to extend the IRR double-track to MP 746.7, rather than IPA's proposed end at MP 749 4.

As discussed in Section III.C below, Mr. Murphy has concluded that IRR would need additional track and facilities adjacent to the Coal Wye tracks to support IRR's conduct of 1,000-

[23] IPA Opening Exh. III-B-1.

[24] This extension of IPA's proposed second mainline track appears on UP Reply Exhibit III.B-1.

[25] UP adds the costs IRR would incur in moving IRR trains to and from UP's Provo Yard.

or 1,500-mile inspections of some loaded coal trains received at Provo, as well as some of the empty trains IPA assumes that any inspection of empty trains would occur at the Springville car facility, but UP explains in Section III.C.2.c.vii below that this is not realistic. IRR would need lead tracks at Ironton on the east end of the wye tracks and an inspection track and 1,500-foot repair in place ("RIP") track at the locomotive shop for setting out bad-order cars. Without lead tracks, the process of removing bad-order cars (so that mechanical personnel could work on them) and inserting spare or repaired cars would block the mainline. The result would be to prevent or delay the entry of other trains that need to be refueled and inspected, or to block departure by trains that are otherwise ready to depart

d. Miles and Weight of Yard Track

UP accepts the use of 115-pound relay CWR for the IRR yards. For the reasons set forth above, IRR needs 15.25 miles of yard track to operate efficiently, or 2 75 miles more than IPA's proposal of 12.50 miles.

3 Other

a Joint Facilities

UP accepts IPA's assumption that IRR will replicate UP's joint facility agreement with URC for the two-mile segment between IPA's Springville car facility and the connection with URC's tracks at Provo, allowing URC trains to move to and from the car shop over IRR track.

b Signal/Communications System

UP accepts IPA's proposed signal/communications system for IRR. As described in Section III.D below, the residual UP will incur additional costs due to the need to integrate its signal system with IRR's systems

c. Turnouts, FEDs and AEI Scanners

UP accepts IPA's proposed locations for turnouts and automatic equipment identification ("AEI") scanners As discussed above and in Section III.F below, UP's engineering experts concluded that IPA did not provide sufficient FEDs for IRR. UP's experts add three FEDs to comply with industry standards and adjust the placement of the FEDs proposed by IPA

As discussed above and in Section III.C below, IPA has provided insufficient set-out track for the FEDs and insufficient distance between FEDs and set-out tracks. IPA's track charts show set-out tracks on only one side of three FED locations.[26] As discussed above, set-out track is required on both sides of each FED location because trains will be passing the FEDs in both directions and set-out tracks on both sides of each FED location are necessary in order to avoid the inefficient and risky process of shoving a train backwards on the mainline As discussed above, Mr Murphy has provided for two 1,000-foot set-out tracks per FED location, located 10,000 feet from either side of each detector.

[26] IPA Opening Exh III-B-1.

III. C. STAND-ALONE RAILROAD OPERATING PLAN

IPA designed IRR to include a limited number of lines, all within the State of Utah In the current proceeding, IPA includes a subset of the lines that it proposed for its SARR in Docket No. 42127 As discussed above in Section III A, IPA has pared back the network for which the SARR would be responsible This SARR (IRR) relies even more heavily on cross-over traffic and on the residual UP's network in order to bring shipments from their respective origins to IRR and to take shipments from IRR to their destinations. As discussed in Section I, IRR's heavy dependence on cross-over traffic squarely raises the concerns the Board expressed in *Rate Regulation Reforms*.

IRR handles issue traffic that it receives in interchange from URC at Provo IRR delivers all of the issue traffic to a single destination power plant near Lynndyl, referred to as IGS.

IPA has positioned IRR almost exclusively as a bridge carrier. Of the traffic IPA has selected for its SARR, 90 percent would be handled as overhead traffic. IRR will receive this traffic from the residual UP, move it over the UP lines replicated by IRR, and deliver it back to the residual UP. In fact, 99 percent of the IRR non-coal traffic is assumed to be handled in such overhead service.[1] This includes large volumes of intermodal traffic that UP handles between Southern California and Chicago, as to which IRR substitutes for UP for just 89 miles between

[1] As described in the next paragraph and in Section III.A above, for most of the non-coal traffic originating from or terminating at stations on IRR that IPA included in its SARR traffic group, IPA assigned revenues to IRR but assumed IRR would not provide the service required to originate or terminate this traffic. UP therefore eliminates this traffic from IRR's traffic group. Without these shipments, IRR serves the origin or destination for less than one percent of the SARR's non-coal traffic. UP Reply workpaper "IRR Revenue Traffic Class and Freight Payer.xlsx"

Milford and Lyndyl[2] (As explained in Section III.A above, this traffic does not share any facilities with the issue traffic) IRR serves both the origin and destination for only one shipment lane (between Sharp and IGS), which accounts for just four percent of total IRR shipments.

IPA provides for IRR interchanges at Provo, Lynndyl, and Milford. It states that IRR will transport the overhead traffic "intact," without any classification or switching activities performed at interchange points.[3] In limited cases, IRR picks up or sets out cars at local industries on the IRR route. However, IRR picks up or sets out cars only when UP *through* trains perform such services in the real world. When UP local trains pick up at origin and set out at destination and then switch the carloads into through trains, IRR did not replicate UP's service to local industries and provided no facilities or resources to switch cars from local to through trains As described in Section III A above, for these shipments IPA assumed IRR would handle the through train service *only* Because IPA failed to provide for the requisite service to handle the traffic, even though the traffic originates or terminates on the IRR route, UP excludes these shipments from its reply SARR traffic group and its operating plan. As explained in Section III.A above, this appears to be the most realistic approach, in view of IPA's intent to have IRR operate only through trains.

As described above in Section III.A, UP revised IPA's traffic data: (i) to update IPA's volume levels to reflect data published since IPA filed its opening evidence, (ii) to apply more current forecasts of future volumes for IRR traffic; (iii) to remove shipments for on-SARR customers where IPA omitted the necessary local service; and (iv) to remove certain traffic for which IRR could not provide an adequate level of service (high-priority intermodal Z trains,

---

[2] A small portion of the intermodal traffic IPA selected for IRR (and the majority of the high-priority Z trains) moves between Southern California and Denver.

[3] IPA Opening Nar. at III-C-3.

which are discussed in Section III.C.2.b below). Table III.C.1 shows the adjusted peak-year traffic volumes

Table III.C.1
IRR Peak Year Revenue Traffic Volume
(Cars and Intermodal Containers)

	IPA	Reply	Difference
Coal			
Local	19,287	19,287	0
Interline Forwarded	3,966	5,617	1,651
Interline Received	25,001	25,001	0
Overhead	47.363	37,383	(9,980)
Coal – Total	95.617	87,288	(8,329)
Intermodal – Overhead	368,543	354,344	(14,199)
General Freight			
Interline Forwarded	1,036	730	(306)
Interline Received	1.039	1,066	27
Overhead	117,028	107.322	(9.706)
Total	**583,262**	**550,750**	**(32,512)**

Source UP Reply workpapers "Coal Revenue Forecast Reply.xlsx" and "Non-Coal Revenue Forecast Reply.xlsx."

In analyzing IPA's operating plan for IRR, UP relied on experts who are highly familiar with the routes at issue.

Thomas Murphy was a long-time employee of UP and the Chicago and North Western Railway Company From 1999 to 2009. Mr. Murphy served as Assistant Vice President for UP's Western Region. His responsibilities in that position included the territory between Provo, Lynndyl, and Milford, which includes all the UP lines IPA replicated for IRR. Prior to holding that position, Mr. Murphy served for approximately 18 months as the General Manager of UP's Harriman Dispatch Center.[4]

[4] A more detailed statement of Mr. Murphy's qualifications and his verification appear in Part IV below.

David Wheeler, President of Rail Network Analytics, held a number of positions with UP before starting his own railroad consulting business. Among other positions, Mr. Wheeler served as UP's General Director, Capacity Planning and Analysis. He also led teams within UP's Finance, Network and Capital Planning, and Network Design and Integration Departments. Mr. Wheeler has extensive experience with use of the Rail Traffic Controller ("RTC") model, both in connection with submission of evidence in Board rate complaint proceedings and in conducting analysis related to railroad decision-making on capacity and operations issues.[5] Mr. Murphy worked with Mr. Wheeler to identify the operating requirements for IRR so that Mr Wheeler could accurately simulate peak-period operations for IRR using the RTC model.

1 General Parameters

UP's experts have accepted most features of IPA's operating plan for IRR. However, they identified various errors that require correction. As described below in Section III.C 3.f, Mr. Wheeler identified certain flaws in IPA's RTC model and corrected them UP has revised IPA's operating plan to reflect these corrections.

As described further in Section III C.2.b below, UP's experts concluded that IPA's operating plan does not allow IRR to replicate the level of service UP provides for intermodal Z trains (which have the highest priority of all UP trains) that move on the Lynndyl-Milford segment. UP therefore removed this traffic from the IRR traffic group.

a. Traffic Flow and Interchange Points

IPA used UP traffic data for the 12-month period beginning July 1, 2011, and ending June 30, 2012, to select traffic for its SARR and then applied various forecasts to project these

[5] A more detailed statement of Mr. Wheeler's qualifications and his verification appear in Part IV below.

volumes to full year 2012 through 2022 levels As explained in Section III.A above, UP updated IPA's traffic data and applied more current growth rates for the IRR traffic.

IPA provided that IRR will directly serve the Sharp Loadout and one destination power plant, IGS. In addition to a limited amount of manifest traffic that IRR through trains pick up or set out at local industries, the IRR traffic includes.

(a) issue coal traffic from the interchange with URC at Provo and non-issue coal traffic from a single IRR-served source, the Sharp Loadout, moving to IGS.

(b) coal traffic originated by IRR at the Sharp Loadout moving to the residual UP interchange at Provo or Milford;

(c) overhead traffic moving between Provo and Milford; and

(d) overhead traffic moving between Lynndyl and Milford.

UP accepts IPA's description of IRR traffic flows, except in the limited respects described in Section III.C 3.a below UP also accepts the interchange locations that IPA identified for IRR at Provo, Lynndyl, and Milford. IRR interchanges traffic with the residual UP at all of the interchange locations, and with URC at Provo.

Table III C.2 shows traffic density by line segment in the peak year (2022) for IRR.

Table III.C.2
IRR Peak-Year Traffic Density by Line Segment (Million Gross Tons)

Segment	IPA	Reply	Difference
Provo to Sharp	17.6	16.6	(1.0)
Sharp to Lynndyl	22.4	19.4	(3.0)
Lynndyl to IPP Industrial Lead	50.3	N/A	N/A
IPP Industrial Lead to Milford	40.9	40 4	(0.5)

Source. UP Reply workpaper "IRR Densities xlsx"

For the issue traffic received from URC in the Provo area, IPA assumes that IRR operations will mirror UP's real-world operations. UP receives these loaded trains in interchange from URC at the Coal Wye tracks that connect UP's Provo and Sharp Subdivisions, at a location referred to as Ironton At the interchange point, URC removes its locomotives from the train, and UP attaches its own locomotives and operates the train westward on the Sharp Subdivision towards IGS. IPA assumes that IRR will replicate the Coal Wye tracks and receive the trains from URC in the same manner as UP does today.[6]

IPA states that after unloading at IGS, IRR will return the empty trains to IPA's car shop near Springville (on the Sharp Subdivision south of Provo) (the "Springville car facility"), consistent with UP's current practice According to IPA, IRR will remove the locomotives and return them to the IRR locomotive facility. Following inspection and servicing of the empty train by IPA personnel at Springville, a URC crew will bring URC locomotives to the car facility and attach them to the empty cars For the empty interchange, the URC crew and power are assumed to operate over a portion of IRR track between Ironton and Springville, as they do over the UP track today.[7]

UP accepts IPA's description of this set of activities However, as described in Section III.C.2.c v below, UP's experts have increased IPA's assumed dwell time for interchange of the loaded trains because IPA's estimates do not account for the time required to complete all the activities that must occur during this operation, including inspections.

b. <u>Track and Yard Facilities</u>

The IRR track and yard facilities are described in Section III.B 2 above. As discussed there, UP adopts most of IPA's assumptions about these facilities As described in Section III B.1.c.i above, UP's experts concluded that additional mainline track of approximately 2.7

[6] IPA Opening Nar. at III-C-5 to III-C-6

[7] *Id* at III-C-6

miles would be needed near the Springville car facility (extension of a track addition proposed by IPA for this area) and that additional track would be needed at the Coal Wye tracks near Provo to accommodate inspection of loaded trains and some empty trains that IRR must perform. Schematics of the tracks and yard facilities are shown in UP Reply Exhibits III.B-1 and III.B-2.

UP accepts IPA's standards for track construction corresponding to various train speeds and for maximum gross weight on rail ("GWR"). IPA has chosen to construct the IRR mainline to a standard that permits maximum train speeds of 70 mph (conditions permitting) for intermodal trains, and 60 mph for all other trains, on the Lynndyl Subdivision. As explained below at Section III.C.2.c.iii, UP rejects IPA's 60-mph assumption for loaded coal trains (train symbols starting with C), loaded or empty grain trains (G or U symbols), and customer special trains (S symbols), all of which have a maximum operating speed of 50 mph in UP's system.

IPA has provided for centralized traffic control ("CTC") and main-track power switches on the Lynndyl Subdivision mainline between Lynndyl and Milford, but it has assumed all other portions of the IRR route will not be signaled (*i.e.*, will be "dark" territory).[8] IPA's assumption that these portions will not be signaled has safety and efficiency implications for IRR. For safety reasons, the Federal Railroad Administration ("FRA") limits speeds on unsignaled track to 49 mph.[9] As the UP track on the IRR routes is all CTC in the real world – permitting higher maximum speeds – IRR operations will be slower and more cumbersome than UP operations over part of IRR. Moreover, in dark territory a railroad must conduct more on-track inspections and increase use of rail defect detection processes, reducing IRR's efficiency further.

[8] *Id.* at III-C-7.

[9] *See* 49 C.F.R. § 236.0(c)(2)

IPA assumed that the IPP Industrial Lead would have a maximum speed of 40 mph.[10] However, the IPP Industrial Lead track must be treated as siding because it is not mainline track and not signaled Thus, trains cannot exceed 20 mph on the lead.[11]

UP accepts IPA's conclusion that engineer-controlled power switches will be used for turnouts connecting the non-CTC mainline track with passing sidings.[12] UP also accepts IPA's use of wood crossties, as well as its tie, other track, and subgrade specifications.

UP accepts IPA's identification of two small interchange yards located at Lynndyl and Milford.[13] As described in Section III.B.2 above, UP adds an interchange track at each yard to facilitate adding and removing cars from trains at each location and storage of these cars. Activities occurring at the yards are described in Section III.C.2 below.

c. Trains and Equipment

i Train Sizes

UP accepts IPA's assumptions regarding train sizes and its methodology of adding "growth" trains to reflect anticipated traffic growth [14]

ii Locomotives

UP accepts IPA's choice of the GE ES44-AC locomotive model to power IRR.[15]

IPA asserts that IRR will require a total of 14 locomotives to handle its peak-period traffic volume. According to IPA, this figure takes into account the need to equalize the

---

[10] IPA Opening Nar. at III-C-7

[11] UP Reply workpaper "UP System Special Instructions-Speeds.pdf" (provided in discovery at UP-IPA2-000000278 and 818).

[12] IPA Opening Nar. at III-C-7 to III-C-8.

[13] *Id* at III-C-8

[14] *Id.* at III-C-8 to III-C-9.

[15] *Id* at III-C-9 to III-C-11.

locomotive power IRR uses in run-through service for interline trains and also a spare margin and peaking factor.[16] As explained below, IPA has underestimated the number of locomotives IRR will need for the traffic IPA selected in several respects IPA

- based its locomotive requirements on understated running and dwell times,
- failed to account for the fact that IRR would need dedicated locomotive consists to power certain coal trains, including trains carrying the issue traffic;
- did not equip issue-traffic trains with 4 locomotives in order to enable a "2x2" Distributed Power configuration that produces more efficient operations,
- erroneously assumed that IRR would not incur ownership responsibility for units that would be "isolated with throttles in the idle position";[17] and
- ignored the fact that IRR would need to share in the cost of repositioning locomotives to address the imbalance in train and locomotive flows over the IRR lines

First, IPA developed locomotive hours for IRR through analysis of peak-period operations using the RTC model. As described below in Section III.C.3.f. UP's experts identified various errors in IPA's use of this model. For example, as discussed in Section III.C 2 c below, IPA understated loading, unloading, and other dwell times When these and other errors are corrected (and even with the downward traffic adjustments described in Section III.A), the RTC simulation shows that IRR operations would require a greater number of locomotive hours than IPA calculated As a result, IRR needs a higher number of locomotives than IPA assumed.

Second, IPA determined its total locomotive requirements using a calculation that fails to consider the fact that IRR will have two types of locomotive obligations. For the majority of IRR traffic, including all non-coal trains and coal trains interchanged with the residual UP, IRR

[16] *Id*

[17] *Id* at III-C-10.

will provide power to a run-through locomotive "pool." For trains for which IRR is solely responsible for providing the necessary power, IRR would need a separate dedicated pool of locomotives.

In its reply evidence filed in Docket No. 42127, UP explained this same point, as the operations needed to serve the traffic on the SARR in that proceeding also required provision of locomotives for two very distinct services. Because IPA truncated the SARR at Provo in the current proceeding, the traffic for which IRR will be solely responsible for providing locomotives is now even more limited, comprised entirely of IPA's own coal shipments on two lanes: the issue traffic received from URC at Provo[18] and non-issue traffic originating at the Sharp Loadout. However, IPA says nothing about the point UP raised in Docket No. 42127, applying the same formulaic approach to determine all of IRR's locomotive requirements. As a result, IPA has significantly overstated the utilization that units needed to power the IPA trains will achieve and erroneously assumed that run-through units will be immediately available at Provo whenever an IPA train appears.

IPA's own evidence confirms that the locomotive fleet requirements it developed would not adequately power the IPA trains carrying its coal. IPA proposes that each IPA train will be powered by three units.[19] In its calculation of IRR locomotive hours, however, IPA determines

[18] Although these trains are interline received at Provo, the URC power does not run through, requiring IRR to provide its own power to operate these trains. IPA acknowledges this aspect of the operations. IPA Opening Nar. at III-C-6 ("The URC removes its locomotives from the train and the IRR puts its own locomotives on the train as part of the interchange process.").

[19] IPA Opening Exh. III-C-2. As explained below, UP rejects this assumption and powers the IPA trains with four units. IPA's own workpapers show that this is how UP powers more than 90 percent of the IPA trains in the real world. IPA Opening workpaper "IRR Base Year Trains.xlsx." IPA's assumption that three locomotives would be used would result in inefficient operations. As explained below, a 2x1 locomotive configuration would not allow the IPA trains to re-load at Sharp and return to IGS without an increase in the time and effort required.

that the IPA trains would require only 1.8 units[20] This result is simply infeasible. IPA's formula fails to ensure that a full locomotive consist will be available when need – wholly inconsistent with its narrative description of the operations In its narrative, IPA explains that when URC delivers a loaded train to IRR at Provo, "three IRR locomotives and crew are ready to move from the IRR's nearby locomotive shop to join the train."[21] But IPA's calculation of IRR's locomotive fleet does not yield that number of units

Moreover, IPA cannot assume that locomotives would be available whenever an IPA train appears at Provo. Under IPA's operating plan, most of IRR's locomotives will operate in run-through service[22] IPA determined that the average on-SARR time for these run-through trains will be less than 5 hours.[23] Many of these IRR trains will continue on the residual UP to various points between Los Angeles and Chicago Thus, at any given time, most of IRR's units will be scattered throughout the residual UP's system. UP does not take issue with IPA's assumption that it would be efficient for units used for IRR's overhead traffic to run-through, but IPA cannot assume that these units would be available at Provo exactly when needed. IRR would need a dedicated pool of locomotives to ensure that power would be available for the IPA coal trains.

---

[20] IPA calculated that loaded and empty trains moving between Provo or Sharp and IGS (train symbols CUSIP, CUWIP, CIPIP, CSRIP, CIPSP, and CIPSR) would require 10,343 locomotive hours. IPA Opening workpaper "IRR Base Year Trains.xlsx," Tab "Combined Base Year." IPA adjusted locomotive hours on coal trains by a cumulative 50 percent to account for volume growth, spare margin, and a peaking factor, and divided by the total number of hours in a year (8,760) to determine its locomotive requirements. IPA Opening workpaper "IRR Operating Statistics xls" IPA's formula results in this computation: (10,343 x 1 50)/8,760 = 1.8 units.

[21] IPA Opening Exh. III-C-2, at 2.

[22] IRR trains carrying IPA's coal from Provo or Sharp are the only trains for which IRR power will not run-through at interchange with the residual UP

[23] IPA Opening workpaper "IRR Base Year Trains xlsx," Tab "Combined Base Year"

There is another reason IRR would need to maintain dedicated locomotive consists for the IPA trains. When URC delivers a loaded train to IRR, the interchange occurs on the Coal Wye tracks. Without a pool of locomotives dedicated to the IPA trains, IRR might have to wait for a run-through train to arrive and switch idle units out in order to power an IPA train, incurring delay for both that run-through train and the loaded train carrying the issue traffic. And, if a full consist were not available, the carset would block one of the Coal Wye tracks, which IPA assumes IRR and the residual UP will use to interchange more than 730 loaded and empty coal trains from Utah and Colorado, in addition to the issue-traffic trains interchanged with URC. It would be highly inefficient for IRR to have a loaded train sit, let alone block an interchange track used by an average of more than three trains per day.

UP's experts reviewed the train flows and concluded that IRR would need at least two dedicated locomotive consists to protect the service for the IPA Provo and Sharp trains. There will be more than 700 such trains, loaded and empty, in the first year of SARR operations, an average of nearly two each day.[24] In addition to the benefits of avoiding delay and additional costs, there are several other reasons to provide multiple locomotive consists for IRR. IPA's workpapers confirm that more than one IPA train will be on the SARR at the same time, requiring separate locomotive consists. Due to IPA's assignment of growth trains, more than one IPA train would be operating nearly two-thirds of the days, and on more than one-third of the

[24] IPA Opening workpaper "Peak Period Identification.xlsx"; UP Reply workpaper "Dedicated Coal Train Analysis.xlsx." IPA forecasts that its coal volumes would reach peak-year levels {

}

days there would be three or more IPA trains operating On 17 days five or six IPA trains would operate.[25]

As confirmation, UP's experts reviewed IPA's RTC simulation of IRR operations and identified numerous instances throughout the analysis period when multiple IPA trains would be on-SARR at the same time, requiring IRR to provide more than one locomotive consist to power both trains.[26] In some of these situations the on-SARR originations or terminations of IPA trains will occur at close to the same time, but in different locations not near one another, such as Provo and IGS.[27] In order to avoid delay – for these trains or others on the Coal Wye tracks – IRR must provide separate locomotive consists dedicated to the Provo and Sharp trains carrying the issue traffic and other IPA coal Finally, IPA's coal shipment volumes have fluctuated significantly from one month to the next [28] Thus, it is likely that IRR will need to run a higher than average number of IPA trains in some months, rather than spacing them evenly throughout the year. For all of these reasons, it is highly unlikely that IPA's coal shipments could be effectively served by only one dedicated locomotive consist. UP includes two dedicated locomotive consists for IRR, in addition to the "run-through" locomotive pool.

Third. IPA should have equipped issue-traffic trains with four locomotives rather than 3, to allow for a "2x2" Distributed Power ("DP") configuration. The 2x2 configuration, which UP uses on virtually all issue-traffic trains in the real world, permits a more efficient operation.[29]

---

[25] IPA Opening workpaper "Peak Period Identification.xlsx"; UP Reply workpaper "Dedicated Coal Train Analysis.xlsx "

[26] UP Reply workpaper "IPA Consist Same Time Different Locations xlsx."

[27] *Id.* UP Reply Exhibit III.C-1 illustrates such a situation

[28] UP Reply workpaper "IPA Monthly Volumes pdf."

[29] IPA's failure to replicate UP's use of a 2x2 configuration means that its purported use of actual dwell times at the Sharp loadout is invalid. IPA Opening Nar. at III-C-24. As the (continued...)

Around 90 percent of the issue-traffic trains reload at the Sharp Loadout after an initial stop at IGS These trains need two locomotives on each end, due to the track configuration at the loadout Because there is no loop track at Sharp, a train that pulls into the loadout cannot move out without switching the headend. The 2x2 configuration ensures that there will always be two units on the headend. With the 2x1 configuration IPA assumes, the crew would need to reposition one of the units from one end of the train to the other, lengthening the dwell time at Sharp, interfering with movements on the mainline, and increasing the frequency of re-crews.[30]

The dedicated locomotive pool for IPA trains would have nine locomotives – two consists of four units each, plus another unit when IPA's spare margin is applied.[31] Each of these units would require pace setter equipment to control movement of the train during loading and unloading operations.

Fourth, IPA erroneously assumed that IRR would not incur ownership responsibility for run-through units on IRR trains that would be "isolated with throttles in the idle position."[32] IPA states that in the case of overhead service, where one or more locomotives on a train IRR receives are not needed to move the train over IRR, these locomotives are assumed to be "isolated" or shut down so they are not contributing power for the movement of the train while it is on the IRR system[33] UP accepts this assumed shut-down of power, which would result in

---

discussion in the text shows, the loading operation at Sharp would take longer with a 2x1 locomotive configuration because the crew would need to reposition a unit to the headend.

[30] UP Reply Exhibit III C-2 illustrates the problem with using a 2x1 configuration for movements that include the Sharp Loadout.

[31] UP Reply workpaper "IRR Operating Statistics_Reply.xlsx "

[32] IPA Opening Nar. at III-C-10.

[33] *Id.* at III-C-21.

some fuel saving for IRR.[34] Shutting down locomotives, however, will not reduce the IRR locomotive requirements, since IRR would still have a locomotive-equalization obligation for any foreign locomotive on its system, whether or not the locomotive is powered up.[35]

Fifth, IPA failed to include an appropriate factor to account for imbalance in train and locomotive flows across its network. The non-coal traffic that IPA chose for IRR includes many more trains moving westbound than trains moving eastbound. This imbalance is clearly demonstrated by IPA's workpapers.[36] The imbalance results in greater costs due to the need to reposition locomotives (and train crews, as discussed in Section III.D). IPA failed to address this issue at all. It did not include any of the costs that IRR would incur as a result of the imbalances.

Table III.C.3 below summarizes the train counts and locomotive counts by direction for non-coal trains moving between Lynndyl and Milford from IPA's Base Year train list for IRR.[37]

---

[34] As explained in Section III.D, for the purposes of calculating IRR's fuel expense, UP excludes such units. UP Reply workpaper "IRR Operating Expense_Reply.xlsx." UP also excludes from the calculation of IRR's fuel expense locomotives being repositioned due to the imbalance in east-west train flows on IRR.

[35] Under standard locomotive equalization agreements, a railroad owes horsepower hours to the owner of a locomotive for the entire time the locomotive is on the railroad's property, regardless of whether that locomotive is idle or shut down. *E.g.*, UP Reply workpaper "equalization agreement.pdf." Of course, so long as a locomotive is in a foreign carrier's possession, it remains unavailable to the owning railroad.

[36] IPA Opening workpaper "IRR Base Year Trains.xlsx."

[37] The trains summarized in Table III.C.3 account for more than 80 percent of all IRR non-coal trains. *Id.* The locomotive counts represent the actual number of locomotives on the IRR trains, not the figures IPA labeled "SARR Locos." The latter figures reflect IPA's erroneous assumption that certain units would move on IRR trains yet be excluded from IRR's locomotive costs because they were "isolated with throttles in the idle position." IPA Opening Nar. at III-C-10. Even if idled for portions of the train's movement, the locomotives need to be considered when determining imbalances and the costs of re-positioning.

Table III.C.3
Imbalance in IRR Train and Locomotive Flows between Lynndyl and Milford

	Trains			Locomotives		
	Lynndyl-Milford	Milford-Lynndyl	Train Imbalance	Lynndyl-Milford	Milford-Lynndyl	Locomotive Imbalance
General Freight	843	566	49%	2,827	2,180	30%
Intermodal, incl. Z trains	1.100	651	69%	3,944	2.503	58%
Total, incl. Z trains	**1,943**	**1,217**	**60%**	**6,771**	**4,683**	**45%**
Total, excl. Z trains	**1,943**	**1,001**	**94%**	**6,771**	**3,924**	**73%**

Source: IPA Opening workpaper "IRR Base Year Trains xlsx."

Table III.C.3 shows that on IRR there are 60 percent more trains that move westbound from Lynndyl to Milford than move eastbound from Milford to Lynndyl This difference amounts to an average of two trains per day for IPA's traffic group – and jumps to an imbalance of nearly 2 to 1 when the high-priority Z trains are removed from the IRR traffic base due to IRR's failure to meet service standards for those trains. Some of the imbalance in train flows is offset by IRR's movement of more locomotives on the eastbound trains, as shown in Table III C 3. Nevertheless, in the IRR Base Year there are nearly 2,100 more locomotives moving westbound over the IRR lines than eastbound. In an average week, 130 locomotives move on IRR non-coal trains from Lynndyl to Milford, while only 90 return from Milford to Lynndyl.

This imbalance cannot be sustained, as units cannot continue to pile-up off of the western end of the SARR, while additional ones are needed beyond the eastern end of the SARR to continue to power the westbound trains.[38] Other railroads would require IRR to share in the costs of repositioning locomotives, and this time and expense must be included in IRR's

[38] This is typically not an issue for SARR traffic groups comprised of unit coal trains, as their empty return ratios generally result in a balanced flow of locomotives Here, where most IRR trains are non-coal – and exhibit sizable imbalances between eastbound and westbound flows – all railroads participating in the move will share in the costs of repositioning to correct the imbalance.

operating costs. By failing to account for the repositioning of locomotives needed to address directional imbalances on the IRR network, IPA provided an infeasible operating plan that would bring the railroad to a halt.

IPA cannot eliminate the need to account for imbalances simply by assuming that the power runs-through at the on-SARR or off-SARR point. IRR shares in the imbalances of locomotive flows on trains that are interchanged in run-through service, and it must share the costs with other railroads participating in those traffic flows Assuming that IRR could "free ride" on the efforts of UP and other railroads to reposition locomotives would be inappropriate. IPA claims that its IRR "road locomotive requirements take into account the need to equalize the locomotive power used in run-through service for interline (including overhead) trains."[39] To do so, the operating expense calculations must account for the fact that IRR will have an excess of more than 2,000 locomotives on westbound train movements over the course of the year. The costs must be covered in order to ensure that westbound trains can continue to get the necessary power

On reply, UP includes the costs associated with the imbalances in non-coal train and locomotive flows. UP's experts examined the train and locomotive flows by direction and increased IRR locomotive hours to account for the cost to reposition units to locations where they are needed to sustain the operations.[40]

IPA incorporated a spare margin of { } percent and a peaking factor of 19.1 percent for locomotives[41] UP accepts both of these factors. As indicated above, however, it applies the

[39] IPA Opening Nar at III-C-9

[40] UP Reply workpaper "Run-Through Locomotive Imbalance.xlsx."

[41] IPA Opening Nar. at III-C-11.

peaking factor only to the "run-through" locomotives, as two consists can adequately cover seasonal variations for the dedicated pool.[42]

UP has adjusted IRR road locomotive requirements by taking into account the corrected traffic levels that UP developed, the other corrections to RTC model inputs, the need for additional units in run-through service and in dedicated coal service, and the imbalance in train flows. UP concludes that IRR would need a total of 27 road locomotives in the first year of IRR operations.[43] Table III.C.4 shows IRR's locomotive needs.

Table III.C.4
IRR 2013 Locomotive Needs

	IPA	Reply	Difference
IRR Locomotives	14	27	13

Source: UP Reply workpaper "IRR Operating Statistics – Reply.xlsx."

IPA assumes that IRR will require no switch or helper locomotives.[44] UP accepts this assumption. IRR road units will be required to switch any bad-order cars.

iii. Railcars

UP accepts IPA's summary of ownership of railcars and intermodal units for each traffic type, with one exception.[45] As described in Section III.D.2 below, IPA erroneously concluded that IRR will provide all of the intermodal flat cars used to carry its traffic. Review of detailed UP traffic files indicates that the majority of the intermodal flat cars IRR will transport are

[42] UP examined the impact of removing the IPA coal trains from IPA's calculation of the peaking factor, and determined the peaking factor would slightly increase. UP Reply workpaper "Opening Peaking Factor for Run Through Trains.xlsx."

[43] UP Reply workpaper "IRR Operating Statistics_Reply.xlsx."

[44] IPA Opening Nar. at III-C-9 & n.7.

[45] *Id.* at III-C-12.

privately owned.[46] As IRR handles intermodal traffic exclusively in overhead service, it will be unable to revise this aspect of the operation, and will use the private equipment, as UP does in the real world.

UP adjusts IRR's railcar requirements to reflect its reply SARR traffic group, incorporating more current traffic forecasts and excluding shipments originating or terminating on-SARR for which IRR does not provide origination/termination service and the high-priority intermodal Z trains for which IRR provides inadequate service UP's railcar requirements also account for the longer transit times resulting from UP's corrections to IPA's RTC model. UP accepts IPA's conclusion that IRR car requirements should be increased by a five percent spare margin and the same peaking factor used for locomotives [47]

Section III.D.2 below and UP's workpapers detail UP's development of car ownership costs for system, foreign, and private cars.[48]

2. Cycle Times and Capacity

IPA properly recognizes[49] that the operating plan for a SARR must enable it "to meet the transportation needs of the traffic to be served,"[50] "must be capable of providing, at a minimum, the level of service to which the shippers in the traffic group are accustomed."[51] and "must be

[46] IPA Opening workpaper "2011 ATC Traffic.xlsx"; UP Reply workpaper "2011 ATC Traffic Reply.xlsx."

[47] IPA Opening Nar. at III-C-12 to III-C-13.

[48] UP Reply workpaper "IRR Car Costs_Reply.xlsx."

[49] IPA Opening Nar at III-C-13 to III-C-15

[50] *Id* at III-C-13 (citation omitted); *see also W Fuels Ass'n, Inc. & Basin Elec Power Coop. v BNSF Ry*, STB Docket No. 42088, slip op. at 15 (STB served Sept. 10, 2007) ("*WFA I*").

[51] *Pub. Serv. Co of Colo D/B/A Xcel Energy v Burlington N & Santa Fe Ry.*, 7 S.T.B. 589, 598 (2004).

realistic, *i.e.*, consistent with the underlying realities of real-world railroading."[52] In several significant respects, however, IPA's operating plan for IRR fails to satisfy these criteria. UP corrects various errors in IPA's analysis, and Mr. Wheeler incorporates the resulting adjustments into UP's RTC model, producing revised figures for cycle times and other operational data. Mr. Wheeler's adjustments are described in Section III.C.3.f below.

a. Procedure Used to Determine Configuration and Capacity

In developing IRR's capacity, IPA started with 2011-12 traffic data for its chosen traffic group and determined the "growth" trains, *i.e.*, the increased number of trains that would be required to handle the 2022 volumes IPA projected for the IRR traffic group. As explained in Section III.A above, UP revises IPA's traffic levels to reflect actual volumes in the fourth quarter of 2012 and to use updated traffic growth forecasts.

As described above, UP's operating witnesses are former UP employees who are highly knowledgeable about the IRR routes. Mr. Murphy has years of experience with the UP lines replicated for IRR and facilities located on these routes. In addition, in September 2011 Mr. Murphy took a hi-rail trip over the entire IRR route, visiting key locations.[53] He also drove along parts of the IRR route (on the Sharp Subdivision and in the Provo area) in March 2011. On these trips Mr. Murphy conducted interviews with UP operating personnel. He conducted follow up interviews with several of these employees in February and March 2013.[54] Based on information he gathered on these trips and in the interviews, as well as his long experience with

[52] *WFA I*, slip op. at 15.

[53] UP Reply workpaper "Murphy Trip Summary 2011.pdf."

[54] UP Reply workpaper "Murphy Interview Notes.pdf."

the relevant routes and locations, Mr. Murphy advised Mr. Wheeler about the track configurations, yard facilities, and other facilities that would be needed for IRR operations.

Mr. Wheeler started with the routes and trains IPA chose for IRR and reviewed IPA's RTC model. He used data from UP track charts and timetables, as well as information and recommendations from Mr. Murphy, as input for his RTC model simulations. Mr. Wheeler corrected IPA's model assumptions in various respects, as described in Section III.C.3.f below. He populated the RTC model with UP's revised numbers for IRR trains during the simulation period, including the peak volume week identified by IPA (March 7-13, 2022). After confirming through the RTC model simulations that IRR would not provide the necessary level of service for the high-priority, service-sensitive intermodal Z trains, Mr. Wheeler adjusted his simulations to omit those trains.

b Development of Peak Period Trains

UP accepts IPA's choice of a seven-day peak period (March 7-13, 2022) and a nine-day period for RTC model simulation (March 6-14, 2022).

UP also accepts IPA's development of 208 trains for the simulation period as a starting point for the analysis. UP adjusts this train count downward based on the differences between its calculation of peak-year traffic volumes and that of IPA.[55]

In addition, as noted above, UP's experts concluded that IPA's operating plan does not allow IRR to replicate the level of service UP provides for the high-priority, service-sensitive intermodal Z trains that move on the Milford-Lynndyl segment, typically as part of an eastbound movement from Southern California. The Z trains compete with trucks and with BNSF's expedited service. If the Z trains become slower or less reliable, UP will lose this highly

[55] See Section III.A above and UP Reply workpaper "UP Reply RTC Adjustments EP 715.xlsx."

competitive, service-sensitive business. IPA chose to insert IRR as a bridge carrier for a small part of this service-sensitive movement

IPA asserts that IRR meets or exceeds UP's service for all IRR traffic flows (including traffic on the Milford-Lynndyl segment) [56] But this assertion rests on a flawed analysis, because IPA failed to compare total transit time for movements on the SARR to UP's actual performance. IPA's analysis improperly ignores the total dwell time associated with the new interchange events created by insertion of IRR into the movements.[57] In effect, IPA inserts IRR into UP's route, then attempts to assign to UP the time required to interchange the traffic back to UP. In addition, IPA compared RTC run times for IRR trains during March 7-13 to UP's actual times from October 2012, rather than actual times for March 2012.

UP's analysis shows that, for the high-priority Z trains, when the additional dwell time for the interchange back to UP at Lynndyl is considered, IRR provides inferior service. When IRR's times (including dwell times at both interchanges) for March 7-13 are compared with UP's actual times for the Z trains for March 7-13, 2012, IRR is an average of 46 minutes (42 percent) slower than UP from Milford to Lynndyl (IRR time of 2 hours, 32 minutes vs. UP time of 1 hour, 46 minutes). When compared with UP's October 2012 times, IRR is an average of 23 minutes slower than UP (IRR time of 2 32 vs. UP time of 2 09). Indeed, when compared with UP's actual times for Z trains for the entire Base Year (July 2011 through June 2012), IRR is an average of 40 minutes (36 percent) slower than UP (IRR time of 2:32 vs. UP time of 1.52).[58]

---

[56] IPA Opening Nar at III-C-38; IPA Opening Exh. III-C-4

[57] IPA's narrative suggests that it allots 30 minutes of dwell time at each interchange point. IPA Opening Nar at III-C-25 However, IPA's RTC model does not include this dwell time when trains move off the IRR system

[58] UP Reply workpaper "IPA vs UP Z Train Transit Times.xlsx."

UP attempted to modify the operations on the Milford-Lynndyl segment to determine whether IRR could meet the level of service UP provides, including by undoing IPA's "shut-off" of some locomotives received from UP. Despite these efforts, UP's experts were unable to identify operational changes to the RTC model that would allow IRR to make up the difference in times.[59] UP therefore removed the Z trains from the SARR analysis because they could not meet the service requirements for this traffic.

The number of peak-period trains for IRR is shown in Table III.C.5 below.

Table III.C.5
Peak-Period Trains in RTC Model

Train Type	IPA	Reply	Difference
Coal			
Coal ("C")	54	49	-5
General Freight			
Auto ("A")	2	2	0
Manifest ("M")	42	42	0
Grain ("G")	4	4	0
Ore ("O")	15	15	0
Special ("S")	7	7	0
Unit Bulk ("U")	4	4	0
Intermodal			
Standard Intermodal ("I")	13	13	0
Priority Intermodal ("K")	61	62	+1
Premium Intermodal ("Z")	6	0	-6
URC Moves between Ironton and Springville			
Light Engine	0	8	+8
Empty Coal	0	8	+8
Total	**208**	**214**	**+6**

Source: IPA Opening workpaper "RTC List.xlsx" and UP Reply workpaper "Reply RTC Results.xlsx."

---

[59] UP Reply workpaper "Alternative Scenarios.zip."

c. Operating Inputs to the RTC Model

The elements discussed in this section are inputs to the RTC model. UP accepts many of IPA's inputs. In some cases, however, UP's experts concluded that it was necessary to adjust the inputs, for reasons discussed below. These adjustments in turn affected the results of the simulation of IRR's peak-period operations and the resulting transit times for IRR trains

i. Road Locomotive Consists

UP accepts IPA's assumptions about the locomotive consists used for particular types of trains, with one exception As discussed in Section III C 1 a.ii above, UP equips all issue-traffic trains with a 2x2 DP configuration (rather than a 2x1 DP configuration) for efficiency reasons related to the layout of the Sharp Loadout, where the issue-traffic trains typically reload.

As discussed in Section III.C 1.c ii above, IRR is responsible for supplying locomotives in two separate situations. For the majority of IRR traffic, including all non-coal trains and coal trains interchanged with UP, IRR will provide power to a run-through "pool " For trains for which IRR is solely responsible for providing the necessary power (*e.g* , for the issue traffic and non-issue coal traffic for IGS originating at the Sharp Loadout), there would be a separate dedicated pool of locomotives.

As described in Section III.C 1.c.ii above, IPA has underestimated IRR road locomotive requirements for its traffic group in certain respects. On the other hand, as a result of UP's adjustment to IPA's traffic growth rates and removal of the Z trains and shipments originating or terminating on-SARR for which IPA has not provided for origination/termination service by IRR, UP's traffic group for IRR is smaller. Considering all of these factors, UP's experts have determined that IRR would require 27 road locomotives in the first year of operations, rather than the 14 that IPA provides[60]

ii. Train Size and Weight

UP accepts IPA's assumptions regarding train size and weight, with the exception that UP decreases the train size for certain IRR trains to reflect removal of cars for which IRR would not provide local service, which UP excluded from the SARR traffic group.

iii Maximum Train Speeds

UP rejects IPA's 60-mph assumption for loaded coal trains (symbols beginning with C), loaded or empty grain trains (G or U symbols), and customer special trains (S symbols). IPA purports to replicate speed restrictions required by UP's operating timetables,[61] and all of these trains have a maximum operating speed of 50 mph under UP's operating rules.[62] IPA also failed to limit speeds for trains carrying certain hazardous materials, so-called "Key Trains," to 50 mph, as required by industry guidance and UP operating rules.[63] UP's train speed adjustments for all of these trains are consistent with UP's real-world practice. As discussed above at Section III C.1.b, UP also reduces the maximum speed on the tracks leading to the IPP Industrial Lead to 20 mph, because this track is not signaled and must be treated like a siding. UP accepts IPA's other decisions regarding maximum train speeds.

[60] The power assignments UP developed appear at UP Reply workpaper "IRR Base Year Trains Reply xlsx."

[61] IPA Opening Nar at III-C-22.

[62] UP Reply workpaper "UP System Special Instructions-Speeds.pdf" (provided in discovery at UP-IPA2-000000818 to 820)

[63] UP Reply workpapers "Examples - Key Trains Exceeding 50mph.pptx," "AAR Circular OT-55-L.pdf," and "UP System Special Instructions-Speeds.pdf."

iv. Unloading Times at IGS

IPA provides that IRR will deliver traffic to only one power plant, IGS, and it allots train dwell time of 4.25 hours for that delivery.[64] Rather than use train or car event data that UP provided in discovery, IPA relied on records maintained by Intermountain Power Service Corporation ("IPSC"), an IPA affiliate that staffs IGS According to IPA. IPSC personnel keep track of time spent by each UP coal train from the time the loaded train departs the UP main line until the time the empty train is released back to UP IPA states that the dwell time is the interval between arrival at the plant gate and IPSC's notification that the empty train is ready to depart the plant, based on daily records IPSC personnel maintain [65]

UP's experts reviewed IPA's calculations of unloading time at IGS and determined that the times IPA used fail to account for the full dwell time for locomotives at IGS. UP's experts found numerous examples where the time IPA counted as the endpoint for its dwell time calculations significantly preceded the actual departure of the train.[66] As each of the parties' RTC models assumes that the unloading time is followed immediately by the train departure, the dwell time must include all time up to the actual departure event UP's experts also confirmed that the locomotives on these trains remained at IGS during the entire unloading operation and were not used in other service.

Analysis of UP's records shows that the average actual unloading dwell time at IGS in 2011-12 was 6 3 hours.[67] Board precedent supports the use of actual loading and unloading

[64] IPA Opening Nar. at III-C-23.

[65] *Id.*

[66] UP Reply workpaper "IGS Average Dwell Times xlsx "

[67] *Id.*

times in rate cases.[68] UP has substituted the average real-world unloading time of 6.3 hours for IPA's incomplete estimate.

v Dwell Times at the Sharp Loadout

IPA proposes that IRR will serve the Sharp Loadout, and allocates 6 hours of train dwell time for that location.[69] IPA bases this figure on the *median* dwell time it calculated from UP's train movement records, acknowledging that the average was "somewhat higher" and that there were trains with loading times in excess of eleven hours.[70] As indicated in the preceding subsection, the Board routinely adopts for the SARR the actual dwell times that the incumbent experiences for loading and unloading at on-SARR industry locations. However, IPA's use of a median figure is inappropriate, as it fails to account fully for the actual loading times. IPA failed to explain why UP's actual experience with all trains would not apply to IRR.

UP's experts examined the train records and determined that for the trains with dwell times between 11 and 12 hours, the locomotives stayed with the train for the entire loading process[71] IPA claims that such trains "skew[]" the average,[72] but the average reasonably reflects the time that IRR locomotives would likely spend loading trains at Sharp UP's correction of IPA's estimate to include the longer dwell times produces an average dwell time at the Sharp Loadout of 6.4 hours.[73] UP uses this figure.

---

[68] *See Ariz Elec Power Coop , Inc v BNSF Ry.*, STB Docket No 42113, slip op. at 29 (STB served Nov 22, 2011) ("*AEPCO November 2011*"), *WFA I*, slip op. at 17, *Tex Mun Power Agency v Burlington N & Santa Fe Ry*, 6 S.T.B. 573, 656 (2003)

[69] IPA Opening Nar at III-C-24.

[70] *Id.*

[71] UP Reply workpaper "Sharp Coal Average Dwell Times.xlsx."

[72] IPA Opening Nar. at III-C-24 n 16

[73] UP Reply workpaper "Sharp Coal Average Dwell Times.xlsx."

vi Dwell Times at Sharp Grain Loop

UP accepts IPA's use of 19.0 hours for train dwell time at the Sharp Grain Loop [74]

Table III.C.6 below shows the actual loading and unloading times for the origins and destinations served by IRR.

Table III.C.6
Loading and Unloading Times for IRR Origins and Destinations (hours)

	IPA	Reply	Difference
Unloading			
IGS	4 25	6.3	2 05
Loading			
Sharp Coal Loadout	6.0	6.4	0.4
Sharp Grain Loop	19 0	19 0	0 0

Source. UP Reply workpapers "IGS Average Dwell Times.xlsx" and "Sharp Coal Average Dwell Times.xlsx"; IPA Opening Nar. at III-C-24

vii. Dwell Times at Yards or Other Interchange Points

IPA assigns various train dwell times for IRR yards and other interchange points, depending on the activities it proposes for those yards. Significantly, IPA has chosen not to equip some portions of IRR with CTC, including those in the Provo area. As a result, movements in the vicinity of Provo will be subject to the requirement that the train crew obtain track warrant authority from the IRR dispatcher before moving onto mainline track. This process will apply to trains moving from UP's Provo Yard onto IRR's Sharp Subdivision, trains moving between the Coal Wye tracks and IRR's Sharp Subdivision, and train movements to or from the Springville car facility The process of obtaining a track warrant can be cumbersome, requiring multiple radio communications between the crew and the dispatcher before the crew

[74] IPA Opening Nar at III-C-24.

will be authorized to move onto the mainline[75] Following this procedure, which is essential for safety in dark territory, will add substantial time to any activity that involves movements onto IRR's mainline track.

IPA allocates 45 minutes of total dwell time at Lynndyl for trains that change consists at that location, and 2.5 hours of total dwell time at Milford for trains that change consists there.[76] UP accepts these proposed dwell times. For trains that only interchange at Lynndyl and Milford without changing consists or requiring other activity, IPA assigns 30 minutes of dwell time UP accepts 30 minutes of dwell time for these trains.

IPA provides no dwell time for trains destined to/from UP-served points north of Provo, because IPA assumes the trains are interchanged in UP's Provo Yard and move to/from that yard without stopping on IRR's tracks.[77] UP accepts IPA's assumed interchange at UP's Provo Yard

IPA allots 30 minutes of dwell time for interchange for all westbound coal trains and all non-coal trains interchanged between IRR and UP at Provo.[78] UP accepts 30 minutes of dwell time for simple interchange operations However, UP adds inspection time for some IRR trains.

IPA's evidence regarding train inspections on IRR is contradictory. At some points IPA states that IRR does not need to conduct 1.000-mile or 1,500-mile inspections of any of its trains.[79] Later it states that empty IPA coal trains undergo inspections at IPA's Springville car facility and that other empty coal trains received from the residual UP at Milford will stop at the

---

[75] UP Reply workpaper "track warrant procedures.pdf" includes a description of the track warrant process

[76] IPA Opening Nar. at III-C-20.

[77] *Id.* at III-C-26

[78] *Id.* at III-C-25.

[79] *Id.* at III-B-8, III-C-39.

IPA car shop for inspection "when necessary."[80] And in its description of the movement of loaded coal trains received in interchange from URC at Provo, IPA refers to carmen performing a brake inspection.[81]

IPA includes dwell time for inspection of only those empty coal trains destined for Utah origins east of Provo, for which it allots three hours of dwell time.[82] However, coal trains moving to or from Colorado origins and loaded coal trains originating in Utah and travelling to Southern California also must be inspected and fueled by IRR because the roundtrip distances for these trains (over 1,500 miles) and the absence of other inspection facilities on these routes would necessitate inspections at Provo.[83] These inspections would occur on the Coal Wye tracks, as they do on UP in the real world. IPA neglected to include inspections for these trains in the loaded direction. UP allots three hours of dwell time for these trains, the same dwell time IPA assumes for empty coal train inspections.[84]

IPA assumes that coal and other trains moving between UP's Provo Subdivision and Lynndyl or beyond (including the IPA trains) will use the Coal Wye tracks replicating the tracks that connect UP's Provo and Sharp Subdivisions, and thus will not travel via UP's Provo Yard.[85] UP accepts this assumption.

---

[80] *Id.* at III-C-28.

[81] IPA Opening Exh III-C-2, at 3.

[82] IPA Opening Nar. at III-C-28 to III-C-29.

[83] *See* 49 C.F R. Pt. 232; UP Reply workpaper "Coal Train Fueling & Inspection Analysis.xlsx", UP Exhibit III.C-3. In the real world UP designates Provo as the inspection location for these trains when it identifies locations for 1,000-mile inspections, pursuant to FRA rules. *See* 49 C F.R § 232.207(c).

[84] IPA Opening Nar. at III-C-28 to III-C-29.

[85] *Id.* at III-C-25 to III-C-26

Locomotives on trains interchanged between UP and URC are not run-through, and IPA assumes the same will be true for locomotives on trains interchanged between IRR and URC. IPA assumes that, for loaded coal trains originating on URC, the inbound URC crew will remove the URC locomotives on the Coal Wye and take them to URC's Provo Yard. IPA states that the IRR crew will then bring three locomotives from the IRR Springville locomotive facility and place them on the train in a 2x1 DP configuration[86] IPA allots 1.25 hours for the locomotive transfer, activation of the DP unit. and performance of an air test.[87]

UP concludes that 1.25 hours is insufficient for the activities that IPA assumes for this interchange with URC Due to the track curvature, locomotives must move slowly in this area Because this area is unsignaled. track warrants are required IPA assumes IRR will issue two track warrants covering IRR's tracks at MP 698 50 and the Coal Wye tracks for the URC-IRR interchange of the issue traffic (one joint track warrant for URC and one track warrant for the IRR crew) and has added a set of crossover tracks at MP 1.19.[88] UP accepts the use of a joint track warrant for the URC crew and a separate track warrant for the IRR crew and the addition of the crossover tracks However, Mr. Murphy has determined that these changes will not significantly reduce the dwell time for the URC-IRR interchange This interchange is time consuming because URC locomotives do not have DP capability and therefore cannot be used in run-through service on the residual UP or IRR. As a result, URC locomotives arriving on loaded westbound trains must be removed before IRR locomotives can be added. This process requires multiple steps and safety precautions – none of which can be meaningfully shortened by IPA's

---

[86] *Id.* at III-C-26 to III-C-28. As discussed at Section III C.1.c.ii above, a 2x2 DP configuration is needed to avoid inefficient operations

[87] *Id* at III-C-28, IPA Opening Exh. III-C-2

[88] IPA Opening Exh. III-C-2; IPA Opening Nar at III-C-27.

proposed joint track warrant procedures or additional crossover track In addition, IPA has failed to account for certain necessary steps, such as applying and releasing hand brakes to secure the cars so they do not move unexpectedly.

Mr Murphy determined that the interchange operation IPA assumes for loaded trains coming off URC onto the wye track would entail at least the following activities:

1 Before entering the #1 wye track.[89] the URC crews operating the train would obtain a joint track warrant[90] to occupy IRR tracks at MP 698.50 and both wye tracks. The URC train would enter the #1 wye track and would pull forward until the entire train is on the wye track Mr. Murphy assigned no dwell time for this activity

2 The URC train stops on the #1 wye track so that the rear end clears MP 0.03. URC trains typically have three or four locomotive units on the head end (front of the train), two in the middle, and sometimes one or two on the rear.[91] The conductor riding on the middle units would turn the angle cock on the car ahead and uncouple the units from the cars ahead The head-end crew would then pull the front portion of the train forward onto the IRR Sharp Subdivision at restricted speed (5 to 7 mph) until the rear car is far enough on the Sharp Subdivision to provide adequate space for switching the middle locomotives onto the #2 wye track through the crossovers at MP 1.19. The middle unit conductor would then

[89] Contrary to IPA's description in IPA Opening Exhibit III-C-2. IRR would receive the train on the #1 wye track. rather than the #2 wye track. Due to the placement of IRR's locomotive shop adjacent to the #2 track, receiving the train on that track would block the switches IRR needs to move locomotives out of the locomotive shop for attachment to the train and would block access to the RIP track for setting out any bad-order cars.

[90] Joint track warrants authorize multiple parties (including separate crews on the same train) to work together over the same designated track for a common purpose

[91] Depending on the number of URC locomotives on the train, the entire train may not fit between the switches at MP 1.19 and MP 0.03. The URC crew operating the head-end units would likely pull past the switch at MP 1 19 before stopping the train to ensure that the rear car or rear URC locomotives clear the switch at MP 0.03 and to ensure that IRR will have adequate space between the rear car and MP 0 03 to add IRR locomotives to the train. Consequently. with the train blocking the switch at MP 1 19, the URC and IRR crews will not be able to use the crossover tracks at MP 1.19 (with the exception of removing the middle URC units) to interchange the train. UP has added a crossover track at MP 750.20 to facilitate the efficient movement of trains to/from the Springville car facility and the wye tracks. UP assumes that the URC and IRR crews would use the crossover track at MP 750.20 for the interchange when the crossover track at MP 1 19 is blocked by the train

secure hand brakes on the first ten cars behind the middle units and uncouple the middle units from those cars The middle unit crew would align the crossover switches to the #2 wye track from the locomotive cab, and pull forward onto the #2 wye track The middle unit crew would then realign the crossover switches, proceed east on the #2 wye track, and return to URC's yard at Provo Mr. Murphy estimates that this set of activities would take at least 25 minutes

3. After the middle unit crew departs with the middle units, the URC head-end engineer would shove the front portion of the train backwards to join the rear portion of the train To do this, the conductor of the head-end crew would walk to the rear car on the front portion of the train and protect the movement by walking with the rear car until a coupling is made. After the coupling is made, the conductor would cut in the air, release the ten hand brakes previously applied, and walk back toward the head end of the train. Mr. Murphy estimates that these activities would take at least 30 minutes.

4. The head-end conductor would set the hand brakes on ten cars at the head end of the train and uncouple the head-end units from the train. The head-end crew would then take the head-end units past the crossover switches at MP 750.20 and align the crossover switches to the #2 wye track from the locomotive cab. After the switches are aligned, the head-end crew would proceed east onto the #2 wye track, realign the crossover switches, release the joint track warrant, and return to URC's yard at Provo. Mr. Murphy estimates that these activities would take at least 25 minutes

5. After obtaining a track warrant for both wye tracks, the IRR crew would leave the IRR locomotive facility and operate four IRR locomotives eastward on the #2 wye track (at 5 to 7 mph). The IRR crew would continue eastward until the rear unit clears the switch at MP 0 03, realign the switch to the #1 wye track from the locomotive cab, and then move west to the rear of the train The IRR conductor would then couple the rear DP units onto the train and cut in the air, and the IRR engineer would check the DP communication After the IRR conductor uncouples from the rear locomotives, the IRR crew would operate the other two units eastward until both units clear the switch at MP 0.03, realign the switch to the #2 wye track, and then operate the two units westward on the #2 wye track. The crew would then align the crossover switches at MP 750 20, proceed onto the #1 wye track, realign the switches, and move the two units onto the head end of the train. Mr. Murphy estimates that these activities would take at least 30 minutes.

6. The IRR conductor would couple the head-end DP units onto the front of the train, cut in the air, and release the hand brakes, while the IRR engineer sets up the DP communication The IRR crew would then obtain a track warrant for the Sharp Subdivision and wait for the carmen to perform a brake inspection before heading west onto the Sharp Subdivision. Before conducting the inspection, the carmen would apply blue flag protection to the front and rear of the train (*i e.*, the carmen would place a blue flag on the track and also on the train) as required by

> FRA regulations. *See* 49 C.F.R. § 218.25. Once the carmen have completed these necessary safety precautions, the engineer would set the brakes and the carmen would inspect the brakes by driving along both sides of the train, ensuring that the brakes were applied on each car. At the conclusion of the inspection, the carmen would remove the blue flags from the track and the train. Mr. Murphy estimates that these activities would take 20 minutes

The minimum time required for these activities would be 130 minutes.[92] Mr Wheeler used this as the dwell time for the loaded coal trains interchanged between URC and IRR at Provo.

IPA assumes that empty IPA coal trains will be interchanged with URC at IPA's Springville car facility and will undergo inspection, bad-order switching, and repairs by IPA personnel.[93] Other empty coal trains IRR receives from UP at Milford that are destined for URC origins or UP-served origins east of Provo also stop at the car facility "when necessary."[94] IPA allots three hours of dwell time for inspection and fueling of the non-IPA empty coal trains.[95] UP accepts three hours of dwell time for these activities, although more time would almost certainly be needed in those instances when locomotives or cars are removed and replaced.

UP accepts IPA's assumption that the Springville car facility will perform these functions for the IPA trains, and that IPA will charge IRR the same hourly fee that it charges to third parties IPA did not submit evidence supporting this hourly fee UP nevertheless accepts IPA's

[92] UP Reply Exhibit III.C-4 contains schematic diagrams illustrating the activities described in the text If the URC train had locomotive units on the rear of the train, more activities would be required to remove these units, adding to the dwell time.

In fact, UP's estimate of 130 minutes is over an hour less than the average actual interchange time for the URC trains for the July 2011 to June 2012 period, based on UP car event records produced to IPA in discovery. UP Reply workpaper "Provo Average Interchange Times.xlsx."

[93] IPA Opening Nar. at III-C-28

[94] *Id*

[95] *Id* at III-C-28 to III-C-29

assumptions for the IPA trains IPA allots no dwell time for empty IPA trains that are interchanged with URC. Instead, IPA treats these trains as terminating and then originating at the Springville car facility[96] UP accepts IPA's treatment of these empty IPA trains. IPA also assumes there will be URC movements over IRR tracks to pick up these trains,[97] but it did not include these movements in its RTC simulation Mr. Wheeler has added these movements to UP's RTC analysis.

UP also accepts IPA's allotment of three hours of dwell time for inspection and fueling of the non-IPA empty coal trains.[98] However, UP rejects IPA's assumption that IPA would perform these inspections at the Springville car facility Including the loaded coal trains that would require inspection at Provo, IPA's proposal means that the Springville car facility would perform 1,150 inspections each year, an average of four and a half trains each workday.[99] Mr. Murphy has analyzed the operations and track configurations at the car facility and determined that it lacks the capacity to conduct efficient inspections of all the non-IPA empty coal trains, as well as the loaded coal trains destined for Southern California discussed above The Springville car facility operates eight hours a day, five days a week. Thus, trains that arrive late in the day or over the weekend would incur substantial delays waiting for the car shop to reopen IPA asserts that it currently performs some inspections of some non-IPA empty coal trains at the Springville car facility,[100] but it provides no evidence of how frequently this occurs,

---

[96] *Id.* at III-C-29 n.20.

[97] *Id.*

[98] *Id* at III-C-28 to III-C-29.

[99] UP Reply workpaper "Coal Train Fueling & Inspection Analysis xlsx."

[100] IPA Opening Nar. at III-C-29

how much delay such trains experience as a result, or even whether these are trains that IPA chose for IRR's traffic group

Moreover, performing inspections of all trains at the Springville car facility would be inefficient from an operational standpoint. For trains IRR will move in interchange to the residual UP, stopping for inspection at the Springville car facility would require that an IRR crew make an extra trip to the car shop to pick up the inspected train and move it to the wye tracks for delivery to the residual UP. This would mean additional costs for IRR. IPA assumes that a UP crew would pick up the train at the Springville car facility[101] But there is no basis for assuming that UP would move over IRR tracks to pick up these trains. Rather, UP would expect an IRR crew to handle any movement over IRR tracks. Thus, the more efficient location for IRR to inspect the trains is on the Coal Wye tracks. IRR already provides for carmen on the wye tracks to conduct brake inspections for trains it receives in interchange from URC[102] IRR could use those employees to conduct additional inspections at that location.

Finally, UP's Coal Wye Tracks, which IRR replicates, are where inspections of non-IPA trains moving on UP occur today. Absent persuasive evidence that IRR could operate more efficiently by moving the inspection location, the Board should presume that IRR would perform inspections of non-IPA trains on the wye tracks UP has moved the inspection for these trains to IRR's Coal Wye Tracks and provided for the necessary inspection personnel and facilities.[103]

---

[101] *Id*

[102] IPA Opening Exh. III-C-2, at 3.

[103] UP Reply Exhibit III.C-5 illustrates the positions of IPA and UP regarding the location for inspections of non-IPA trains at Provo

viii Dwell Times at Intermediate Pickup and Setout Points

IPA has allotted 30 minutes of dwell time for each pickup or delivery operation at Nephi. Martmar, Delta, and Bloom.[104] However, this dwell time is inadequate for the activities necessary for the pickup and setout operations at these locations. Mr. Murphy has determined that picking up cars at these locations would take at least 70 minutes. and setting out cars would take at least 90 minutes.[105]

ix. Crew-Change Locations/Time

IPA provides for IRR crew changes at Provo, the Sharp Loadout, Lynndyl, Milford, and IGS. It allots 15 minutes for a crew change at points where this is the only activity and no extra time at points where other functions are performed.[106] UP accepts these time allotments.

IPA's operating plan for IRR specifies four crew districts and assignments.[107] UP accepts these proposed districts and assignments

IPA acknowledges that some IRR crews will expire under the Hours of Service Law and that there will be re-crew and taxi expenses in these situations.[108] When crews outlaw. there is additional delay, as well as greater cost, a second crew must be called, and both crews must be taxied between the train and their home terminal. IPA determined that 0.96 percent (two out of 208) of the trains in its RTC model required a re-crew.[109] UP accepts this percentage as an acceptable proxy for the times that IRR crews would reach the Hours of Service limit and require

[104] IPA Opening Nar at III-C-30 to III-C-31

[105] UP Reply workpaper "Pickup and Delivery Operations at Intermediate Points docx"

[106] *Id*

[107] *Id.* at III-C-31 to III-C-32.

[108] *Id* at III-C-32.

[109] *Id.* at III-D-14

relief. While UP's RTC model did not show that crews would exceed the limit for trains modeled in the peak week, it cannot be concluded that a railroad operating in Utah would never have to relieve crews. IRR would operate a mix of trains at different speeds, such as intermodal trains, key trains carrying hazardous materials and other shipments that require special handling, and coal unit-trains IRR would have planned maintenance windows, random track outages, and other delays and interference that are beyond its control IRR – like all railroads – would have crews outlaw on occasion. This is inevitable given day-to-day vagaries of railroad operations, including challenges in coordinating with the residual UP And there is weather – especially in Utah. A perfect record could not be achieved throughout the year.

IPA states that its crew districts and crew assignments reflect IRR's ability to operate in a manner not constrained by prior mergers or union work rules. It asserts that IRR has more flexibility than Class I railroads in scheduling crews and maximizing their use[110] However, this flexibility is limited by FRA requirements that apply to all railroads, and IPA acknowledges that IRR crews must operate within the constraints of the federal Hours of Service Law[111] This flexibility is also limited by the fact that all trains traverse only one crew district on IRR, reducing the likelihood that the crew will go off duty at a location where there will be opportunity for a subsequent assignment to work nearby IRR's low train volumes will further hamper its purported flexibility, as trains will not always be available for the crew to operate back to the home terminal "after receiving their minimum rest under FRA rules"[112]

[110] *Id* at III-C-32

[111] *Id.*

[112] *Id.* at III-C-31.

x. Track Inspections and Maintenance Windows

IPA allots no separate time for FRA-prescribed track inspections in its RTC model, assuming instead that such inspections would be performed between train movements, or in the wake of a train during periods of heavier traffic.[113] IPA also does not budget time for program maintenance based on its assumption that such maintenance will occur during periods other than the peak traffic period it models.[114] UP does not accept IPA's assumption regarding track inspections and program maintenance for purposes of its reply RTC model simulations in this case

IPA's assumption that a hi-rail vehicle could move between train movements or in the wake of a train is incorrect. In dark territory, hi-rail vehicles would occupy track pursuant to track warrants. In theory, a track warrant issued to a hi-rail vehicle could be shared by a train, but this would slow the speed of the train. Hi-rail vehicles travel at a maximum speed of 45 mph[115] and make frequent stops as inspectors dismount to examine track. In signaled territory a train and a hi-rail vehicle ordinarily would not share a track block due to safety concerns, in particular the risk that a hi-rail vehicle would collide with a stopped train IPA's assertion that trains and hi-rail vehicles would travel in the same block on IRR is inconsistent with industry practice and raises serious safety issues.

Moreover, it is unrealistic to assume that there would be no program maintenance during a typical week The Board has accepted inclusion of this real-world practice in a recent rate

[113] *Id.* at III-C-33 to III-C-34.

[114] *Id* at III-C-34. IPA is incorrect in suggesting that program maintenance would occur when the weather is better. The weather should generally permit some program maintenance in early March, the period of IRR's peak week.

[115] UP Reply workpaper "UP System Special Instructions - Speeds.pdf" (provided in discovery at UP-IPA2-000000895).

case.[116] UP assumes a normalized maintenance schedule and incorporates windows for program maintenance into the RTC model.

UP's RTC model includes two hi-rail movements for track inspection during the peak week. Mr. Wheeler also includes normalized track maintenance delays of approximately 3.4 hours per day, based on analysis by UP's MOW expert, Mr. Hughes.[117]

xi. Time for Random Outages

IPA acknowledges that random events affecting rail operations would inevitably occur during the peak period used for its RTC model simulation.[118] It allots time for four random outages during the peak week it models, citing review of data produced by UP during discovery.[119] UP accepts IPA's treatment of these four outages.

d. Results of the RTC Simulation

Mr. Wheeler reviewed IPA's RTC model and analyzed the assumptions IPA made in developing the model. As discussed below in Section III C.3.f, he identified a variety of problems with IPA's RTC simulation. In addition, as explained above, UP's experts identified certain respects in which IPA's operating plan is not consistent with efficiency, safety, or customer requirements. In particular, IPA's comparison of UP and IRR average transit times on the Lynndyl-Milford segment does not take proper account of the additional dwell time due to new interchange operations at Milford and Lynndyl. As explained above, when the additional

[116] *AEPCO November 2011*, slip op. at 28-29

[117] UP Reply workpaper "Maintenance Windows for RTC.xlsx." Mr Hughes estimated track maintenance required over the DCF period (including tie renewal, surfacing, rail replacement, and switch replacement) and then averaged this effort over total working days. This analysis produced a normalized figure of 3.4 hours of track occupancy per day *See id.*

[118] IPA Opening Nar. at III-C-35.

[119] *Id* at III-C-35 to III-C-36.

dwell time at Milford and Lynndyl is considered, it is evident that IRR would not meet UP's level of performance for the high-priority, service-sensitive intermodal Z trains Mr. Wheeler therefore removed these trains from the RTC simulation

Mr Wheeler used the RTC model to run a corrected simulation of IRR operations. He used IPA's peak week for modeling purposes, but corrected for the errors he identified. With the advice of Mr Murphy and UP's engineering experts, Mr Wheeler incorporated appropriate track and yard configurations and various revisions to IPA's operating parameters, as described above. Mr Wheeler ran UP's RTC model and obtained outputs in the form of running times for each line segment and transit times and cycle times for IRR trains.[120] These outputs were used to develop IRR's time-based responsibilities for locomotives, freight cars, and train crews. UP used the output of Mr Wheeler's RTC simulation to develop revised equipment fleet sizes and crew requirements for its Reply SAC analysis of IRR

3. Other

a. Rerouted Traffic

UP accepts IPA's assertion that the IRR traffic group does not include any traffic that has been re-routed from its real-world route of movement [121]

b. Fueling of Locomotives

IPA proposes that IRR will re-fuel road locomotives on coal trains that pass through Provo in the eastbound direction, "as needed."[122] According to IPA, a contractor will perform

[120] Schematic diagrams of the IRR tracks as they appear in UP's RTC model are provided as UP Reply Exhibit III B-1. The electronic files containing UP's RTC model run, output, and case files are included in UP Reply workpaper "UP Reply RTC Case.zip."

[121] IPA Opening Nar. at III-C-38.

[122] *Id* at III-C-39

direct-to-locomotive ("DTL") fueling of these locomotives.[123] IPA assumes that all locomotives on other IRR trains will be fueled while on UP,[124] and includes in its calculations of IRR's operating expense the cost of all fuel consumed on IRR segments, even for trains that are not fueled by IRR.[125] UP generally accepts IPA's proposals for locomotive fueling. However, IPA failed to fuel certain IRR coal trains that UP fuels in the loaded direction at locations replicated by IRR. UP discovery documents produced to IPA indicate that certain coal trains that UP originates from Utah coal mines are fueled on the Coal Wye tracks (which IPA replicates for IRR), not at UP's Provo Yard (which these trains do not traverse).[126] As IRR would be responsible for fueling these trains, UP accounts for the additional time associated with this activity.

c. <u>Car Inspections</u>

i. <u>Inspection Locations</u>

As discussed in Section III.C.2.c.vii above, IPA's evidence regarding IRR inspections is internally inconsistent. At some points, IPA asserts that IRR will arrange for inspection of both IPA and non-IPA empty coal trains at IPA's Springville car facility. UP accepts IRR use of the Springville car facility for inspection of the IPA trains. However, for the reasons described above, inspection of non-IPA trains at that facility would be inefficient, and it is inconsistent with UP's current practice of conducting inspections of non-IPA trains on the Coal Wye tracks. Mr. Murphy determines that all inspections of non-IPA trains should occur on the wye tracks.

---

[123] *Id.*

[124] *Id.* This assumption is consistent with common railroad operating practice. However, IRR is responsible for the cost of all fuel used by locomotives while they are on IRR lines.

[125] UP Reply workpaper "IRR Operating Statistics_Reply.xlsx."

[126] UP Reply workpaper "Fueling & Inspection Locations – Coal Unit Trains & Z Trains.xls" (provided to IPA in discovery at UP-IPA2-000001032).

ii. Inspection Procedures

UP accepts IPA's description of the inspection procedures IRR would follow for empty coal trains moving to the Sharp Loadout, the staffing it proposes for these activities, and its allotment of three hours of dwell time for these trains.[127] As discussed above, UP adds inspections for certain loaded coal trains received from UP and loaded coal trains received from URC, and assumes similar procedures for such inspections.

d. Train Control and Communication

i. CTC/Communications System

IPA provides for CTC on only part of the IRR system – the mainline between Lynndyl and Milford. The remaining IRR mainline – approximately half the system – is dark, although IPA assumes that locomotive engineers will control mainline switches remotely [128] IPA assumes that a single dispatcher located at Lynndyl will control train operations in dark territory through radio communications and issuance of track warrants [129] As noted above, the need to obtain a track warrant when moving onto mainline track will add time to some operations in dark territory, including at Provo and at sidings on the Sharp Subdivision UP accepts IPA's assumptions on these subjects. IPA's assumptions regarding communications equipment are discussed in Section III.F.6 below.

IPA provides for installation of FEDs at intervals along IRR tracks [130] As discussed in Section III.B 1.c iv above, UP's engineering experts conclude that IPA did not provide sufficient

[127] IPA Opening Nar. at III-C-28 to III-C-29, III-C-40

[128] *Id* at III-C-40.

[129] *Id.* at III-C-40 to III-C-41.

[130] *Id.* at III-C-41.

FEDs under current rail engineering standards. They add three FEDs and modify the placement of the FEDs proposed by IPA.

IPA states that if set-out of a car is required, the train crew will use set-out tracks located on either side of each FED on the Lynndyl Subdivision, or on one set-out track on the Sharp Subdivision.[131] As discussed above in Section III.B.1 e.iv above. IPA has failed to provide sufficient set-out tracks at certain FED locations. On single track, there must be set-out tracks on both sides of an FED, because trains will pass the FED in both directions. At several locations, IPA has provided set-out tracks on only one side of an FED.[132] As explained above, however, any assumption that trains with a bad axle or wheel could be shoved backwards to set out a car is incorrect Such an operation would cause unnecessary delays, increase the possibility of a derailment, and could not be performed properly with the two-person crew IPA assumes. Some of the set-out tracks IPA provides are too close to the FEDs to permit the train to stop in time to set out a car on the tracks. UP adds the necessary set-out tracks and adjusts the spacing of the set-out tracks IPA proposed.

ii. Dispatching Districts

IPA provides for a single dispatching district for IRR, with one dispatcher position.[133] UP accepts this proposal. UP addresses IPA's proposal for dispatching equipment in Section III.F.6 below.

---

[131] *Id.* at III-C-41, III-B-7.

[132] IPA Opening Exh. III-B-1.

[133] IPA Opening Nar. at III-C-41. IPA's provision of just one dispatcher position for a broad area with large amounts of dark territory means that crews at Provo that need to enter the mainline may face delays due to the need to obtain a track warrant. Trains that enter sidings on the Sharp Subdivision may also face delays in returning to the mainline.

iii PTC Implementation Under RSIA

IPA properly recognizes that its locomotives will need to be equipped for Positive Train Control ("PTC") operations, since IRR road locomotives will operate in run-through service over UP lines.[134] As explained in Section III.D.1 below, IPA failed to account properly for the cost of retrofitting its locomotives with such PTC equipment.

c. Corrections to IPA's RTC Simulation

As discussed above, UP's experts identified errors or unacceptable inefficiencies reflected in IPA's RTC model simulation, and Mr Wheeler corrected the model accordingly. The following list summarizes changes Mr. Wheeler made to IPA's RTC simulation.

Traffic Selection Changes:

1. Remove high-priority intermodal Z trains
2. Reduce peak-period train counts to account for Reply adjustments to traffic levels
3. Remove cars for which IRR does not provide the necessary local service

Operating Changes

4. Correct coal loading and plant unloading times to reflect real-world experience
5. Add 30-minute interchange dwell time for trains at off-SARR points (as well as on-SARR points)
6. Locate interchange at Lynndyl Yard for northbound Milford-Lynndyl trains (as IPA assumed for interchange of southbound Lynndyl-Milford trains)
7. Change UPC-IRR loaded train interchange dwell time at Provo from 1.25 hours to 130 minutes (2.17 hours)
8. Increase dwell times for pick-ups and set-outs at Nephi. Martmar, Delta and Bloom from 30 minutes to 70 minutes (pick-ups) or 90 minutes (set-outs)
9. Add URC movements to and from IPA car facility
10. Add hi-rail movements and program maintenance delays

[134] *Id.* at III-C-42 to III-C-43.

11. Change maximum speed limit to 50 mph for key trains and trains with symbols starting with C, G, U, or S

Capacity Adjustments

12. Extend the second mainline track near the IPA car facility to facilitate train movements in this area

III D. <u>OPERATING EXPENSES</u>

In Section III D of its opening evidence, IPA summarized the annual operating expenses of its SARR, based on the traffic and operations that it assumed for IRR. IPA calculated total expenses of $46 million for 2013, the first calendar year of IRR operations, associated with expenses for equipment, personnel, information technology, maintenance of way, taxes, and loss and damage.[1] In this Section III.D, UP presents its development of the operating expenses for its reply case. UP's numbers differ from IPA's numbers in two material respects First, UP determined the expenses associated with its reply SARR traffic group, which, as explained in Section III A above, has lower volumes than IPA's opening traffic group.[2] Second, UP identified many items for which IPA has understated – or failed to provide altogether – the expenses associated with the operations, maintenance, and support that are required for IRR. In addition to understating the costs that IRR will incur, IPA failed to account for additional costs that the residual UP would incur as a result of IRR's operations, costs that must be included in a SAC analysis Table III.D.1 below compares the parties' operating expense results, summarized by expense item. Following the table, UP addresses each item in turn

[1] IPA Opening Nar. at III-D-3, Table III-D-1.

[2] UP's lower reply volumes result from updating 2012 volume levels with more current data, applying more accurate forecasts of future volumes for the SARR traffic, and eliminating certain intermodal trains and other shipments for which IRR would not provide service comparable to the service UP's customers demand and receive today.

Table III.D.1
IRR 2013 Operating Expense Summary
($ millions)

Expense Item	IPA	Reply	Difference
Locomotive Lease	{ }	{ }	{ }
Locomotive Maintenance	{ }	{ }	{ }
Locomotive Operations	15 2	18.1	2.9
Railcar Lease	5.1	7 5	2 4
Material & Supply Operating	0.2	0.4	0.2
Train & Engine Personnel	3.1	5 3	2.3
Operating Managers	3 0	4.0	1.1
General & Administrative	7 3	8.8	1.5
Loss and Damage	0.1	0.1	0.0
Ad Valorem Tax	0.9	0.6	(0 4)
Maintenance of Way	4.9	8.1	3.1
Insurance	1 7	2.3	0.6
Startup and Training	1.7	2 4	0.7
Total	**$45.7**	**$62.2**	**$16.4**

Source UP Reply workpaper "IRR Operating Expense Reply xlsx."

1 Locomotives

IPA proposes powering IRR with high-horsepower General Electric ("GE") ES44-AC units ("ES44s") As explained in Section III.C above, IPA made several errors that led it to understate the number of locomotives that would be required to handle the IRR traffic, including:

- basing its locomotive requirements on understated running and dwell times;
- failing to account for the fact that IRR would need dedicated locomotive consists to power certain coal trains, including trains carrying the issue traffic.
- not equipping issue-traffic trains with four locomotives, in order to enable a "2x2" Distributed Power ("DP") configuration to produce more efficient operations;
- erroneously assuming that IRR would not incur ownership responsibility for units that would be "isolated with throttles in the idle position,"[3] and

[3] IPA Opening Nar at III-C-10.

- ignoring the fact that IRR would need to share in the cost of repositioning locomotives to address the imbalance in train and locomotive flows over IRR lines.

In addition, IPA committed other errors that led to understated locomotive acquisition, maintenance, and fueling costs, as discussed in detail below.

a. <u>Acquisition</u>

IPA assumes that IRR would lease all of its locomotives. IPA calculated an annual lease cost of { } from an ES44 lease that UP produced in discovery. UP accepts the use of this amount as the lease cost for the base period, to be input to the SAC cost model and inflated over the analysis period (*i.e.*, 2012-2022).

In addition to the base lease amount, IPA included { } as the cost of equipping each locomotive for Positive Train Control ("PTC") operations. IPA identified that amount from a document that UP produced in discovery, but it ignored another estimate that was both more recent and more detailed. UP produced the more recent estimate in response to a set of IPA's supplemental discovery requests that specifically sought such information. The figure on which IPA relied was just one component of a much broader set of calculations that UP produced in response to Request for Production ("RFP") No. 73 from IPA's first set of discovery requests.[4] RFP No. 73 sought UP's actual or expected costs "to implement its PTC Implementation Plan on a system-wide basis." UP's response included estimates for a variety of items, including {

} in addition to locomotive equipment. Subsequently, IPA served Second Interrogatories and Requests for Production of Documents, focused exclusively on the costs "of equipping locomotives to be PTC-compliant."[5] In response to that request, UP produced a detailed estimate identifying costs of {

[4] UP Reply workpaper "IPA First Discovery Requests.pdf."

[5] UP Reply workpaper "IPA Second Discovery Requests.pdf."

}[6] An example of the costs that were included in the more recent estimates produced in response to the supplemental requests was a "Crashworthy Memory Module." This item, which is required by FRA rules, was not included in the estimate on which IPA relied.[7] Other examples include antenna equipment, related cables, and bracketry specific to upgrading GE units, for which more detail was provided in the later estimate. UP relies upon { } as the cost of equipping IRR's GE locomotives for PTC operations.

Table III.D.2 below summarizes the 2013 locomotive counts and lease expenses.

Table III.D.2
IRR 2013 Locomotive Lease Expense

	IPA	Reply	Difference
Number of Units	14	27	13
Lease Costs	{ }	{ }	{ }

Source: UP Reply workpaper "IRR Operating Expense Reply xlsx."

b. <u>Maintenance</u>

IPA assumes that IRR locomotives would be maintained by a contractor and bases the associated IRR operating expenses on the terms of an agreement between UP and { } that UP produced in discovery.[8] UP accepts IPA's calculation of the { } and tailors those calculations to the reply traffic group, operations, and locomotive counts. To correct IPA's erroneous exclusion of costs associated with locomotives that IRR would idle, UP

---

[6] UP Reply workpaper "Dans on_board cost_111120100954 xlsx" (produced in discovery at UP-IPA-000040834).

[7] *See* 49 C.F.R. § 236.1005(d) ("Each lead locomotive, as defined in part 229, manufactured and in service after October 1, 2009, that is equipped and operating with a PTC system required by this subpart, shall be equipped with an event recorder memory module meeting the crash hardening requirements of § 229 135 of this chapter.").

[8] IPA Opening Nar. at III-D-4 to III-D-5

includes all units moving on IRR trains in the calculation of maintenance expense. Charges under the {

}.[9] UP incurs a maintenance expense – { } – when its units are idling or being re-positioned, and IRR will, too.

IPA assumed that IRR's units would require an overhaul every six years, based on IPA's conclusion that the units would average about 12,000 miles per month.[10] UP's experts correct IPA's erroneous assumptions, as described above, and develop a larger fleet of IRR locomotives that will average about 8,000 miles per month.[11] UP accepts IPA's overhaul cost, and pushes out to eight years the frequency of overhauls, to account for the more realistic utilization levels of its reply IRR fleet.[12]

Table III.D.4 below summarizes IRR's 2013 locomotive maintenance expenses.

Table III.D.3
IRR 2013 Locomotive Maintenance Expense

IPA	Reply	Difference
{ }	{ }	{ }

Source: UP Reply workpaper "IRR Operating Expense Reply.xlsx."

[9] {

} IPA includes excerpts of UP's maintenance contract in its workpapers. IPA Opening workpaper "III-D-1 Locomotive Cost.pdf" at 20-21.

[10] IPA Opening Nar. at III-D-6.

[11] UP Reply workpaper "IRR Operating Statistics Reply.xlsx."

[12] UP Reply workpaper "IRR Loco Overhaul_Reply.xlsx."

c Servicing

IPA bases IRR's locomotive servicing expenses (other than fueling) on certain figures from UP's 2011 Annual Report Form R-1 ("R-1") and UP's lube oil expense information contained in materials that UP produced in discovery.[13] Review of the underlying calculations indicates that IPA included UP's locomotive servicing expenses from Schedule 410. UP generally accepts IPA's approach for estimating the locomotive servicing expense (other than fueling), but corrects one omission. IPA included only direct servicing expenses – including $84 million in salary and wages – and failed to include fringe benefits for operating personnel who perform locomotive servicing.[14] As IPA posits that this cost would constitute the entirety of IRR's servicing expense – and fringe benefits would not be added in a separate step[15] – the cost per unit-mile must account for fringe benefits. UP allocates a pro-rata share of the fringe benefits reported in Transportation-Train Operations in Schedule 410 to develop a proper basis for estimating the full locomotive servicing expense that IRR would incur.

In addition, UP applies the servicing cost to the miles for all locomotives on IRR trains, consistent with its calculation of IRR's locomotive requirements and locomotive maintenance expense. IPA's servicing unit-cost is calculated based on the total number of locomotive unit-miles system-wide reported in UP's R-1, a total that includes all miles run, including when units are idled or being re-positioned. In order to recover the full cost, the unit-cost must be applied to

[13] IPA Opening Nar. at III-D-7.

[14] IPA Opening workpaper "Loco Servicing Cost.xls" indicates that IRR costs are based solely on expenses reported to Line 411, "Servicing Locomotives."

[15] To calculate per employee expense for personnel that perform other operating functions, such as train and engine crews, IPA applies a fringe benefit ratio to the total compensation and uses this amount to develop total personnel expense. IPA Opening workpaper "IRR Operating Expense.xls." By contrast, IPA's total personnel expense for locomotive servicing consists solely of the cost per locomotive unit-mile derived from UP's R-1.

total locomotive unit-miles on IRR trains, not the unit-miles based on IPA's lower locomotive counts.

d. Fueling

The cost of fuel is IRR's single largest operating expense item IPA's figures considerably understate the fuel expense that IRR would incur. IPA based its IRR fuel costs on two sets of materials that UP produced in discovery: a document identifying fuel costs at different locations, and a dataset containing records of fuel consumption for trains operating in Utah

Regarding IRR's fuel cost per gallon, UP accepts IPA's use of the fuel price paid at Provo in 2011-2012, indexed to 4Q 2012.[16]

UP rejects IPA's use of the fuel consumption records to determine the amount of fuel IRR would consume. UP's actual records are not a reasonable proxy for the rate of fuel consumption for IRR locomotives. IRR trains operate at higher speeds than UP trains, and IRR does not follow UP's fuel conservation measures.[17] As a result, locomotives on IRR trains spend a much greater percentage of their time in higher throttle positions than the UP locomotives that IPA included in its analysis. This is confirmed by a comparison of IPA's RTC simulation analysis with the UP fuel consumption records on which IPA relied, summarized below IPA cannot "have it both ways." IPA seeks the benefit of the higher speeds through lower transit times, and therefore lower locomotive and freight-car requirements. Then, when measuring fuel consumption, rather than develop an estimate that reflects IRR operations, IPA instead uses the

[16] IPA Opening Nar at III-D-8.

[17] UP produced in discovery System Special Instructions that identified UP's fuel conservation measures. UP Reply workpaper "UP Fuel Conservation.pdf" (produced in discovery at UP-IPA-00000718 to 00000720 and UP-IPA-00001061 to 00001062). For example, at speeds {

}.

results for UP's locomotives, which typically power trains in lower throttle positions, consuming relatively less fuel per mile.

IPA used UP's records to argue that locomotives powering IRR coal trains would consume fuel at a lower rate than the UP system-average per locomotive unit-mile, and that locomotives powering IRR intermodal trains would also consume fuel at a lower rate than the UP system-average.[18] This is wrong on its face. Regarding the coal trains, all IRR loaded coal trains travel up-hill from Provo to Sharp, and also from Lynndyl to Milford.[19] While IPA eliminated the mountainous Provo Subdivision it included in the SARR network for Docket No. 42127, on IRR's segment from Provo to Sharp the issue-traffic trains and other loaded coal trains climb 700 feet, with most of that rise on a stretch that averages a *0.8 percent grade over 12 miles*.[20] And IPA allows IRR's intermodal trains to run on the IRR segment between Lynndyl and Milford at speeds of 70 mph – the speed of the fastest trains on the entire UP system. Under these conditions, it is reasonable to expect that units powering IRR's coal trains and intermodal trains would consume more fuel, not less, than UP's system-average, an average weighted heavily by trains operating across the Great Plains.

In order to measure the relative fuel consumption of UP and IRR locomotives, UP examined the UP fuel consumption records from discovery and the results of the RTC model

---

[18] IPA Opening workpaper "IRR Fuel Consumption.xlsx" identifies { } gallons per locomotive unit-mile for coal trains and { } for intermodal trains for the 2009-2011 period. UP's 2011 system-wide running consumption (*i.e.*, excluding yard switching) was 2.24 gallons per locomotive unit-mile, based on dividing 981 million gallons by 437 million locomotive unit miles. *See* UP 2011 Annual Report Form R-1, Schedules 750 and 755.

[19] UP's condensed profiles for the Sharp and Lynndyl Subdivisions are included as UP Reply workpapers "Sharp Track Profile (2011 Tonnage).pdf" and "Lynndyl Track Profile (2011 Tonnage).pdf."

[20] UP Reply workpaper "Sharp Track Profile (2011 Tonnage).pdf."

simulation that IPA submitted with its opening evidence UP summarized the percentage of time that units in each of these locomotive groups spent in different throttle positions.[21] Table III.D.4 below shows that for each type of train – coal, general freight, and intermodal – IRR locomotives from IPA's RTC model spent a much greater percentage of the time in one of the highest throttle positions – #6 through 8, with the highest fuel-consumption rates – than did the UP locomotives that IPA uses to estimate IRR fuel costs.

Table III.D.4
Percentage of Running Time in High Fuel-Consumption Throttle Positions, #6-8

	UP Discovery Records	IPA RTC Simulation	Difference
Coal	22%	52%	30%
General Freight	44%	67%	23%
Intermodal	44%	81%	38%

Source: UP Reply workpaper "IRR Fuel Consumption_Reply xlsx."

UP uses the percentage of time in each throttle position to determine the relative fuel consumption of the UP locomotives that IPA used for its analysis, and the IRR locomotives. IPA's RTC evidence includes fuel consumption rates by throttle position for different locomotive models. UP applied the rates by throttle position for the model on which IPA relied[22] to the corresponding proportion of time spent in each throttle position. The result was a "weighted average" consumption rate, reflecting the different operations in each group UP compared the

[21] The UP discovery data and IPA's RTC simulation runs each include data on locomotive throttle positions #1 through 8, dynamic braking, and idle. For the purposes of this analysis, UP excluded idle time, if idle time had been included, the disparity between the UP actuals and IPA's RTC results would have been even greater. UP Reply workpaper "IRR Fuel Consumption_Reply.xlsx."

[22] IPA explains that it modeled IRR operations in the RTC with AC4400 units. IPA Opening Nar. at III-C-19 & n.13. UP Reply workpaper "IRR Fuel Consumption_Reply.xlsx" also presents the results of calculating the relative consumption based on publicly available consumption rates for the ES44 locomotive model. The resulting adjustment factors are close to the results summarized in Table III.D.5

relative consumption factors from each group for each train type, and calculated the adjustment factor required to account for the fact that IRR locomotives operate at higher speeds and spend more time in higher throttle positions than the UP locomotives Table III.D.5 below summarizes the results for locomotives on IRR's coal, general freight, and intermodal trains.[23]

Table III.D.5
Fuel Consumption Adjustment Factors
to Account for Differences Between Operations on UP and IPA's IRR

	Weighted Consumption Rate per Hour. Based on Throttle Positions		
	UP Discovery Records	IPA RTC Simulation	IPA Adjustment Factor (IPA/UP)
Coal	90	122	+35%
General Freight	112	149	+33%
Intermodal	123	173	+40%

Source: UP Reply workpaper "IRR Fuel Consumption_Reply xlsx"

Tables III D 4 and III.D.5 show that UP's actual fuel consumption rates must be adjusted to account for the locomotive operations that IPA assumes for IRR. UP's workpapers also include the results of UP's reply RTC analyses and the calculation of adjustment factors that correspond to operations on UP's IRR. As UP reduces the maximum speeds for certain types of trains below what IPA assumed (see Section III C), the adjustment factors that UP uses on reply are lower than those shown in Tables III D.5[24] UP applies the adjustment factors to the corresponding IRR locomotive unit-miles by train type

There are two other reasons that IPA's fuel consumption analysis fails to reflect IRR operations and thus should not be used without adjustment. The first is IPA's failure to restrict its analysis of records to a relevant time period. IPA's consumption-record subset covers the

[23] In determining IRR's fuel consumption expenses, UP does not include the locomotives that IPA would "isolate[] with the throttles in the idle position" IPA Opening Nar. at III-C-10.

[24] UP Reply workpaper "IRR Fuel Consumption_Reply xlsx."

years 2010 through 2012. However, 50 percent of the locomotive unit-miles underlying IPA's average are from 2010.[25] Records of fuel consumption from 2010 and 2011 should not be used as the basis for evaluating fuel costs for trains that operated in late 2012, let alone through 2022 Traffic gains throughout the last three years have resulted in more trains, larger trains. and greater congestion, all of which suggest that records that reflect 2010 operations understate the fuel consumption experienced in 2012 and beyond. In fact. review of IPA's Opening workpaper "IRR Fuel Consumption xlsx" indicates that the average consumption that it calculated for IRR trains from UP's 2012 records is { } gallons per mile, 11 percent higher than the { } average for 2010 If the Board does not apply the factors presented in Table III.D.5 to adjust IPA's results to conform to IRR's operations, the Board should use only the 2012 records

Another problem with IPA's analysis of UP's fuel consumption records is the very limited dataset that IPA used for coal trains IPA's coal trains represent the single-largest portion of IRR's traffic. accounting for more locomotive unit-miles than either general freight or intermodal trains.[26] Review of IPA's analysis reveals that its conclusion that locomotives on IRR coal trains would consume fuel at lower than system-average rates was based on just *five records*[27] This included four records from 2010. none from 2011, and one from 2012. In fact, the single 2012 record was for *an empty train* with 89 cars, averaging { } gallons per unit-mile[28] One of the reasons IPA's set of records is so limited is its restriction that 75 percent of the locomotive consist be comprised of ES44 units. If, for example, IPA had relaxed the

[25] IPA Opening workpaper "IRR Fuel Consumption xlsx."

[26] IPA Opening workpaper "IRR Operating Statistics.xls"

[27] IPA Opening workpapers "Utah Fuel Consumption_2010.xlsx." "Utah Fuel Consumption_2011.xlsx," and "Utah Fuel Consumption_2012 xlsx."

[28] IPA Opening workpaper "Utah Fuel Consumption_2012 xlsx," Tab "2012." Row 5483.

limitation to 50 percent, rather than identify only one record from 2012, IPA would have found at least eight records, comprised of even numbers of loaded and empty trains.[29] These eight records produce an average consumption of { } gallons per unit-mile, 28 percent higher than what IPA calculated for IRR coal trains in 2012, based on a single empty train If the Board does not adopt the factors presented in Table III.D 5 to adjust IPA's results to conform to IRR's operations, it should relax the 75-percent ES44 criteria, and incorporate the more realistic estimate of fuel consumption for locomotives on IRR coal trains of { } gallons per unit-mile.[30]

Table III.D.6 below summarizes the 2013 fuel costs.

Table III.D.6
IRR 2013 Fuel Expense

IPA	Reply	Difference
$14,606,230	$17,156,927	$2,550,697

Source. UP Reply workpaper "IRR Operating Expense Reply.xlsx."

2 Railcars

a. Acquisition

IPA assumed that IRR traffic would be handled by a mix of railroad-provided, foreign, and private equipment.[31] For railroad-provided equipment, UP accepts IPA's assumption that all such equipment would be leased, the annual lease costs that IPA used for the different car types (*e.g.*, boxcars, gondolas), and the spare margin used to calculate the overall equipment

[29] IPA Opening workpaper "Utah Fuel Consumption_2012.xlsx," Tab "2012."

[30] In fact, the use of consumption factors based on consists that have some non-ESS44 units is hardly inappropriate for IRR. While IPA has posited that all IRR road power will be ES44s, most IRR units will operate in a "run-through" pool, powering IRR trains along with UP units that include various non-ES44 models.

[31] IPA Opening Nar. at III-C-11 to III-C-12

requirement. For foreign and private equipment, UP accepts IPA's use of the figures from UP's 2011 R-1 report, from which IPA determined the corresponding costs per mile, but corrects a significant IPA error. As described in Section III.C, IPA improperly converted the car owner for intermodal shipments. IPA claimed that "car ownership for the IRR's traffic group was determined from the shipment data produced by UP in discovery."[32] IPA's workpaper shows that, for the intermodal shipments IPA selected, 79 percent moved on private flatcars[33] But rather than calculate IRR's intermodal flatcar costs based on UP's real-world experience, IPA assumed that all of the flatcars would be system equipment[34] Based on this assumption, IPA used an equipment cost per mile that was 72 percent less than the cost UP incurs for private equipment[35] As explained in Section III C above, all of IRR's intermodal traffic moves in overhead service, with IRR serving as a bridge to the residual UP, and IRR performs no switching of these shipments. Thus, IRR would handle trains comprised of the same equipment that UP carries in the real world. As indicated above, IPA's own analysis of UP's shipment records showed that more than three-quarters of the flatcars used for intermodal traffic IRR would carry are privately owned. Thus, in order to apply UP's private car charge by car type "to all private car-miles on the IRR,"[36] the actual mix of private and railroad equipment should be used[37]

---

[32] *Id* at III-C-11

[33] IPA Opening workpaper "2011 ATC Traffic xlsx," Tab "Pivot-Car Ownership."

[34] IPA Opening Nar at III-C-12, and IPA Opening workpaper "IRR Car Costs.xlsx," Tab "Intermodal Cars."

[35] IPA Opening workpaper "IRR Car Costs.xlsx" identifies UP costs of 8 cents per mile for foreign railroad flatcars and 28 cents per mile for private flatcars.

[36] IPA Opening Nar. at III-D-12.

[37] UP Reply workpaper "IRR Car Costs_Reply.xlsx"

b Maintenance

IPA assumed that the lease payment amounts it used reflected full-service leases and that IRR would not be responsible for any other maintenance costs[38] UP accepts this assumption, and also accepts IPA's proposed expense for two End-of-Train Devices.

c Private Car Allowances

UP addressed IPA's miscalculation of equipment costs for IRR intermodal flatcars in the above section discussing Railcar Acquisition, and includes the corrected amounts in its Reply workpapers."[39]

Table III.D.7 below summarizes the 2013 freight car lease and rental costs that IRR would incur.

Table III.D.7
IRR 2013 Freight Car Expense

IPA	Reply	Difference
$5,124,541	$7,495.540	$2,370,999

Source: UP Reply workpaper "IRR Operating Expense Reply xlsx."

3 Personnel

a Operating

i Staffing

(a) Train and Switch Crew

As indicated in Section III C above, UP accepts IPA's proposed crew districts and assignments, and it follows IPA's approach to apply those assignments to the corresponding number of trains traversing each district to determine the number of crewpersons. In addition to

[38] IPA Opening Nar. at III-D-11.

[39] UP Reply workpaper "IRR Car Costs_Reply xlsx."

adjusting the IRR's crew requirements to reflect the train movements associated with UP's reply SARR traffic group, UP corrects a significant omission from IPA's evidence. As explained in Section III.C above, IPA failed to account for imbalances in train flows across its network. The non-coal traffic that IPA chose for IRR includes many more trains moving westbound than moving eastbound, as demonstrated by IPA's own workpapers.[40] The imbalance results in greater costs due to the need to reposition train crews from their off-duty point (typically Milford) to locations where they are more frequently needed to go on duty on westbound trains that are inbound to the SARR (Lynndyl). Despite Board precedent supporting the inclusion of the costs of deadheading crews where there are directional imbalances,[41] IPA did not address the issue at all.

Table III.D.8 below summarizes the train counts by direction for non-coal trains moving between Lynndyl and Milford from IPA's base-year train list for IRR.[42]

Table III.D.8
Significant Imbalance in IRR Train Flows between Lynndyl and Milford

	Lynndyl-Milford (westbound)	Milford-Lynndyl (eastbound)	Train Imbalance (EB/WB)
General Freight	843	566	49%
Intermodal, including Z trains	1,100	651	69%
Total, including Z trains	**1,943**	**1,217**	**60%**
Total, excluding Z trains	**1,943**	**1,001**	**94%**

Source: IPA Opening workpaper "IRR Base Year Trains.xlsx."

[40] IPA Opening workpaper "IRR Base Year Trains.xlsx."

[41] *Ariz. Elec. Power Coop., Inc. v. BNSF Ry.*, STB Docket No. 42113, slip op. at 46 (STB served Nov. 22, 2011) ("*AEPCO November 2011*").

[42] The train counts in Table III.D.8 account for more than 80 percent of all IRR non-coal trains. IPA Opening workpaper "IRR Base Year Trains.xlsx."

Table III D.8 shows that on IRR there are 60 percent more trains that move westbound from Lynndyl to Milford than move eastbound from Milford to Lynndyl. This difference amounts to an average of two trains per day for IPA's traffic group – and jumps to an imbalance of nearly 2 to 1 when the high-priority 7 trains are removed from the IRR traffic base due to IRR's failure to meet service standards for those trains. This imbalance cannot be sustained, as crews cannot continue to pile-up at off-SARR points when there is a shortfall of returning trains to work in the opposite direction

In fact, IPA assumes that IRR crews will work in turn service between Lynndyl and Milford, and that a crew will work two trains every shift[43] Table III.D.8 demonstrates, however, that nearly one-half of the crews that work from Lynndyl to Milford will not have a train available at Lynndyl in order to complete their "turn."[44] Thus, IPA's calculations overstate the efficiency that IRR train crews could achieve, and need to be adjusted to account for the costs of moving crews to other locations where there are IRR trains to work[45]

Table III.D.9 below summarizes the parties' evidence regarding the number of train and engine personnel that IRR would require for its first year of operation.

Table III.D.9
IRR 2013 Train Crew Requirements

IPA	Reply	Difference
30	35	5

Source: UP Reply workpaper "IRR Operating Expense Reply.xlsx."

[43] IPA Opening workpaper "IRR Crews Hotels Taxis.xlsx."

[44] *Compare* 1,943 westbound trains to 1,001 eastbound trains.

[45] UP Reply workpaper "IRR Crews Hotels Taxis_Reply xlsx "

(b) Non-Train Operating Personnel

IPA concluded that IRR would require a non-train operating staff of 21 people.[46] UP accepts IPA's proposals for most of these positions, with two exceptions. First, UP determined that IRR would require an additional Manager of Train Operations ("MTO"). IPA provided for three MTOs to cover the 24/7 position in 12-hour shifts[47] As a result, each MTO would be required to work 2,920 hours annually[48] This is a very heavy schedule. Further, a fourth MTO would be needed to facilitate the administration of various field requirements, including a formal program for certifying conductors, recently required by law[49]

Second, UP determined that IPA's proposed approach to equipment inspection is infeasible. As explained in Section III.C above, IPA assumed that IRR would be responsible for inspecting only empty coal trains, and that all of those inspections could be outsourced to IPA's Springville car facility[50] Both of those assumptions are invalid. First, IPA failed to account for the fact that UP inspects many loaded trains on the Coal Wye tracks replicated by IRR. Long-haul coal trains travel from Utah or Colorado mines to Southern California destinations that are 750 miles from Provo, requiring that the train receive an inspection in both the loaded and empty direction. Exhibit III.C-3 shows several destinations for IRR coal shipments and their distances from Provo. In addition, it is unlikely that IRR would outsource such inspections of non-IPA trains to the Springville car facility because it would create an additional, inefficient crew run. UP delivers loaded coal trains from Utah or Colorado mines to IRR on the Coal Wye tracks, and

[46] IPA Opening Nar. at III-D-15

[47] *Id* at III-D-18 to III-D-19.

[48] 8,760 annual hours / 3 people = 2,920 per person.

[49] 49 C F R Part 242.

[50] IPA Opening Nar. at III-C-39 to III-C-40

most non-IPA empty trains are interchanged to UP on the Wye tracks in the real world.[51] If IRR outsourced inspection of these trains to IPA, an IRR crew would be called to the Coal Wye tracks, and would bring the train several miles to the Springville car facility, where that crew would depart the train. When the inspection was completed, another IRR crew would have to go to Springville and start the train's second movement for the trip to Lynndyl and Milford It would be much more efficient for IRR to perform the inspections in the location where UP does these inspections in the real-world (*i.e* , the Coal Wye tracks), avoiding excessive movements of crews and trains.

IPA asserts that the residual UP would have operating rights over the Coal Wye tracks and down the Sharp Subdivision to IPA's car facility at Springville.[52] But IPA cannot assume that UP would have such an arrangement with IRR. IPA has provided no basis for thinking UP would agree to incur additional costs of its own to move over IRR, without compensation Further, this assumption is inconsistent with two other components of IPA's SARR evidence (1) its assumption that IRR's revenue division was calculated to Ironton, on the eastern end of the Coal Wye tracks, not Springville, and (2) its failure to include any UP train movements over IRR lines in its RTC model simulation.

Moreover, as discussed in Section III C above, Mr. Murphy has determined that the Springville car facility lacks sufficient capacity to inspect the non-IPA trains. Under IPA's proposal, more than 1,150 inspections would be done at the Springville facility in the SARR's first year, including inspections of empty non-IPA trains and inspections of certain loaded coal

[51] IPA's own description of the issue-traffic movement refers to such inspection activity *occurring on the Coal Wye tracks.* IPA Opening Exhibit III-C-2 identifies that "the carmen are performing a brake inspection."

[52] IPA Opening Nar at III-B-10.

trains that must be performed at Provo.[53] As the IPA car facility is open only on weekdays, this would require IPA to inspect an average of four and a half trains every workday. Trains that arrive late in the day or over the weekend would incur substantial delays waiting for the car shop to reopen. IPA asserted that its car facility has the capacity to inspect and switch five trains per day,[54] but it has not presented evidence to show that this would be possible every day or that performance of inspections at the car facility would not unduly delay trains.

UP determined that IRR could outsource the inspection of empty IPA trains to IPA's car facility[55] – *as is done in the real world* – and that IRR personnel would inspect non-IPA coal trains on the Coal Wye tracks (where they are inspected today). In order to cover IRR's inspection needs, UP concludes that IRR needs two inspectors each shift, 24x7, which requires nine total inspectors.[56] These inspectors would also be responsible for traveling to repair bad-order cars set out en route.[57]

With the addition of the fourth MTO and nine inspectors, IRR would have 31 non-train operating personnel, ten more than in IPA's proposal, as summarized in Table III D.10 below.

[53] UP Reply workpaper "Coal Train Fueling & Inspection Analysis.xlsx."

[54] IPA Opening Nar. at III-C-29.

[55] Empty IPA trains are interchanged to URC, and URC is assumed to have operating rights over IRR as it does over UP. This avoids the inefficient, two-part movement between Springville and Ironton that would be required for trains interchanged to UP.

[56] 2 inspectors / shift x 3 shifts x 365 days = 2,190 shifts, divided by 250 shifts / person = 8.8 inspectors.

[57] In order for IRR personnel to perform inspections, IRR would require materials and supplies including work carts, tools, and parts. IRR would also require a wheel change truck to fix bad-orders that occur along the IRR's lines. UP Reply workpapers "IRR Operating Expense_Reply xlsx" and "cartruck.tif."

Table III.D.10
IRR Non-Train Operating Personnel

Position	IPA	Reply
Vice President – Operations	1	1
Director of Operations Control	1	1
Manager – Train Operations	**3**	**4**
Manger – Locomotive Operations	1	1
Crew Callers	5	5
Dispatchers	5	5
Manager – Operating Rules, Safety and Training	1	1
Customer Service Managers	2	2
Chief Engineer	1	1
Manager of Mechanical Operations	1	1
Equipment Inspectors	**0**	**9**
TOTAL	21	31

Source UP Reply workpaper "IRR Operating Expense Reply.xlsx"

ii. Compensation

Train and Engine Crew Salary: IPA developed the compensation for IRR train and engine crews using a figure from the website salary.com.[58] This figure – which IPA's own workpaper indicates is 22 percent less than UP's average train and engine crew compensation[59] – is not an appropriate basis for IRR compensation, due to the higher utilization that IPA assumes its crews will achieve. The Board has found in past cases that "employees working more hours would command more compensation,"[60] and the same logic applies here. UP performed a study of the UP payroll records to identify the proportion of train and engine crew employees that worked 270 shifts – the number of shifts IPA assumes IRR train crews will work[61] – and the average compensation they received The study indicated that fewer than { } percent of UP

[58] IPA Opening Nar. at III-D-21

[59] IPA Opening workpaper "IRR Salaries xlsx"

[60] *W Fuels Ass'n, Inc & Basin Elec. Power Coop v BNSF Ry*, STB Docket No. 42088, slip op. at 30 (STB served Sept. 10, 2007) ("*WFA I*")

[61] IPA Opening Nar. at III-D-14

crewpersons achieved 270 shifts in 2012, and their average compensation was { }.[62] By contrast, IPA used a salary.com figure associated with the top decile of wages; for UP, crew people in the 90th percentile worked { } shifts, { } fewer than the utilization IPA assumed.[63]

UP follows Board precedent and incorporates the compensation level for UP crews that work the highest number of shifts as a better estimate of the wage expense IRR would incur in attracting and retaining train and engine crew members expected to work 270 shifts.

Fringe Benefits: IPA used a fringe-benefit ratio of 41.3 percent for IRR.[64] IPA suggests this represents the average ratio "for all Class I railroad employees in the United States in 2010,"[65] but review of the carriers' R-1 reports indicates that 41.3 percent is lower than the recent experience of Class I railroads. In fact, the Class I average has ranged from 43 to 46 percent in each year since 2009.[66] Figure III.D.1 below presents the average fringe-benefit ratio for all Class I railroads and for UP in each year from 2009 through 2011, and shows that IPA's ratio does not account for recent cost increases in the industry.

[62] UP Reply workpaper "T&E Crew Salary.xlsx."

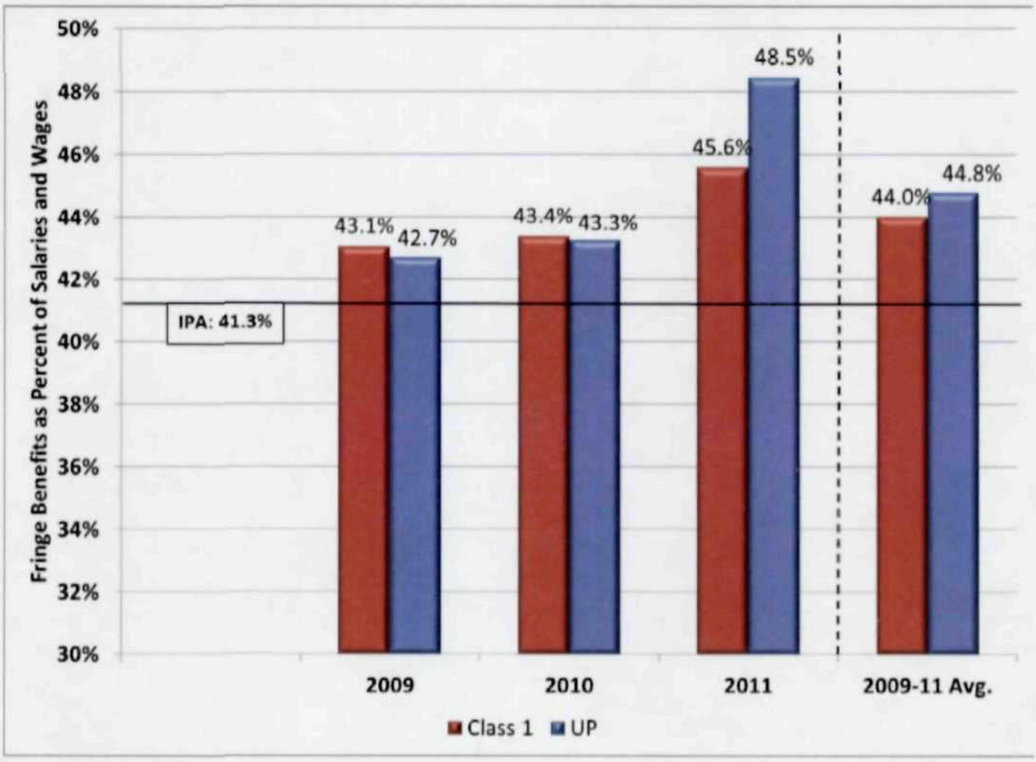
[63] *Id.*

[64] IPA Opening Nar. at III-D-21.

[65] *Id.*

[66] UP Reply workpaper "Class 1 Railroad Fringe Benefits 2005-11.xlsx."

Figure III.D.1
Class I Railroad Fringe-Benefit Ratios, 2009-2011



UP corrects IPA's understated factor by using 44.0 percent – the Class I average over the last three years – as a reasonable proxy of the fringe-benefit expenses that IRR would incur. In addition to the higher levels of fringe-benefit ratios observed through 2011, UP also notes that in November 2012, the Internal Revenue Service increased Tier II tax rates for 2013 for employees and for employers by 0.5 percentage points[67] – suggesting that UP's use of the average from 2009-2011 may understate the fringe-benefit expense that IRR would incur.

[67] *See* Publication of the Tier 2 Tax Rates, 77 Fed. Reg. 71481 (Nov. 30, 2012), *available at* https://www.federalregister.gov/articles/2012/11/30/2012-28930/publication-of-the-tier-2-tax-rates.

b General and Administrative

i Introduction

The general and administrative ("G&A") category encompasses essential core functions that support the management of an enterprise Most G&A functions are the direct result of a company's need to comply with financial, commercial, legal, or regulatory requirements—they must be performed by any efficient company, regardless of size. In order to survive, any railroad must bill customers and ensure timely and accurate payment. Any railroad operating in the 21st century must provide adequate computer systems and support for those systems. A railroad that transports interline shipments must manage relationships with both customers and other railroads: It must negotiate contracts, coordinate with connecting carriers, develop and review rates, and monitor receivables related to joint moves

IPA glosses over important G&A functions in its opening evidence. While it posits that IRR will have approximately $108 million in annual revenue, IPA proposes a G&A staff of only 23 (excluding outside directors)

This proposed G&A staffing level is much too low, even for a relatively small railroad. It is far below the 36 G&A employees the Board approved for a SARR of comparable size in *WFA I*. IPA relies heavily on *WFA I* in support of its G&A staffing proposal, asserting that IRR staffing levels should be lower.[68] UP agrees that *WFA I* is a reasonable benchmark and that

[68] IPA Opening Nar. at III-D-21 to III-D-29. IPA also cites *Western Fuels Association, Inc & Basin Electric Power Cooperative v BNSF Ry.*, STB Docket No. 42088 (STB served Feb , 18, 2009) ("*WFA II*") in support of its proposed staffing levels. IPA Opening Nar at III-D-24 to III-D-25. Because BNSF did not contest G&A staffing in *WFA II*, that decision is not an appropriate reference point *See WFA II*, slip op at 39

IPA also cites the experience of Mr. Reistrup, its primary witness on G&A issues, with the Monongahela Railroad ("MGA"), claiming that railroad "was comparable in size to the IRR" and

IRR's staffing should be lower than that accepted in *WFA I* in some respects However, there is no basis for IPA's suggestion that IRR can operate with 13 fewer G&A employees than the SARR in *WFA I*.

IPA incorrectly presumes that, since IRR has lower traffic density and lower revenues than the *WFA I* SARR, IRR can survive with over a third fewer G&A staff than that SARR However, most G&A staffing functions must be provided for an independent railroad, whatever the size. Moreover, a smaller railroad does not enjoy the economies of scale enjoyed by a larger carrier. In addition, there are ways in which IRR operations are more complex than those of the *WFA I* SARR. For example, the *WFA I* SARR interchanged trains with only one other railroad, BNSF Here two railroads (the residual UP and URC) will interchange with IRR. Moreover, while the traffic selected for the SARR in *WFA I* was confined to relatively simple coal movements, much of IRR's traffic is carload or intermodal shipments. Unlike coal trains for utilities, for which there is one bill per train, most general freight and intermodal trains require

---

had a four person G&A staff. IPA Opening Nar. at III-D-23 & n.18 MGA is not a valid comparison to IRR for at least four reasons.

First, a review of publicly available sources indicates that MGA was not an independent, "stand-alone" railroad that had to handle all administrative functions Instead, MGA was a subsidiary of larger railroads. UP Reply workpaper "MGA Internet materials.pdf." MGA therefore did not have to manage outside investors and likely would not have had to provide a full array of staff functions for corporate, finance, legal, HR or technology services. Rather, it would have relied on its parent companies to handle many administrative functions. IPA provides no information on the role played by MGA's affiliates or the amount it spent on purchased services. *Second*, it appears MGA interchanged only with its parent railroads and therefore did not have the significant communications and billing issues IRR would face in connection with interchanging with two unaffiliated railroads (UP and URC). *Third*, technological advances and increased government scrutiny of corporate and financial operations place a greater burden on G&A staff than existed when Mr. Reistrup was at MGA from 1988 to 1992. *Finally*, it appears MGA transported only coal. IRR, in contrast, moves a variety of goods, which requires more marketing resources than would a single traffic type. IRR also carries some hazardous chemicals shipments, which MGA did not Thus, MGA's staffing model provides little guidance for the G&A staff needs of IRR.

separate billing for individual carloads. While there may be some multi-car shipments and perhaps even some unit trains, most of the non-coal traffic would require separate transactions for each car.

UP has determined that IRR would need a G&A staff of 33 (plus three outside directors), 10 more than IPA's staffing level of 23. In addition to the staff IPA proposed, IRR's G&A staff should include the following:

- 1 additional Administrative Assistant;
- 1 additional Marketing Manager,
- 1 Treasurer;
- 1 Assistant Controller,
- 1 additional Revenue Manager;
- 1 additional Programmer, and
- 4 additional IT and Operations Support Specialists.

The staff UP identifies is three fewer than the 36 G&A staff the Board accepted in *WFA I*, and on its face is a more reasonable staffing level than IPA's 23. However, the real question is whether IPA has shown that its proposed G&A staffing will be sufficient to meet IRR's needs or whether IRR would need more G&A staff to perform the tasks required to operate efficiently. IPA has not made the necessary showing. Among other things, IPA failed to provide:

- sufficient staffing to handle revenue accounting for interline shipments, including monitoring of the Interline Settlement System ("ISS"), a labor intensive process IPA chose to handle IRR's interline revenues.
- a Treasurer, who would have primary responsibility for cash management;

- sufficient staff responsible for integrating IRR's numerous off-the-shelf computer systems;[69] and
- 24/7 on-site IT and Operational support coverage.

In these and other areas, IPA has failed to provide staff levels that are essential to safe and efficient operations, let alone to the optimally efficient operations it claims IRR would enjoy.

If UP were to begin with a clean slate in designing the G&A functions for IRR, it would organize these functions somewhat differently than IPA's proposed structure. For example, assuming there is to be no separate marketing department, it appears more logical to place marketing functions in Finance, rather than in Operations. However, for purposes of this Reply, UP accepts the general structure that IPA has proposed. Where IPA has overlooked critical functions or has seriously underestimated the resources needed for a function, UP determines the minimum staffing that would be necessary to cover these functions.

UP's analysis of G&A staffing and expense requirements was developed by Richard W. Brown. Mr. Brown, a Director with FTI Consulting, has over 30 years of experience working in the North American railroad industry, for BNSF and predecessor carriers. While at BNSF and its predecessors, Mr. Brown gained significant experience managing functional reorganizations and implementing technological solutions to streamline administrative functions. For the last 13 years, he has managed rail carrier strategic planning and merger and acquisition studies at FTI. In developing UP's G&A requirements, Mr. Brown relied on his broad industry experience and

[69] As described further on pages III D-38 to III D-39 below, there will be a continuous need to update these systems over time. For example, the RMI will feed all the journal and ledger entries for the accounting system. As requirements change, these systems will need to be updated and revised.

also on interviews with several UP managers to generate specific types of information for the G&A analysis [70]

ii. Staffing Requirements

Table III D 11 summarizes IPA's headcounts for IRR's G&A functions and UP's G&A staffing plan for IRR. Staffing levels the Board accepted in *WFA I* are included as a reference point.

[70] Mr. Brown's detailed Statement of Qualifications and his Verification appear in Part IV below

Table III.D.11
IRR General & Administrative Staffing Summary

Position	***WFA I***[71]	**IPA**	**Reply**	**Difference**
Outside Directors (non-employees)	3	3	3	0
President and CEO	1	1	1	0
Administrative Assistants[72]	3	2	3	1
Director - Corporate Relations	1	0	0	0
Manager - Operating Rules and Safety	1	0	0	0
Marketing Managers	2	1	2	1
Vice President - Finance & Accounting	1	1	1	0
Treasurer	1	0	1	1
Assistant Treasurer	1	0	0	0
Cash Manager	1	0	0	0
Controller	1	1	1	0
Asst. Controller	0	0	1	1
Taxes	1	0	0	0
Revenue Accounting	1	0	0	0
Revenue Managers	3	2	3	1
Accounts Payable Manager	1	1	1	0
Manager - Budget and Purchasing	2	1	1	0
Director Financial Reporting	1	0	0	0
Vice President - Law and Admin	1	1	1	0
General Attorneys	2	1	1	0
Manager of Safety and Claims	1	1	1	0
Director of Human Resources	1	1	1	0
Manager of Training	1	1	1	0
Director of Security	0	1	1	0
Director of Information Technology	1	1	1	0
IT Specialists	7	6	6[73]	0
IT and Operations Support Technicians	0	0	5	5
Total	**39**	**26**	**36**	**10**

Source. UP Reply workpaper "IRR Operating Expense Reply.xlsx."

[71] *WFA I*, slip op. at 43 Although a few position titles for IRR differ from those in *WFA I*, job functions and salaries for the positions are essentially the same.

[72] Includes one Paralegal/Administrative Assistant from *WFA I*.

[73] UP adds a third Programmer and removes IPA's proposed Help Desk PC Technician

(a) Executive Department/Marketing

Administrative Assistants

UP agrees that IRR needs only a President and several Administrative Assistants for the executive function. IPA states that two Administrative Assistants would support the President and three Vice Presidents. UP believes the Administrative Assistants could support the entire Headquarters staff, not just these officers as IPA proposed.[74] Because Mr. Brown has concluded that the G&A staff must be larger than IPA has assumed in order to meet all of IRR's needs, UP has provided for three Administrative Assistants, rather than two. The third Administrative Assistant would have primary responsibility for supporting the Finance and Accounting staff[75]

There are many administrative functions that IRR will need to perform that larger entities would ordinarily cover with higher level officials UP proposes that IRR would hire experienced Administrative Assistants who would be able to handle functions beyond ordinary secretarial duties, including.

- Corporate Communications & Public Relations. Manage relationships with the media and coordinate messaging on all issues involving IRR, including with local communities and the customer base
- Investor Relations Assist the Vice President of Finance with strategic and tactical issues with IRR's investor community, including coordination of board issues, and dissemination of financial material. IRR, as a privately financed multi-million dollar entity, is likely to have few but active investors, each

[74] IPA Opening Nar at III-D-32

[75] IRR's Finance and Accounting Staff is leaner than the Finance and Accounting staff in *WFA I* and thus would need the added support that a dedicated Administrative Assistant could provide.

interested in IRR's activities and the potential impact those activities would have on their investment.

- Expense Account Management IRR provides no technology for managing the expense account process Thus, expense reports will need to be handled manually or through spreadsheets. Administrative Assistants will be needed to manage and support the paper flow
- Compliance/Ethics Hot Line. IRR should have a hot line employees could use to report anonymously on concerns about safety, compliance with legal requirements, and other issues. An Administrative Assistant could monitor this hot line as well as initiate case processes to review issues and work on solutions.

Outside Directors

IPA assumes IRR would have a board with three outside directors. It asserts that these directors would be willing to serve without compensation because they would have a substantial interest in IRR's affairs.[76] UP believes this assumption is unrealistic and that IRR will need to provide substantial compensation to attract high quality directors who are in fact independent and who will spend the time necessary to meet their corporate responsibilities. Nevertheless, for purposes of this case, UP (like IPA) provides only for expenses of travel to board meetings for these directors

[76] IPA Opening Nar. at III-D-32 to III-D-33.

Marketing Managers

For its marketing function, IPA assumes only one Marketing Manager, who reports to the Vice President-Operations.[77] According to IPA, one Marketing Manager is adequate to "[interface] with the IRR's customers and [handle] day-to-day marketing functions as well as contract renewals."[78] UP believes IRR will need at least two Marketing Managers. IRR marketing personnel will need to perform many activities that cannot be outsourced to a connecting carrier.

IRR serves two very different market segments, coal and non-coal (including intermodal, grain, and general merchandise). These segments include customers with a wide variety of service and equipment needs.

Responsibilities of the Marketing Managers will include:

- Setting rates for new business and as existing contracts expire. This requires market analysis, understanding customers' business, development of IRR costs and understanding requirements for contribution to fixed costs, and evaluating the most favorable term (one year, three years, or longer, seasonal or terminable on 30 days' notice).

- Local traffic and traffic interlined with URC. IRR will be fully responsible for setting, managing and maintaining rates for IPA traffic from the Sharp Loadout and the IPA traffic interchanged with URC under Rule 11

- Interline traffic with UP: IRR will have primary responsibility for traffic originating on IRR and interlined with UP. IRR will also interact with UP in setting rates for traffic terminating on the SARR. These rates and fuel surcharges will need to be set, managed and updated

- Overhead traffic: UP will have primary responsibility for setting and maintaining rates for overhead traffic. However, IRR will need to monitor this process to make sure that IRR is agreeing to rates that meet its strategic and tactical requirements. IRR staff will be involved in negotiating terms of

[77] *Id.* at III-D-33. IPA also includes two Customer Service Managers as Operating personnel. *Id.* at III-D-15.

[78] *Id.* at III-D-33

contracts, administering contracts, responding to customer questions, and advising customers of changes in rates and fuel surcharge revenues.

- Preparing revenue and volume forecasts for IRR's annual budget, by communicating with customers on shipping plans and projecting how rates and fuel surcharges will be adjusted. Such forecasts are critical to budgeting and are used by IRR's Operations team to ensure IRR has enough equipment and crews, and by its Engineering team to plan IRR's maintenance program

- Coordinating with Revenue Managers to make sure that the revenue accounting system has correct updates on rates (updates can be quarterly or annual) and fuel surcharges (which may change monthly). IRR will have joint rates with UP and will have to manage many different surcharge programs for its diverse traffic base.

This lengthy list (encompassing marketing duties related to interline relationships, as well as duties relating to local customer relationships) demonstrates that a single Marketing Manager could not meet all of IRR's needs. UP's provision for two Marketing Managers is consistent with the number of Marketing Managers the Board accepted in *WFA I*, a case that involved fewer than 40 customers and homogeneous traffic.[79] IRR's traffic group, in contrast, consists of 700 customers and coal, bulk commodities, and intermodal traffic. A varied traffic group requires more marketing resources than a single shipment type

While IRR is shorter than the SARR IPA proposed in Docket No. 42127, it will have most of the traffic and customers that the earlier SARR had. Marketing Manager duties will not differ much as a result of the SARR's shorter length. IPA states that IRR will not need as many marketing resources as UP previously proposed, because IPA has reduced the number of coal movements. However, managing the coal unit train traffic is only a small part of the marketing responsibility The current SARR will have over 1,200 price authorities to manage. Many of

[79] Opening Narrative of Complainants Western Fuels Association, Inc. & Basin Electric Power Cooperative, Inc. at III-A-4, *W. Fuels Ass'n, Inc & Basin Elec. Power Coop v BNSF Ry*, STB Docket No. 42088 (Apr. 19, 2005).

these are general freight and intermodal authorities for which UP will take the lead and perform much of the work. But IRR staff still needs to understand each of these rates, including escalators, fuel surcharges, and other features. IRR staff will also need to set IRR's revenue requirements.

(b) Finance and Accounting Department

Vice President-Finance & Accounting

IPA provides for a Vice President-Finance & Accounting and a Controller. UP accepts these positions. However, IPA does not appear to recognize the breadth of responsibilities these positions would have to assume. UP believes additional staff would be needed to cover all of the finance and accounting functions UP therefore has added a separate Treasurer position, an Assistant Controller, and a third Revenue Manager

IRR does not describe the functions that the Vice President-Finance & Accounting will need to cover. In addition to providing overall supervision of the activities of the Finance & Accounting employees, the Vice President will have other tasks Since there is no staff within the Executive Department to handle investor communications, that burden will fall squarely on the Vice President.[80] IRR will have significant investors including banks, investment companies and private investors This group will expect to receive advice and updates on the financial performance of IRR. This function involves interaction with high level individuals and needs to be handled by a high level IRR executive. The Vice President would also handle risk management, including decisions on what insurance coverage IRR needs, purchase of the

[80] In *WFA I*, the Board provided for a Director of Corporate Relations to handle investor communications. *WFA I*, slip op. at 43.

insurance, and administration of any self-insured retention. The Vice President may also manage a pension plan for the company.

Treasurer

IPA combines the positions of Vice President and Treasurer, apparently assuming that the Vice President would also handle all of IRR's cash management and credit functions normally handled by a treasurer. UP believes IRR would need a separate Treasurer position. Cash management is a critical function that must be managed on a daily basis. This is particularly true here because IRR will have daily cash needs, but IPA has provided that much of IRR's revenue will come through ISS settlement, which involves monthly transfer of funds, rather than payments spread throughout the month. IRR relies on ISS for about $67 million of its monthly revenue.[81] Based on industry averages, IRR would receive this revenue about 51 days after the original waybill date.[82] IRR will also bill and hold until settlement approximately $25 million each month but only about $6 million of this will be IRR revenue.[83] There will therefore be a significant lag in IRR's receipt of most of its revenue. This time lag between providing service and being paid for this service will be exacerbated by the fact that IRR traffic volume varies significantly over the course of the year, due to the seasonality of coal and intermodal shipments.[84]

The Treasurer function would have a number of other responsibilities, including:

---

[81] UP Reply workpaper "IPA Rev Summary.xlsx."

[82] UP Reply workpaper "ISS Average Days to Cash Transfer 0113.xlsx."

[83] UP Reply workpaper "IPA Rev Summary.xlsx."

[84] UP Reply workpaper "IPA Monthly Volumes.pdf."

- *Credit.* The Treasurer function would be responsible for maintaining IRR's creditworthiness, responding to inquiries about IRR creditworthiness, and conducting credit checks on new customers.
- *Investments and debt management* IRR would need extensive lines of credit to manage an erratic cash flow. The Treasurer function would manage short and medium term investments to ensure that there is ample cash available to meet IRR's commitments. The Treasurer must therefore understand the complex ISS process and communicate with IRR operating and marketing staff to manage operating expenses and traffic forecasts. In addition, the Treasurer function must manage long term investments for retirement programs.

Given the significance of and time involved in these duties, IRR would need at least one separate employee, a Treasurer, to cover the cash management and credit function. UP's staffing for this function is more conservative than the G&A staffing in *WFA I*, which consisted of a Treasurer, Assistant Treasurer, and Cash Manager.[85]

[85] *WFA I*, slip op at 43. IPA cites *AEP Texas N Co v BNSF Ry*, STB Docket No. 41191 (Sub-No 1) (STB served Sept. 10, 2007) ("*AEP Texas North*") and *Tex Mun Power Agency v Burlington N. & Santa Fe Ry.*, 6 S T B. 573 (2003) ("*TMPA*"), in connection with its staffing. IPA Opening Nar. at III-D-37 to III-D-38. However, in *AEP Texas North*, the Board accepted a three-person treasury staff to assist the Vice President of Finance and Accounting (a manager of administration, an administrative assistant, and a secretary). *AEP Texas North*, slip op. at 55. UP's proposal of a single Treasurer is therefore more conservative than this larger treasury staff. *TMPA* also does not support IPA's proposal. There, BNSF merely cited BNSF's own operations without showing TMPA's proposal was inadequate. *TMPA*, 6 S.T.B at 683. The Board therefore accepted TMPA's proposal as the best evidence of record.

IPA's proposal for the treasury function is also contrary to the Board's decisions in *WFA I* and *Public Service Co. of Colo. D/B/A Xcel Energy v Burlington N. & Santa Fe Ry*, 7 S.T.B. 589 (2004) ("*PSCo/Xcel I*"). *See WFA I* at 44 ("[W]e are not persuaded that a single employee could handle all of the duties of the treasurer's office."), *PSCo/Xcel I*, 7 S T B at 649 (denying shipper's proposal to have a single Vice President-Finance handle the treasury function, and instead accepting a three person Treasurer's Office (a Treasurer, Director, and an Analyst)).

Additional Finance and Accounting Staff

IPA assumes that two Revenue Managers and an Accounts Payable Manager, with supervision from the Controller and some assistance from a Manager of Budgets and Purchasing, would handle all the remaining accounting functions, including billing, accounts payable, budgeting, purchasing, and audit Although this is a logical span of responsibility for these positions, more staff would be required to accomplish the work that IRR would need within these functions. Mr. Brown has determined that an Assistant Controller and a third Revenue Manager would be needed to support the Controller. In addition, as noted above, one additional Administrative Assistant will primarily assist the seven-person Finance and Accounting staff This staffing is consistent with that in *IPFA I*.

As discussed below, UP proposes fully staffing revenue accounting under the supervision of the Assistant Controller. Doing so would allow the Controller to focus on supervision of all other accounting functions and to handle all financial reporting functions. These functions include payroll, accounts payable, taxes, and property accounting. IPA assumes that a stand-alone computer system with financial reporting capabilities is all that is needed to perform financial reporting tasks.[86] However, there must be an employee to operate the system, extract data, and plan for the future. In Mr Brown's judgment, the Controller could handle the financial reporting function, so that IRR would not need a separate Director of Financial Reporting. In addition, the Controller would have responsibility for interaction with audit and tax personnel, including the preparation of data and documentation required by the outside audit firm The Controller would also manage the property accounting function, preparing all the inputs that would go to outside contractors and responding to issues and questions This staffing is more

[86] IPA Opening Nar at III-D-39.

conservative than the Finance and Accounting staff the Board approved in *WFA I*, which included a separate financial reporting position.

Revenue Billing

IPA's assignment of only two Revenue Managers is insufficient for the important work of ensuring that IRR is timely and accurately paid for its services IRR will need to devote effort to ensuring that it receives the revenue it needs to support its operations. This is particularly important for a small railroad like IRR, which operates leanly This work would require at least three revenue managers. In addition, as noted above, an Assistant Controller would manage and oversee the revenue billing effort

There are four functions that IRR would have to accomplish to ensure that it receives correct revenues.

First, IRR will need to create freight bills for customers on all traffic that IRR originates. It will also be responsible for creating bills for shipments it receives in Rule 11 (a total of 35.000 cars per year. or six to seven trains per week) In addition to unit train coal movements received from URC at Provo and from the Sharp Loadout, IRR will originate and be responsible for billing over 600 cars of general freight per year

Second, IRR will need to maintain a database that includes rate authorities for all traffic UP will route via IRR. Over 94 percent of the carloads IRR handles are interline traffic handled in interchange with UP. There are more than 1.200 rate authorities currently governing the UP traffic IPA selected for IRR [87] In the course of IRR's operations. some of these authorities will expire and new authorities will be added. But even stable authorities will change. including through quarterly or annual adjustments to rates and monthly changes to the fuel surcharge.

[87] UP Reply workpaper "IRR Price Authorities.xlsx."

UP's fuel surcharges apply differently to different types of traffic. Since IPA has chosen to have IRR participate in joint rates with UP (and thus follow UP's lead), IRR will need to calculate these different surcharges for its miles in each movement. In addition, the residual UP will always be searching for new business and will generate new traffic on this corridor, either to replace traffic it loses or to grow volume. IRR must manage the resulting new rates.[88]

Third, IRR will need to record revenue divisions on any new moves for which UP will choose an IRR routing. For each new traffic move, there will be a new division of revenue. In the SARR world, the division calculation is based on URCS cost; thus, IRR's division presumably will change with changes in origin, destination, car type or shipment weight. And whether divisions are based on market analysis and negotiation or on URCS calculations, IRR personnel (not UP staff) would have to determine IRR's division. IRR will need someone in Finance and Accounting to calculate the division for new traffic using the approved division methodology.

Fourth, IRR will need to update its revenue accounting system so that it can validate amounts it receives and to monitor results from ISS to be certain that IRR is getting the amount to which it is entitled. IPA has chosen to have IRR use ISS for a substantial portion of its interline traffic (about 420,000 carloads in 2011-12). As discussed below, administration and monitoring of ISS payments will be a particularly time consuming function for IRR.

Under IPA's proposal, IRR will use the RMI Revenue System to handle messaging with ISS. However, IRR must understand what revenue it is due on every shipment. The only way

[88] IPA's traffic and revenue projections assume growth in the volume of existing traffic movements. Any railroad will gain and lose business over time, so as a practical matter, at least some IRR traffic in future years will represent new traffic movements governed by new rates. *See Carolina Power & Light Co. v. Norfolk S. Ry.*, 7 S.T.B. 235, 250 (2003).

IRR can know the amount due is to have a solid understanding of the rate and rate adjustments governing each shipment and the corresponding revenue that IRR should expect to receive. Thus, it will need to update its "rate master" database so that it can identify the proper rate and fuel surcharge for each shipment handled. In the ISS process, a participating carrier must take exception to a revenue determination within ten days or it is deemed accepted with no further review. If IRR is not up-to-date on rates and the revenue to which it is entitled under each rate, it runs the risk of losing revenue.

IRR will need to monitor the ISS revenue determinations to make sure that it is receiving the full amount due. IRR could not afford to assume that all of these determinations are correct. If IRR did not check the ISS revenue determinations, it would risk losing a substantial amount of the revenue to which it is entitled. This is not because UP or any other railroad will be looking to cheat IRR. Rather, data entry errors, misunderstandings, and other factors can lead to errors.

UP's experience shows that a railroad will sacrifice substantial revenue if it does not monitor its ISS revenues for errors. UP's ISS dispute staff recovers on average over { } of the initial billed amount. Table III D.12 below sets forth the amount of revenue recovered by UP's ISS dispute staff over the last four years.

Table III.D.12
UP ISS Settlements (2009-2012)

Year	Initial Amount Billed by UP[89]	Settlement Amount Received by UP	Variance Amount	Variance Percentage
2009	{ }	{ }	{ }	{ }
2010	{ }	{ }	{ }	{ }
2011	{ }	{ }	{ }	{ }
2012	{ }	{ }	{ }	{ }

Source UP Reply workpaper "ISS Settlements.pdf."

As the table shows, UP has billed an average of about { } in annual revenue through the ISS System UP recovered an average of { } of its initial billed amount by devoting considerable personnel and system resources to review and analysis of ISS results

If IRR did not make similar efforts, it could not count on receiving the full amount of revenue due to it UP's experience suggests that, assuming IRR ISS revenues of approximately $73 2 million, IRR would lose approximately $4 03 million if it did not engage in ISS revenue auditing. IPA could not expect that UP or any other foreign railroad would perform the auditing validation function for IRR An assumption that IRR, an independent rail carrier, could rely on its connecting carrier to make large numbers of adjustments to divisions and fuel surcharge updates for IRR, rather than performing this vital business function for itself, would amount to shifting costs to UP – essentially an improper subsidy for IRR

IPA may suggest that monitoring of revenue receipts is unnecessary because errors in IRR's favor will balance any errors against it, but this is not a reasonable assumption UP and any other railroads involved in a move will diligently look for errors that have reduced their revenue, and they presumably will seek correction of any such errors they identify Thus, it is

---

[89] Initial billed amounts may need to be adjusted for a number of reasons, including employee error in assigning the traffic volume to a movement, or the billing carrier's application of an incorrect rate.

unlikely that IRR will be able to retain any substantial revenue resulting from errors in its favor. Moreover, it is highly unlikely that IRR's auditors would accept a failure to audit revenues regularly based on a hope that any errors would balance out

IRR will have to deal with billing disputes in any event If UP or another origin carrier bills a shipment at an incorrect rate, the shipper will dispute the rate and the origin carrier will issue a corrected freight bill. That shipment may already have settled through ISS. Settlement corrections to disputed rates are made through an overcharge claims process. which is largely manual. IRR will need to be able to work with its connections to resolve such claims.

Given the volume of price documents and shipments billed. and the need to update the rate database frequently, IRR's assertion that a Controller could supervise all revenue accounting matters in addition to handling all other accounting tasks is unrealistic.[90] In Mr. Brown's judgment, staffing of this function should be headed by an Assistant Controller and include three Revenue Managers One position should be designated to create and manage freight bills, as well as waybills. Even in cases where waybills would automatically generate from the electronic data interchange ("EDI"), corrections and adjustments will be managed by this position That individual would also be responsible for assisting with maintenance of IRR's rate database. A second position would have primary responsibility to maintain and manage the rate database and to handle fuel surcharge adjustments. divisions calculations, and accounting for new traffic moves A third position would have primary responsibility to monitor ISS settlements and claims.

[90] IPA Opening Nar. at III-D-38 to III-D-40. As discussed on pages III.D-36 to III.D-37 above. accounting tasks under the supervision of the Controller include payroll, accounts payable, taxes, property accounting, and financial reporting.

As suggested by the discussion above, designation of only one Revenue Manager to monitor ISS settlements and claims is conservative. Even though ISS billing and review can be automated, a staff person will need to review any discrepancies daily. With over 400,000 overhead shipments per year, even if only five percent of the payments showed discrepancies, the Revenue Manager would need to review 100 bills per work day. The Revenue Manager assigned to ISS would also have to oversee the claims process for differences that materialize after settlement. UP and other originating railroads have accurate, automated billing systems, but even a small error rate could result in daily claims that IRR will need to resolve.

UP's real world experience with ISS staffing supports the addition of a Revenue Manager for ISS. Although UP relies more on Rule 11 revenue arrangements (in part to avoid the cumbersome ISS process), it had about { } ISS shipments in 2012, approximately { } as many as for IRR. UP has over 19 staff responsible for handling ISS and other interline issues. In addition, UP has a sophisticated computer system (with IT support) to support the ISS function that automates and facilitates the revenue accounting process, ensuring accuracy and improving efficiency. The acquisition of this computer system permitted UP to shrink its revenue accounting staff, including ISS staff, to a fraction of its original size. IPA has not provided for such a computer system to support IRR's ISS work. Compared with UP staff handling only ISS, on a prorated basis IRR would therefore need at least a three-person staff.

Accounts Payable

IPA provides for one Accounts Payable manager for IRR. UP agrees that this is sufficient. The Accounts Payable Manager will handle a wide variety of functions. For example, he or she will verify bills received from vendors; handle the timekeeping and payroll functions; and manage equipment accounting (including mileage allowances or per diem for cars and locomotive run-through agreements) In addition, the Accounts Payable Manager will process expense account reports. IRR provides no technology for handling expense reporting. Thus, IRR's employees who travel or make other business-related expenditures will have to prepare expense reports on paper or spreadsheets, submit the hard copies to managers for review and approval, and then forward them to accounting for final processing and payment

Purchasing and Budgets

UP agrees that a single manager could adequately perform the Purchasing and Budgeting function of a railroad the size of IRR. This manager would interact with other IRR staff to develop material and supply needs, including fuel for rail operations. This position would handle relationships with vendors and manage the purchasing process to ensure that material flows in an orderly way. The manager would participate in the revenue budgeting process and help track whether IRR's revenue levels were meeting expectations This position would also have primary responsibility for preparing the IRR budget and managing the budget process throughout the year

(c) Law and Administration Department

UP accepts IPA's staffing and functions for Legal/Claims and Human Resources ("HR").[91] UP also accepts IPA's staffing for the Security function with a Director of Security.[92] However, in Mr. Brown's judgment, the information technology ("IT") staffing IPA describes would not be adequate to maintain an effective rail operation IPA also failed to provide sufficient staffing for 24/7 operations support.

---

[91] IPA Opening Nar at III-D-41 to III-D-42.

[92] *Id* at III-D-46.

IPA provides for an IT Director with six IT Specialists: a Lead RMI Technician, a Network/Exchange Engineer, an IT Security/Service Manager, two Programmers, and one Help Desk PC Technician.[93] Mr. Brown has determined that a third Programmer and five IT and Operations Support Technicians (in lieu of IPA's proposed single Help Desk PC Technician) are needed to address two major deficiencies in IPA's proposed IT staffing.

First, while IPA purports to have provided IRR with state of the art systems for a long list of functions, including Operations, Crew Calling, Dispatch, Human Resources and Accounting, it has provided no interface among these systems. In the 21st century, an entity the size of IRR would likely power its computer system using a state of the art integrated platform provided by enterprise software vendors such as SAP or Oracle. Instead, IPA has chosen to acquire computer systems for each IRR business function as a stand-alone unit, and assigns two Programmers to maintain these systems and to develop "any necessary system integration . . ."[94] IPA assumes the two Programmers will also maintain a corporate information website.

UP recognizes that IRR could function with stand-alone systems for operating, crew calling, dispatch, accounting and HR functions, therefore, UP accepts these systems at the cost specified by IPA. However, Mr. Brown concludes that IRR would need a third Programmer on the IT Specialist staff in order to develop the additional system enhancements necessary to integrate the inputs and outputs of the various stand-alone systems IPA uses to handle individual tasks. IPA provides for adequate initial implementation costs, but integration is an ongoing need. For example, RMI will provide the necessary data to generate journal and ledger entries for IRR accounting systems. As rules and requirements change, systems also need to change.

[93] *Id* at III-D-45 to III-D-46.

[94] *Id* at III-D-46.

Individual systems must be integrated so that data from one system will flow through to other systems. For example, to have an efficient billing operation, tonnage data from the RMI system must flow through to the accounting system, and to handle the accounts payable function effectively the accounting staff should be able to cross check invoices with an inventory control system. Programmers must write the code to create these system integration processes and keep them up to date. UP provides a third programmer to join the two proposed by IPA.

Second, IPA has not provided adequate staffing for IT support functions. IPA has provided for one person on duty during "normal business hours," with a technician on call at all other times.[95] It is unclear which of the IT staff (all of whom will have a full plate of other job responsibilities) would cover the "non-business hours" and whether these individuals would provide an adequate quality of service. IRR trains will operate both day and night throughout the year. (Since IRR is essentially a bridge carrier and it plans on interchanging trains within 30 minutes, it will have to be a 24/7 operation throughout the year.) These trains will handle service-sensitive freight as well as some hazardous commodities. IPA assumes that the IRR system will operate with minimal, so even minor computer glitches could halt train operations. IPA's provision of separate systems for a wide range of functions will strain IRR's IT support function. In addition, IRR will be relying on modern data applications, including email, smart phones, and tablets, to make employees more productive around the clock.

To ensure safe and efficient operations, and to satisfy customer demands, IRR needs 24/7/365 live coverage for the IT support function, so that questions can be answered and issues resolved without delay. For example, if a computer problem holds up a high priority shipment between Milford and Lynndyl, the shipper will expect IRR to have a technician ready to handle

[95] *Id.* at III-D-44

the problem immediately, without the delay that may occur with "on call" staff It is inconceivable that IRR would hold high priority trains because of IT issues that could not be resolved timely when there was no IT staff on site Moreover, the operating expenses IPA proposes for IRR rest on assumptions of no avoidable delays

To ensure 24/7 on-site IT support coverage, UP has added five IT and Operations Support Technicians in lieu of the single PC Help Desk Technician. These positions, along with the other IT Specialists, will be sufficient to provide 24/7 coverage

These additional positions would cover more than IT support. Mr. Brown has identified other functional areas for which IPA fails to provide in its Opening that require or would be facilitated by 24/7 coverage, including customer service and accounting For example, issues could arise 24/7 with.

- *Waybilling.* Although most waybills will be populated by EDI, there will frequently be issues that require corrections, changes, diversions, reconsignments, and so forth. There will also be issues with hazardous commodities, where incomplete or inaccurate waybill data could hold up movement of cars or trains.
- *First/last mile functions.* Notifications, releases, car orders, spotting instructions, train line ups, and other first/last mile functions all occur 24/7 These are normal customer service or operations support functions, yet IPA does not provide personnel to perform them 24/7. These issues need to be resolved on a timely basis with coordination and final resolution with accounting during normal business hours.
- *Operational Issues.* AEI scanners will generate train line ups that personnel need to check against train statistics in RMI. Interchange cuts and train line ups at

interchanges have to be updated and acknowledged in RMI Although IPA acknowledges these needs, it provides no staff to perform these functions

All of these diverse functions should be handled 24/7.[96] UP proposes that the IT and Operations Support Technicians (within the IT function) would provide 24/7 IT support and also perform the functions listed above. These entry-level positions would provide broad exposure to many aspects of railroad operations, creating a strong bench to promote from as openings arise in other functional areas.

In addition to this staff and three Programmers, UP accepts the IT Director and the following IT specialists IPA proposes: the Lead RMI Technician, Network/Exchange 2007 Engineer, and IT Security/Server Manager.[97] A single director should be able to manage this staff Thus, UP provides a total of 12 IT positions, compared with IPA's seven positions.

iii <u>Compensation</u>

UP accepts IPA's proposed salaries and benefits for IRR personnel for all positions below the Vice President level. For positions at the Vice President level and above, UP accepts the use of compensation paid by the similar-sized Providence & Worcester Railroad ("P&W"), as described by IPA, but corrects IPA's choice of data. IPA used compensation for executives as listed in P&W's 2012 proxy statement. However, IPA used only the base salary information

---

[96] As described on pages III.D-24 to III.D-25 above, many of IRR's operations are more complex than those of the *WFA I* SARR, and therefore would require 24/7 support for these functions. For example, the SARR in *WFA I* had fewer than 40 customers and moved only unit train coal traffic, which puts fewer demands on the waybilling function. In contrast, IRR moves coal, bulk commodities, intermodal traffic, and hazardous materials for over 700 customers at all hours of the day. In addition, regulations regarding hazardous material shipments have changed significantly since the Board decided *WFA I* in 2007 Today there are more, and more stringent, requirements that proper information and documentation accompany each car For these and other reasons, it is essential to have 24/7 staffing for these functions.

[97] IPA Opening Nar at III-D-45 to III-D-46.

from that schedule to the 10K report. UP instead uses the total compensation column in that same schedule to obtain more realistic compensation amounts for IRR executives. Total compensation includes the full package of compensation for executives (including fringe benefits, stock options, and other forms of executive compensation) and better represents the going market rate for individuals taking on these responsibilities. IRR would need to provide competitive compensation packages in order to attract and retain able executives. Turnover in a small senior management team would be especially disruptive to the efficient operations that IPA posits for IRR

Total IRR G&A compensation by functional area is presented in Table III.D.13 below.

Table III.D.13
IRR General & Administrative Salaries

Position	IPA		Reply		Difference	
President	$	479.668	$	535,695	$	56,027
Administrative Assistants (due to additional position)	$	93.314	$	139.971	$	46.657
Marketing Managers (due to additional position)	$	103.993	$	207,986	$	103,993
Vice President - Finance & Accounting	$	172,719	$	193.988	$	21.269
Treasurer (due to additional position)	$	-	$	112,775	$	112.775
Controller	$	112,775	$	112,775	$	(0)
Asst. Controller (due to additional position)	$	-	$	103,601	$	103,601
Revenue Managers (due to additional position)	$	65,888	$	197.664	$	131,776
Accounts Payable Manager	$	65,888	$	65,888	$	0
Manager - Budget and Purchasing	$	103.601	$	103.601	$	(0)
Vice President - Law and Administration	$	172.719	$	193.988	$	21,269
General Attorney	$	112.775	$	112.775	$	(0)
Manager of Safety and Claims	$	103,601	$	103.601	$	(0)
Director of Human Resources	$	103,601	$	103,601	$	(0)
Manager of Training	$	103,601	$	103,601	$	(0)
Director of Security	$	103.601	$	103.601	$	(0)
Director of Information Technology	$	103,601	$	103.601	$	(0)
IT Specialists	$	477,004	$	477,004	$	(0)
IT and Operations Support Technicians (due to five additional positions)	$	-	$	397,533	$	397,533
Total	$	**2,544,270**	$	**3,473,283**	$	**929,013**

Source: UP Reply workpaper "IRR Operating Expense Reply.xlsx"

iv. Materials, Supplies, and Equipment

UP accepts IPA's proposed unit costs for the materials and supplies to support IRR employees. IPA states in its opening narrative that it provides a pool of three vehicles for G&A

staff.[98] UP agrees with IPA's calculation of annual expense for vehicles,[99] except that UP provides for a fleet of four Explorers for the G&A staff, adding a vehicle for the IT help staff, which will need to travel to and from Provo and Milford to maintain and update equipment at those locations The other three vehicles would be shared by the G&A staff.

UP's corrections to IRR staffing, discussed above, require a corresponding increase in the total expenditure for materials, supplies, and equipment. Table III D 14 below summarizes these expenditures.

Table III.D.14
IRR Materials and Supplies

	IPA Opening	UP Reply	Difference
Furniture & Office Equip	$ 10,659	$ 15,293	$ 4,634
Utilities	$ 40,000	$ 57,391	$ 17,391
Automobiles	$ -	$ 44,058	$ 44,058
Travel Budgets	$ 125,700	$ 157,125	$ 31,425
Office Supplies	$ 7,770	$ 11,148	$ 3,378
Outside Services	$ 1,038,292	$ 994,830	$ 43,462
IT System and communications Capital	$ 350,954	$ 372,395	$ 21,441
IT System and communications Annual Operating Expense	$ 2,113,686	$ 2,129,060	$ 21,441
Total Office Buildings, Materials and Supplies	$ 3,687,061	$ 3,896,525	$ 209,464
Total	**$ 7,374,122**	**$ 8,809,216**	**$ 1,435,094**

Source. UP Reply workpaper "IRR Operating Expense Reply.xlsx."

[98] However, in the calculation of operating expenses provided in its workpapers, IPA lists the number of vehicles as zero. IPA Opening workpaper "IRR Operating Expense xlsx" UP includes vehicle costs in its computation of IRR operating expenses.

[99] IPA Opening workpaper "IRR Materials and Supplies.xls."

v Other

(a) IT Systems

IPA claims IRR's operations are similar to or smaller than the SARR operations in *WFA I* and other small SAC cases, and that IRR therefore does not need larger mainframe systems that characterize Class I railroads.[100] UP agrees that IRR does not need large mainframe computer and communication systems. However, IRR does require a wide array of reliable technology systems

UP accepts IPA's proposals for IRR's transportation, crew management, dispatching, revenue accounting, car accounting, general accounting, and human resources management systems.[101] IPA estimates implementation costs for all these systems at very low levels with no supporting evidence. UP provides for implementation of the Accounting enterprise resource planning ("ERP") system at four times the cost of software, a metric supported by the literature on this subject.[102]

UP accepts IPA's proposal for network and router equipment However, UP adds a security firewall system at each point where IRR systems connect to the Internet, including the headquarters at Lynndyl, as well as the facilities at Provo and Milford. These systems are necessary to ensure confidentiality of traffic and personnel data, as required by law. and as a security measure against Internet hackers.

UP accepts IPA's plan and per unit price for laptops. PCs and printers. UP revises the total number of these units purchased to be consistent with UP's staffing figures. UP also

---

[100] IPA Opening Nar at III-D-50.

[101] *Id.* at III-D-52 to III-D-55.

[102] UP Reply workpaper "ERP Implementation Costs doc."

provides for back up or redundant printers at locations where crews go on duty. This represents a modest expense but will greatly reduce the probability that train crews would experience problems printing out instructions at on-duty points.[103]

UP accepts IPA's proposals for voice and data communications, software maintenance, Railinc services, and security software.[104]

(b) Other Out-Sourced Functions

UP accepts IPA's assumption that IRR will outsource some of its functions and accepts most of IPA's proposals on outsourcing, with some revisions Although IPA recognized the need for an outsourced employee assistance program ("EAP"),[105] it failed to include EAP costs. The only outsourcing cost IPA provided for HR is the cost of payroll services, at $44 per person. To account for EAP costs, UP adds $20 per employee per year. This estimate is based on UP's actual EAP expenses for 2011, which gives IRR the advantage of UP's economies of scale and scope.[106]

UP modifies IPA's approach to outsourced legal work In responding to IPA's filing in Docket No. 42127, UP presented a benchmark approach to estimating outside legal expense, based on a study of legal spend. IPA has adopted the benchmark approach, but has chosen a different benchmark and a slightly different method of calculation that includes subtraction of in-house legal expenses from the benchmark legal spend amount to obtain the outside legal expense amount UP accepts the benchmark IPA provides However, for the in-house legal function expense component, IPA errs in including all expenses of the Vice President Administration and

[103] UP Reply workpaper "IRR Operating Expense_Reply.xlsx."

[104] IPA Opening Nar. at III-D-57 to III-D-59.

[105] IPA Opening workpaper "IRR outsourcing.xls."

[106] UP Reply workpaper "EAP Cost.pdf."

50 percent of the Claims Manager expense The Vice President Administration has responsibility that extends to much more than the legal function UP determines that only 25 percent of the Vice President's expenses should be attributed to the legal function. Claims Management (like other IRR functions) is an internal client of IRR's law department and therefore should not be included in the legal costs. (Similarly, Marketing will need legal assistance in the preparation of contracts, but marketing costs should not be considered part of the in-house legal function expense. Only the compensation of the in-house lawyer who provides the legal assistance should be counted for this purpose) UP agrees that travel costs of in-house lawyers should be included in the internal legal spend component.[107]

IPA also includes expense for outsourced equipment inspection. This covers work on IPA trains, which are inspected by IPA itself, acting as an outside contractor for IRR UP accepts this approach but reduces the total amount paid to the contractor to reflect the reduced number of trains that UP concludes will be inspected at IPA's Springville car facility. As described in Section III.C above, UP concludes that outsourcing all of IRR's inspections would result in inefficient operations for IRR and that the Springville car facility lacks sufficient capacity to perform inspection of all non-IPA trains. IRR would perform inspections on its Coal Wye tracks for non-IPA trains (as UP does today), rather than pay the contractor at the Springville car facility, which reduces IRR's outsourcing expense. UP accepts the cost per inspection that IPA proposed, and calculates an annual expense of $260,000 for IRR to outsource inspections for 325 IPA trains in the SARR's first year.[108]

[107] The results of UP's revised calculations for outside legal spend are shown in UP Reply workpaper "IRR Operating Expense_Reply.xlsx," Tab "Outsourced Services."

[108] When IPA determined that IRR would outsource inspections for 551 trains, it relied on train movements during IPA's "Base Year" of July 2011-June 2012 However, IPA should have

UP accepts IPA's estimates for Tax, Audit and Claims [109]

(c) Start-Up and Training Costs

UP accepts IPA's assumptions on training and initial hiring expense UP also accepts the process IPA used to estimate ongoing restaffing costs However, UP does not accept the attrition rate IPA assumed IPA states in its Opening Narrative that it uses a three percent attrition rate derived from data from the MODOC Railroad Academy.[110] However, its workpapers show that it used a 1.8 percent attrition rate, which is sourced to a quit rate study prepared by Dr. Robert Topel.[111] A quit rate is very different from an attrition rate A quit rate represents the rate at which employees voluntarily leave a job. Attrition, in contrast, includes quits, retirements, deaths, and terminations. Furthermore, a 1.8 percent attrition rate is implausible on its face. It means that IRR workers would work the same job for an average of 56 years.[112]

Mr. Brown reviewed UP's attrition rates by category of employee and used that data to estimate attrition that IRR will experience. UP's actual attrition rates for categories of employees IRR would hire range from { } to { } percent [113]

---

applied the 21 percent tonnage index for coal volumes it used to adjust other IRR operating statistics to the first year of SARR operations IPA Opening workpaper "IRR Operating Statistics.xls." Applying this index results in an outsourced inspection expense of $534,000, or $92,000 higher than the estimate on which IPA relied.

[109] All of these calculations appear in UP Reply workpaper "IRR Operating Expense_Reply.xlsx," Tab "Outsourcing."

[110] IPA Opening Nar at III-D-68

[111] IPA Opening workpaper "attrition rate.pdf."

[112] Average number of employment years equals the total number of employees divided by the number of employees lost per year For example, a 200 person railroad with a 1 8 percent attrition rate would lose 3.6 employees per year, resulting in an average employee remaining for 55.56 years.

[113] UP Reply workpaper "UP Attrition rates.xlsx."

IPA also assumed a 1.8 percent attrition rate for training.[114] Again, this percentage is too low. UP instead uses the MODOC three percent failure rate for classroom work. UP also uses a three percent failure rate for on-the-job training. This is a logical and conservative assumption for the on-the-job training period, because this period lasts approximately as long as the classroom training period, and the on-the-job training period—where trainees first experience the rigors of the demanding, irregular work times and extensive travel schedules involved in railroad operating positions – is typically where the highest attrition occurs.

UP also uses its more reasonable average salary figures for conductors and engineers and a 44 percent fringe benefit rate, rather than the 41.3 percent rate IPA uses. The basis for the salary figures and fringe benefit rate is discussed in Section III.D.3.a.ii above.

Applying these more realistic figures and rates to its adjusted IRR staffing levels, UP has determined that restaffing costs would be $166,463 per year compared to IPA's proposal of $30,614.[115] Total training and restaffing costs are shown in Table III.D.15 below.

Table III.D.15
Training and Restaffing Costs

	IPA		Reply		Difference	
Training	$	1.270,648	$	1,848,202	$	577.553
Initial Hiring	$	430,116	$	535,062	$	104,946
Total Training & Initial Hiring	*$*	*1,700,764*	*$*	*2,383,264*	*$*	*682,499*
Restaffing	$	30.614	$	166.463	$	135,849

vi. <u>Travel Expense</u>

UP accepts IPA's proposed travel expense calculation of $10,475 per employee for individuals at the manager level and higher, and for the three outside members of the Board of

[114] IPA Opening workpaper "IRR Operating Expense.xlsx."

[115] UP Reply workpaper "IRR Operating Expense_Reply.xlsx."

Directors. Not including the outside Board members, IPA's organization called for 12 positions that would entail travel in the G&A organization. UP's slightly larger organization would have 15 such positions.[116] The three added positions that entail travel are the additional Marketing Manager, the Treasurer, and the Assistant Controller.

4. Maintenance of Way

UP's maintenance-of-way ("MOW") plan for IRR was developed by David Hughes.[117] Mr. Hughes has over 30 years of experience as a professional engineer in the fields of railroad engineering, railroad operations, and maintenance supervision.

Mr. Hughes has experience with a broad range of railroads, including small regional freight railroads, as well as larger railroads. Early in his career, Mr Hughes held various positions in the Engineering Department of Southern Pacific Railroad, including as a General Track Foreman in Utah. In that position, he inspected track for defects and personally made minor repairs or scheduled the repairs by a maintenance gang. He also supervised the work of section gangs, smoothing gangs, and welders. In addition, Mr Hughes served as Bridge and Building Supervisor in Houston, Texas In that position, he was personally responsible for performing annual bridge inspections and prioritizing bridge maintenance.

Mr. Hughes later served as Vice President of Engineering for the Boston and Maine Railroad ("B&M"), where he was responsible for all track structures and signal systems maintenance, and for planning the reconfiguration and reconstruction of 155 route miles of mainline. B&M's size and traffic density were similar to those of IRR [118] B&M was in

[116] UP Reply workpaper "IRR Operating Expense_Reply.xlsx," Tab "Summary "

[117] Mr Hughes' detailed Statement of Qualifications and Verification are set forth in Part IV.

[118] Boston and Maine was sold to Guilford Transportation Industries in 1981

bankruptcy reorganization when Mr Hughes was chief engineer, and he gained valuable experience in effectively maintaining track and structures at the lowest possible cost.

After leaving B&M, Mr. Hughes served as President of Pandrol, Inc (a manufacturer of track fastening systems) and Speno Rail Services (a railroad track maintenance contractor), where he assisted railroads in developing high-performance track components and mechanized rail and ballast maintenance practices. In those positions, he spent extensive time in the field observing maintenance problems first hand and devising solutions to those problems.

Mr. Hughes has also served as President of the Bangor & Aroostook Railroad, Chief Engineer for the National Railway Passenger Corporation ("Amtrak"), and Acting President and Chief Executive Officer of Amtrak.

Mr. Hughes has also had a long career as a consultant in the rail industry. As a consultant, Mr. Hughes has performed due diligence reviews of dozens of MOW plans for lines being spun off by Class I railroads or being bought or sold by private parties These reviews generally involved hi-rail inspection trips over lines and interviews with MOW officials regarding their MOW organizations and plans for maintaining the lines. Through the due diligence reviews, Mr Hughes gained extensive familiarity with the MOW practices of non-union railroads These reviews, performed for financial institutions and borrowers, are an ongoing part of his work, allowing him to keep up to date with the most recent MOW practices.

Mr Hughes' testimony addresses the reasonableness of IPA's MOW assumptions and the need to consider real-world evidence in evaluating IPA's MOW plan Mr. Hughes concludes that IRR would need additional MOW resources in several areas

a. <u>General Approach to Developing the MOW Plan</u>

IPA presented a MOW plan developed by Gene Davis. UP agrees with many of IPA's MOW assumptions. However, Mr. Davis and IPA failed to consider, or erred in the determination of, many important expenses necessary for IRR's MOW operations. For example, IPA:

- Provided insufficient track maintenance crews and signal maintainers,
- Omitted the necessary Signal Technician position,
- Miscalculated required rail grinding pass miles.
- Wrongly assumed IRR would pay no derailment repair expenses,
- Mistakenly employed route miles as the basis for determining wreck-clearing expenses,
- Failed to provide for any environmental cleanup expenses, and
- Failed to include vehicle and equipment ownership cost.

Mr. Hughes' MOW plan for IRR follows the precepts approved by the Board in prior SAC cases. In developing his MOW plan for IRR, Mr Hughes gave particular attention to the Board's discussions of the SARR MOW plan in *WFA I*,[119] which involved a SARR similar in size to IRR, and in *AEPCO*.[120]

Mr. Hughes analyzed IPA's MOW evidence and developed an IRR MOW organization from the ground up He relied heavily on knowledge and insights gained while performing MOW due diligence studies related to investments in non-union regional and shortline railroads. The labor and equipment resources he proposes are closely aligned with the practices of shortline and regional railroads, adjusted for the unique characteristics of the IRR system

[119] In *WFA II*, slip op. at 41, the parties "generally agree[d] on maintenance-of-way (MOW) expenses" and did not challenge the Board's analysis in *WFA I*.

[120] *Ariz. Elec. Power Coop., Inc. v BNSF Ry*, STB Docket No. 42113 (STB served Nov. 22, 2011)

b MOW Personnel

IRR's MOW peak year personnel requirements are summarized in Table III.D.16 below.

Table III.D.16
IRR MOW Personnel

Position	**IPA No. of Employees**	**Reply No. of Employees**	**Difference**
HQ Office/Supervisory (based at Lynndyl)			
Track Engineer	1	1	-
Communications & Signals Engineer	1	1	-
Bridge Engineer	1	1	-
Engineer of Programs, Budgets, Safety & Training	1	1	-
Subtotal	**4**	**4**	-
Field			
Roadmasters	1	1	-
Assistant Roadmaster	3	3	-
Track Crew Foremen	2	3	1
Track Crew Member	4	6	2
Roadway Machine Operators	4	5	1
Swivel Dump Truck Driver	0	1	1
Welders/Helpers/Grinders	2	2	-
Roadway Equipment Mechanic	1	1	-
Smoothing Crew Foreman/Machine Operator	1	1	-
Smoothing Crew Member/Machine Operator	1	2	1
C&S Supervisor	1	1	-
Signal Maintainers	3	3	-
Signal Technician	0	1	1
Communications Technician	1	1	-
Communications Maintainer	1	1	-
B&B Supervisor/Inspector	1	1	-
B&B Machine Operator	1	1	-
B&B Foreman	1	1	-
B&B Carpenter	1	1	-
Subtotal	**29**	**36**	**7**
Total MOW	**33**	**40**	**7**
Main track miles per MOW employee	6.02	4.97	1 05

Source: UP Reply workpaper "Reply MOW Costs.xlsx"

Mr. Hughes' MOW plan results in a ratio of approximately 5.0 track miles per MOW employee, an even leaner organization than the 4.0 track miles per MOW employee for the plan adopted by the Board in *WFA I*[121] Mr. Hughes' proposal is also more conservative than MOW plans adopted by the Board in *WFA II, Otter Tail*,[122] *PSCo/Xcel I*, and *AEP Texas North*, as shown in Table III D 17 below.

Table III.D.17
Main Track Miles per MOW Employee

Parameter	*AEPCO*	*WFA I*	*WFA II*	*Otter Tail*	*PSCo/ Xcel I*	*AEP Texas*	IPA	Reply
Main track miles	3,326.24	389.76	404 61	1.485	551.19	1.664.1	198.98	201.69
Total MOW employees	559	97	116	483	179	488	33	40
Main track miles per MOW Employee	5 95	4.02	3 49	3 07	3.07	3.41	6.03	5.04

Sources: *WFA I*, slip op. at 57. Table C-6: *WFA II*, slip op. at 42. Third Supplemental Opening Evidence of Complainants Western Fuels Association and Basin Electric Power Cooperative, Inc at III-B-7, *Western Fuels Ass'n, Inc & Basin Elec Power Coop v BNSF Ry.*, STB Docket No. 42088 (May 13, 2008); Third Supplemental Reply Evidence of BNSF Railway at III-B-5, *Western Fuels Ass'n, Inc. & Basin Elec. Power Coop. v. BNSF Ry.*, STB Docket No. 42088 (July 14, 2008): *Otter Tail*, slip op. at A-1, C-20 to C-22; *PSCo/Xcel I*, 7 S T.B. at 633. Table A-2, 662; *AEP Texas North*, slip op at 27, 68-69; *AEPCO November 2011*, slip op. at 65, Table A-6. IPA Opening Nar at Table III-D-11.

In contrast to Mr. Hughes' proposal, IPA's MOW plan results in a ratio of 6.03 track miles per MOW employee IPA asserts that this high ratio is "comparable to the 5 95 mainline track miles per MOW employee accepted by the Board in [*AEPCO*]."[123] However, this comparison fails to consider the significant differences between the two SARRs and ignores the Board's findings in smaller SARR cases, especially *WFA I*, *WFA II*, and *PSCo/Xcel I* The

[121] *WFA I*, slip op at 57, Table C-6.

[122] *Otter Tail Power Co v BNSF Ry*, STB Docket No. 42071 (STB served Jan. 27, 2006) ("*Otter Tail*").

[123] IPA Opening Nar. at III-D-73.

SARR in *AEPCO* was seventeen times larger than IRR,[124] producing economies of scale that cannot be replicated on a small railroad like IRR.

Merely having a track mile per employee ratio for IRR similar to *AEPCO* does not indicate that the workforce proposed by IPA is appropriate or feasible. The proper size for the MOW workforce must be determined by building a workforce from the bottom up based on the specific conditions that exist on IRR Comparing the resulting analysis to similarly situated railroads is also helpful. In these regards, IPA's proposal comes up short.

c. MOW Organization by Function

The required size of IRR's field MOW organization is dictated by two types of factors. The first set of factors consists of those that determine the actual amount of work that must be accomplished. In general, these factors are governed by the physical quantity of assets to be maintained and the amount of rail traffic inflicting physical damage. These physical assets include rails, ties, fasteners, welds, switches, railroad crossings, road crossings, train control and traffic control signals, bridges and other structures.

The second set of factors consists of those that impede the productivity of maintenance forces in carrying out their work. Here, the principal considerations are train frequency as well as the accessibility of the track, travel distance, and weather.

Overall, the proper size of the field maintenance force is determined by the quantity of assets maintained, the damage inflicted on the assets by passing trains, the required inspection and testing, and the conditions that determine the efficiency with which the field force can

[124] The SARR in *AEPCO* consisted of 3,326.24 main track miles compared to 201.69 miles for IRR In addition, the much higher densities on the *AEPCO* SARR justified investment in higher cost, more durable components and allowed for more mechanized program maintenance

perform the maintenance, testing, and inspection tasks These factors and their relationship to the size of the IRR field workforce are discussed below.

i Track Department

IPA's proposal of 20 employees for IRR's track department is insufficient to handle the maintenance IRR track would require. As described in more detail below, IRR's Track Department requires 26 employees, organized into the positions shown in Table III.D.18 below. The annual compensation associated with each position in UP's MOW plan is consistent with the compensation assumed in IPA's MOW plan

Table III.D.18
IRR Track Employees

Position	IPA No. of Employees	Reply No. of Employees	Comp. Per Employee	IPA Total Comp.	Reply Total Comp.
Track Engineer	1	1	${ }	${ }	${ }
Roadmaster	1	1	{ }	{ }	{ }
Assistant Roadmasters	3	3	{ }	{ }	{ }
Track Crew Foremen	2	3	{ }	{ }	{ }
Track Crew Members	4	6	{ }	{ }	{ }
Roadway Machine Operators	4	5	{ }	{ }	{ }
Swivel Dump Truck Driver	0	1	{ }	0	{ }
Welders/Helpers/Grinders	2	2	{ }	{ }	{ }
Roadway Equipment Mechanic	1	1	{ }	{ }	{ }
Smoothing Crew Foreman	1	1	{ }	{ }	{ }
Smoothing Crew Member/Machine Operator	1	2	{ }	{ }	{ }
Total	**20**	**26**	[redacted]	**$1,430,285**	**$1,803,123**

General Office Staff. UP agrees with IPA that the IRR Track Department should be headed by a Track Engineer. This individual is responsible for maintaining all IRR track, ensuring that the track operating and capital budgets are properly prepared, and ensuring compliance with applicable company and regulatory requirements.

Roadmasters and Assistant Roadmasters. UP agrees that IRR can function with one Roadmaster and three Assistant Roadmasters, as described in IPA's Opening Narrative

Track Crews. UP accepts IPA's proposed track maintenance crew configuration of one foreman, two track crew members supported by a hi-rail track gang truck, and a backhoe with an associated operator/crew member and dump truck.

However, IPA's proposal for two track maintenance gangs is inadequate to maintain the IRR track IPA has provided no support justifying its proposal

A track maintenance crew can typically maintain between 50 and 100 main track miles, depending on maintenance workload, train frequency and the accessibility of the track for maintenance Mr. Hughes performed a detailed assessment of IRR's maintenance requirements for each of three sections on the IRR route to develop main track miles maintainable by one crew for each of the sections. Mr. Hughes examined the passing tonnage per mile, number of switches and crossings per week, and amount of track curvature for each section. He also considered train frequency and access to the track in evaluating potential hindrances to maintenance and inspection activities.[125]

Based on this analysis, Mr. Hughes concludes that, under the traffic and other conditions unique to each line segment, a single crew could maintain approximately 80 main track miles between Provo and Sharp. A second crew would be needed to maintain approximately 70 track miles under the conditions between Sharp and Lynndyl, and a third crew would be needed to

[125] UP Reply workpaper "Track Workload Evaluation.xlsx."

maintain the 50 main track miles between Lynndyl and Milford under the conditions in that portion of the system

Table III D 19 lists track maintenance crews IRR would require, based on Mr Hughes' analysis of each portion of the IRR route.

Table III.D.19
Track Maintenance Crews Required

Line Segment	Main Track Miles	Main Track Miles Maintainable by One MOW Crew	Maintenance Crews Required
Provo to Sharp	55.75	80	0.7
Sharp to Lynndyl	41.17	70	0.6
Lynndyl to Milford	104.77	50	2 1
Total	**201.69**	[redacted]	**3.4**

Mr. Hughes' evaluation of track maintenance crew requirements shows that 3.4 crews are required to maintain the IRR. To be conservative, three crews are included in the MOW workforce plan. In contrast, the two track crews IPA proposed would only be able to maintain fewer than 133 miles of the 201.69 miles of the IRR

Under Mr. Hughes' plan, two crews would be located in Lynndyl and would maintain the Lynndyl to Provo segment, the north end of the Lynndyl to Milford segment, and the associated yard track The third crew, located in Milford, would maintain the southern part of the Milford to Lynndyl segment and the Milford yard

Because track mileage is a key factor affecting track maintenance requirements, the ratio of track miles to track maintenance gangs and the ratio of track miles to track maintenance employees provide useful insights in proper track crew staffing. Table III D.20 below compares main track miles per maintenance gang and per track maintenance employee.

Table III.D.20
Main Track Miles per Maintenance Gang and per Track Employee

Parameter	*AEPCO*	*WFA I*	IPA	Reply
Main track miles	3,326.24	386 17	198 98	201.69
Track maintenance gangs	60	5	2	3
Total track employees	410	54	20	26
Main track miles per track maintenance gang	55.4	77.2	99.5	67.2
Main track miles per track employee	8 1	7.15	9.9	7.8

Sources: *AEPCO November 2011*, slip op. at 32, 65, Table A-6, 68; *WFA I*, slip op. at 26, 58, Table C-7. IPA Opening Nar at Table III-D-12.

As Table III.D.20 shows, IPA's proposed ratios of 99.5 main track miles per track maintenance gang and 9 9 main track miles per track employee are substantially higher than the ratios the Board accepted in *AEPCO* and *WFA I*. In contrast, UP's proposed ratios fall within the ranges accepted in *AEPCO* and *WFA I*

Roadway Machine Operators. UP accepts IPA's staffing of the maintenance crews with one backhoe for each track gang, with the operator functioning as an additional crew member when required. UP also accepts IPA's proposal for an excavator with hi-rail, three-way (rotary) dump truck and lowboy trailer (used to move the excavator) and a Prentice Loader, both of which would be available for use system-wide. However, Mr. Hughes concludes that IRR would require a dedicated operator to make safe and effective use of the expensive rotary dump truck This truck driver would need to hold a commercial driver's license and to be qualified in the operation of on-track hi-rail equipment and of the three-way dumping apparatus, which requires more care to operate safely than an ordinary dump truck. Considering these substantial qualifications required to operate the rotary dump truck and the high cost of the truck (over $100,000), Mr. Hughes has provided for a dedicated operator, in accordance with standard industry practice.

Welder/Helper/Grinders. UP accepts IPA's proposal for one two-person welding crew.

Roadway Equipment Mechanic UP accepts IPA's proposal for one Roadway Equipment Mechanic.

Smoothing Crew. Smoothing is necessary to eliminate irregularities in track geometry that develop over time. UP accepts IPA's proposal for one smoothing crew but, in accordance with industry practice, adds a crew member to the two machine operators IPA provides. Smoothing machinery is a major investment, at a cost of approximately $1 million, and it should be operated carefully and efficiently to preserve the value of this investment Moreover, smoothing is a critical function with important safety implications. Improper smoothing practice can lead to poorly aligned curves, heat buckles in track (either during or after smoothing), and other problems that detract from safe, efficient railroad operation In addition, with only two operators, each operator must be at the controls with no respite other than a brief break for an occasional passing train. An operator cannot reliably focus simultaneously on performing his minute-to-minute on-track operator duties, complying with track occupancy time limits, interacting with the train dispatcher, and assuring the overall quality of the smoothing work Thus, a third crew member is required to ensure safe operations and to minimize total cost.

ii Communications & Signals Department

UP accepts IPA's proposed Communications & Signal ("C&S") workforce with two exceptions

First, Mr Hughes has determined that four signal maintainers are required, rather than the three IPA proposed. As described in Section III.F 6, the signal equipment required by IRR consists of 5.051 AREMA signal units.[126] Dividing the signal maintenance and inspection

[126] "AREMA" stands for American Railway Engineering and Maintenance-of-Way Association

workload among three signal maintainers, as IPA proposes, would result in an unacceptable workload of approximately 1,684 units per signal maintainer — significantly more than the 1,250 units per maintainer the Board accepted in *AEPCO* and 1,239 units per maintainer accepted in *WFA I*. The addition of a fourth signal maintainer results in a more reasonable 1,263 AREMA units per maintainer

Second, IRR's C&S department also requires a Signal Technician for more skilled testing and troubleshooting of electronic systems, and to assist the signal maintainers with tests that require two people to conduct. In *AEPCO* and *WFA I*, the Board found both Signal Technicians and Signal Inspectors necessary to C&S Department operations of the SARR.[127] Considering the size of IRR, Mr Hughes has determined that a single Signal Technician could fulfill both roles.

The specific positions and compensation levels in this department are shown in Table III D.21 below UP accepts IPA's proposed compensation levels

Table III.D.21
IRR C&S Employees

Position	IPA No. of Employees	Reply No. of Employees	Comp. Per Employee	IPA Total Comp.	Reply Total Comp.
Communications & Signals Engineer	1	1	$ 112,775	$ 112,775	$ 112,775
C&S Supervisor	1	1	88,083	88,083	88,083
Signal Maintainers	3	4	80,659	241,978	322,636
Signal Technician	0	1	80,659	80,659	80,659
Communications Technician	1	1	74,861	74,861	74,861
Communications Maintainer	1	1	74,861	74,861	74,861
Total	7	9	[redacted]	$ 592,557	$ 753,875

[127] *See AEPCO November 2011*, slip op. at 74; *WFA I*, slip op at 63

iii Bridge & Building Department

UP accepts IPA's proposal for the Bridge & Building Department.

iv. Misc. Administrative/Support Personnel

UP accepts IPA's proposal for Miscellaneous Administrative/Support Personnel.

d. Compensation of MOW Employees

UP accepts IPA's MOW salary proposals but adjusts the total annual compensation to reflect the seven additional MOW employees UP proposes. To the extent the UP MOW plan includes additional positions, Mr. Hughes has drawn from the same source of compensation information used by IPA, which relied on information drawn from UP's Wage Forms A and B.[128]

e. Non-Program MOW Work Performed by Contractors

UP agrees with IPA that much non-program MOW work for IRR could be best performed by Contractors Specific areas of maintenance that are performed by contractors are described below.

i. Planned Contract Maintenance

Track Geometry Testing. UP accepts IPA's unit cost for track geometry testing but increases track miles tested to UP's 201.69 mile figure for system mileage, resulting in annual geometry testing expense of $70,275.[129] UP accepts $16,000 as the annual total cost of Joint Bar Testing.[130]

---

[128] IPA Opening Nar. at III-D-87.

[129] IPA Opening workpaper "MOW Costs.xls," Tab "Annual MOW Expenses."

[130] The total annual miles of testing and related cost calculations are detailed in UP Reply workpaper "Reply MOW Costs.xls." Tab "Annual MOW Expenses."

Ultrasonic Rail Testing. UP accepts IPA's ultrasonic testing unit cost of $119 68.[131] However, UP adjusts the ultrasonic testing annual cost to $24.138 to reflect UP's addition of main track miles for IRR. resulting in a total of 201 69 main track miles

Rail Grinding. UP accepts IPA's policy to grind standard rail every 60 MGT for tangent track. with one pass for tangent rail and rail in curves less than three degrees, and two passes for curves equal to or greater than three degrees. UP also accepts IPA's rail grinding unit cost per track mile of $1.596 44. However, IPA's workpaper reflects an inconsistency in the columns headed "2020 Gross Tons."[132] The tonnages cited are not consistent with either base year tons or 2022 tons shown in Opening Table III-C-2. In addition. there is no indication that IPA included the gross tonnage of locomotives (as well as training tonnage) in its calculation of total gross tons, as it should have for purposes of determining a schedule for rail grinding.

UP revises the passing tonnage portion of the rail grinding calculation to reflect Reply average gross tonnage and to include gross tonnage for locomotives over the DCF period, resulting in annual Rail Grinding expense of $130,783 [133]

UP does not accept IPA's proposal to capitalize rail grinding costs. This proposal squarely conflicts with Board precedent and UP practice In *WFA I*, the Board accepted treatment of the cost of rail grinding as an operating expense, notwithstanding the complainant's argument that rail grinding cost should be capitalized because it extends rail life [134] The Board

---

[131] UP Reply workpaper "Reply MOW Costs.xls," Tab "Rail Flaw Detection " The total annual miles of ultrasonic testing and related cost calculations are detailed in Tab "Annual MOW Expense."

[132] IPA Opening workpaper "MOW Costs xls." Tab "Rail Grinding Cap Costs."

[133] UP Reply workpaper "Reply MOW Costs.xlsx," Tab "Rail Grinding Expense."

[134] *See WFA I*, slip op. at 71

reaffirmed the appropriateness of expensing rail grinding in *AEPCO*.[135] Because IPA provides no justification for its decision to depart from Board precedent, its argument should be rejected.[136] Moreover, IPA's assertion that UP capitalizes rail grinding is incorrect.[137] UP treats these costs as operating expense.[138] Accordingly, UP includes rail grinding costs in IRR annual MOW operating expense.

Ballast Cleaning/Undercutting. Mr. Hughes agrees with IPA's assumption that shoulder ballast cleaning is appropriate for IRR. However, Mr. Hughes determined that IPA's estimates of the quantity of cleaning required and the cost of cleaning is incorrect for at least two reasons.

First, IPA allows an inadequate amount of time for mobilization/demobilization. IPA provides only 1.4 hours for mobilizing the ballast screening operation, and an equal amount of time for demobilizing.[139] IPA assumes "that the shoulder cleaning operation would begin after the contractor finishes on a nearby (or connecting) railroad and no large mobilization or demobilization charges would be incurred."[140] UP agrees that "no large" mobilization charge would be incurred, but 1.4 hours allows for effectively no mobilization at all. Packing up,

---

[135] *See AEPCO November 2011*, slip op. at 77.

[136] *See General Procedures for Presenting Evidence in Stand-Alone Cost Rate Cases*, 5 S.T.B. 441, 446 (2001) ("[T]he parties to SAC cases are cautioned not to attempt to relitigate issues that have been resolved in prior cases. Unless new evidence or different arguments are presented, we will adhere to precedent established in prior cases.").

[137] IPA Opening Nar. at III-D-91, III-D-102.

[138] *See* Union Pacific Corporation, 2010 Annual Report, Form 10-K, at 74 (2011), *available at* http://www.up.com/investors/attachments/secfiling/2011/upc10k_020411.pdf; Union Pacific Railroad Company, 2010 Railroad Annual Report R-1, at 5 (2011), *available at* http://www.up.com/investors/attachments/reports/rci/2010/r-1.pdf.

[139] IPA allows $1,500 for mobilization and an equal amount for demobilization based on an IPA daily rental rate for a shoulder ballast cleaner of $11,000. A contract work day for ballast screening is generally 10 hours, or $1,100 per hour. $1,500/$1,100 per hour = 1.4 hours. IPA Opening workpaper "MOW Costs.xls," Tab "Shoulder Cleaning Costs."

[140] *Id.* In fact, there are very few other railroads located near much of the IRR system.

moving and unpacking a shoulder ballast screening machine is a time consuming operation. If the ballast screener moves to IRR under its own power, it operates more slowly than freight train speeds[141] Because this movement is a non-revenue move, it would also receive low movement priority compared to revenue freight trains and would travel more slowly than trains In addition, if the screener is loaded on a freight car and shipped to IPA, several days would be required for loading the screener into a car and unloading it later, placing the car in a train, and moving it to destination. Mr. Hughes therefore conservatively determined that mobilization and demobilization would take one day each

Second, IPA provides an inadequate quantity of shoulder ballast screening. In its Opening Narrative, IPA proposes to clean only 5 percent of the track or 10 track miles per year,[142] meaning that only 35 percent of the track would be cleaned in the DCF period.

Shoulder ballast screening is a low cost maintenance process that is intended to postpone the need for much more expensive ballast undercutting.[143] Ballast undercutting is performed only when the ballast has become so fouled that water cannot drain from the track, softening the subgrade and resulting in mud pumping up through the ballast. Shoulder ballast cleaning removes contamination from beneath the ends of the ties and in the shoulder of the ballast

---

[141] The Loram shoulder ballast screener has a maximum travel speed of 48 mph according to the Loram website, compared with 60 to 70 mph operating speeds for many IRR trains (on the Lynndyl-Milford segment) and for other railroads. UP Reply workpaper "Loram Shoulder Ballast Cleaner Specifications.pdf."

[142] IPA Opening Nar. at III-D-91.

[143] Shoulder ballast screening removes only the ballast at the ends of the ties, runs it over vibrating screens to remove dirt, and returns it to the ends of the ties. Track does not require surfacing following shoulder ballast screening. Undercutting removes all ballast from the track, screens it and returns it to the track. Undercutting generally requires adding ballast while shoulder screening usually does not. Undercutting must be followed by two passes of a surfacing gang to reestablish surface and alignment and to compact the ballast.

beyond the ends of ties to ensure water and contaminants can flow freely from the center of the track to prevent the type of ballast fouling that requires ballast undercutting. As such, it should be done early, while the ballast is still relatively clean, to maintain the free flow of water and contaminants from the ballast. Shoulder ballast screening is of no value after the ballast has become fouled, since cleaning only the shoulder will not restore drainage to the full track width As IPA notes in its Opening Narrative, "[b]y taking a proactive approach to shoulder cleaning, wholesale undercutting should not be necessary during the ten-year DCF period."[144] Accordingly, proper maintenance requires that the entire 105 track miles on the high tonnage[145] segment between Milford and Lynndyl be cleaned during the DCF period and that 50 percent (48 miles) of the 97 track miles between Lynndyl and Provo be cleaned, with special attention to the high curvature areas between Sharp and Lynndyl in order to avoid the need for expensive ballast undercutting.

Total required shoulder ballast screening amounts to 22 track miles per year at an annual cost of $58,100.[146]

Yard Cleaning. UP accepts IPA's estimate of three working days per year to clean IRR's yards. As in the case of ballast cleaning, IPA has provided insufficient time for mobilization and demobilization of the yard cleaning operation. These activities would consume a minimum of one day each, bringing Yard Cleaning cost to $12,500 per year.[147] The five days for working and mobilization includes the time required to pack-up and move the yard cleaning machine the 105 miles between Lynndyl and Milford and set it up again.

[144] IPA Opening Nar. at III-D-91 to III-D-92.

[145] The Milford-Lynndyl segment carries 40 MGT/mile per year, including locomotives.

[146] UP Reply workpaper "Reply MOW Costs.xlsx," Tab "Shoulder Cleaning Costs."

[147] UP Reply workpaper "Reply MOW Costs.xlsx," Tab "Yard Cleaning."

Vegetation Control. UP accepts IPA's proposed total annual expense of $19,900 for Vegetation Control.

Crossing Repaving. UP accepts IPA's estimate of $162,404 annually for the cost of crossing repaving and its capitalization of this cost UP agrees that repairing would be performed in conjunction with the annual capital (renewal) program.

Equipment Maintenance. UP accepts an annual cost of maintaining MOW equipment of five percent of the equipment purchase price As explained in Section III D 4.g below, UP identifies the list of machinery and vehicles and revises their purchase prices to conform to actual costs shown in UP's discovery production.[148] Mr. Hughes' equipment maintenance cost for IRR amounts to $216,396 annually.

Communications System Inspection and Repair. UP accepts an annual communications system maintenance cost of two percent of original purchase cost, or $138,000 based on a communications system cost of $6 9 million.[149]

Bridge Inspections. Under the limited and specific conditions existing on IRR, UP agrees that no contract bridge inspection should be required during the DCF period

Building Maintenance. UP accepts two percent of the total building cost of $30.4 million as the cost of building maintenance, or $608,000.[150]

---

[148] UP Reply workpaper "Reply MOW Costs.xlsx," Tab "Annual MOW Equipment Cost."

[149] *See* Section III.F.6.c.

[150] UP Reply workpaper "Reply MOW Costs.xlsx," Tab "Annual MOW Expenses."

ii. Unplanned Contracted Maintenance

UP accepts IPA's assumptions regarding Unplanned Contract Maintenance for Snow Removal and Storm Debris Removal. UP also accepts IPA's assumption that unplanned costs of building maintenance costs will be included in the general building maintenance costs.

iii. Large Magnitude, Unplanned Maintenance

Derailments. IPA includes no expenses for derailment damage.[151] However, it calculates a figure for wreck clearing expense by calculating UP system-wide cost per route mile cost and multiplying by IRR route miles and includes this figure in IRR's costs. UP rejects both IPA's conclusion that there would be no derailment expense and its methodology for calculating the cost of derailment-related repairs to way and structures and the cost of clearing wrecks. IPA's evidence is flawed for at least three reasons.

First, IPA fails to recognize that newly constructed railroads are not exempt from derailment risks. IPA's assertion that "[a] new railroad constructed to modern standards is less likely to experience a major derailment than the older track structure and sub-grade of the UP lines being replicated"[152] incorrectly implies that derailments occur only as a result of track deficiencies. On the contrary, track is responsible for only 35 percent of derailments. 48 percent of main track derailments occur due to human error, signal problems, and train equipment issues. An additional 17 percent of derailment causes are classified as "miscellaneous."[153]

---

[151] IPA Opening Nar. at III-D-98 to III-D-99; IPA Opening workpaper "IRR Derailment and Clearing Wrecks.xlsx." On its face, this makes no sense. If IRR will incur expense for clearing wrecks (as IPA assumes), there most likely will be some expense for repair of way and structures that were damaged by the derailments that caused the wrecks.

[152] IPA Opening Nar. at III-D-98.

[153] In 2012 and for the period 2003-2012, fewer than 35 percent of UP derailments were track-related. UP Reply workpaper "Derailment Cause Report.xlsx," Tab "Analysis." Human error

Further, well-maintained older track is not more likely to cause a derailment than new track. In fact, newly constructed track presents special risks for track-caused derailments. For example, new slopes, particularly side hill cuts, occasionally fail suddenly in wet weather, dropping large quantities of soil and rock on the track. New track may also lose surface due to differential settlement at bridge abutments, over culverts and on high fills due to uneven compaction of the embankment. New drainage structures placed in existing waterways are subject to unexpected erosion and in some cases undermining of the track during heavy rain events. Even though design engineers make their best efforts to take all of these hazards into account and designs are intended to make them unlikely (not impossible), they still occasionally occur.

Older track, in contrast, has had time to settle in and stand the test of time. Differential settlement is finished, side hill slopes are more stable, and drainage structures have been tested by many heavy rain events over time and have been reinforced where necessary to resist erosion.

Second, IPA relies on an inquiry to the FRA Accident Reports database for derailments occurring in the state of Utah in 2011 to conclude that IPA will incur no expense for damage to way and structures due to derailment damage.[154] To assume that IPA will not incur such damage based on one twelve-month reporting period is misleading and imprudent. The lines operated by UP in Utah represent only 3.9 percent of total UP-operated lines.[155] This limited data point

accounted for 34 percent of derailments, train equipment issues accounted for 11 percent, and signal problems accounted for three percent.

[154] IPA Opening Nar. at III-D-98, IPA Opening workpaper "IRR Derailment and Clearing Wrecks.xlsx."

[155] UP operates 1,249 lines in Utah and 31,898 miles on the entire Utah System. *See* Union Pacific Railroad Company, 2010 Railroad Annual Report R-1, at 702 (2011), *available at* http://www.up.com/investors/attachments/reports/rei/2010/r-1.pdf

provides no assurance that IRR could avoid derailment expenses during a different period, and surely IRR will repeatedly incur such expenses over time, as all railroads do. Accordingly, it is incorrect for IPA to assume that IRR would be free of expenses for way and structure damage due to derailments.

Third. IPA develops wreck clearing expenses using UP's 2011 R-1 to derive a cost per route mile on the entire UP system, and then multiplies that figure by IRR's route miles.[156] However, it is plain that it is train miles and associated gross ton miles that are the driver of train derailments, not route miles. A route with no trains, regardless of length, would have no derailments.

A more logical approach would be to apportion derailment related expenses on the basis of ton miles, rather than route miles, since it is trains and the contents of trains, not routes, that actually derail

IPA relies on the FRA accident reporting database to estimate the cost of clearing wrecks (and other derailment-related expenses) UP likewise uses the FRA database to develop derailment-related costs, but it makes certain adjustments to reflect that the costs reported to FRA are incomplete, as described in the FRA Guide for Preparing Accident/Incident Reports. The only costs reported to FRA are the direct costs of labor and material, rental of equipment, and similar costs due to a derailment. The costs of fringe benefits, travel and meals, company owned equipment, the small tools and materials additive, and supervision and overhead are not

[156] IPA Opening Nar. at III-D-99. IPA also develops derailment repair expenses using this route mile allocation methodology. However, it then provided nothing for such costs, based on the faulty reasoning discussed above The route mile methodology is inappropriate for both wreck clearing and way structure damages costs, but IPA did not actually use the figure it developed for way and structure damage

included.[157] In addition, costs for derailments below the reporting threshold are not reported at all.

To partially compensate for the incomplete reporting reflected in the FRA database, UP has adjusted the costs in the FRA database upward to capture some, but not all of the expenses that are not reported to FRA. UP first split IPA's reported $14.01 million into labor and material components, assuming that material and small tools amount to 35 percent of direct labor, as IPA did [158] This results in direct labor costs of $10,380.528 and material costs of $3.633.185. UP then applied additives for fringe benefits and travel and meals to the labor cost, resulting in a final UP 2011 system derailment repair expense of $19.619.198.[159]

UP then allocated the $19.62 million to IPA on the ratio of IPA gross ton miles to UP gross ton miles. This approach better estimates derailment costs because it uses more comprehensive data and allocates on a more sensible basis Using this approach, Mr Hughes determined an annual expected expense for derailment damage to way and structures at $211.864.88,[160] and an annual wreck clearing expense at $210.459 [161]

Washouts. UP accepts $50.000 as the estimated expense to repair washout damage.

Ditching. UP accepts $15,000 as the estimated expense for contract ditching

---

[157] *See* Federal Railroad Administration Office of Rail Safety. *FRA Guide to Preparing Accident/Incident Reports*, at 20-21 (May 23, 2011). *excerpts provided in* UP Reply workpaper "FRA Guide to Accident Reports.pdf."

[158] IPA Opening workpaper "MOW Costs xls." Tab "MOW Staff Salaries "

[159] UP Reply workpaper "Reply IRR Derailment and Clearing Wrecks xlsx."

[160] UP Reply workpaper "Reply IRR Derailment and Clearing Wrecks xlsx." Tab "Derailment "

[161] UP Reply workpaper "Reply IRR Derailment and Clearing Wrecks.xlsx," Tab "Wrecks." IPA's Opening Narrative refers to $106,897 in expense for Clearing Wrecks at III-D-99, but omits that amount from IPA's workpaper "MOW Costs xls." Tab "Annual MOW Expenses."

Environmental Cleanups. IPA assumes that IRR will not incur any environmental cleanup costs.[162] Mr. Hughes rejects this assumption Once again. IPA fails to recognize that newly constructed railroads are not exempt from the risks of derailments, the environmental cleanup costs associated with those derailments, as well as other clean-up not associated with derailment. IPA's assertion that "[d]erailments are less likely to occur on the IRR than on a Class I railroad such as UP because the IRR begins operations in late 2012 over a brand-new track structure that includes CWR on all of its main tracks."[163] incorrectly implies that derailments occur only as a result of track deficiencies. As explained above, almost two-thirds of main track derailments are not track-related but are caused by other issues, including human error, equipment issues, and signal problems.[164] Moreover, a derailment is not the only event that triggers environmental cleanup costs for railroads. Railroads periodically incur cleanup costs associated with releases of hazardous materials not caused by a derailment (e.g defective shipper equipment) Since IRR transports hazardous commodities over several of its lines, it is not exempt from incurring these costs in the event of a non-accident release.

IRR would also likely incur environmental cleanup costs in connection with operations at its locomotive shop, a common source of inadvertent discharge of environmentally hazardous materials (even with the provision of drip pans), and in freight yards and on set-out tracks due to leaking equipment

[162] IPA Opening Nar at III-D-100

[163] *Id*

[164] *See* Section III.D.4.c.iii.

For these reasons, IPA's suggestion that IRR would incur no environmental cleanup costs is implausible. UP therefore incorporates $20,000 as the estimated annual expense for environmental cleanup for IRR.[165]

f. Contract Maintenance

Surfacing. UP accepts IPA's capitalization of contracted surfacing work in the DCF model.

Rail Grinding. As discussed in Section III.D.4.e i above. UP does not accept IPA's rail grinding capitalization assumption.

Crossing Repaving. UP accepts IPA's capitalized annual cost for grade crossing rehabilitation of $162,403 67.

Bridge Substructure and Superstructure Repair. In its Opening Narrative, IPA identifies two emergency contracted repairs to bridges annually for a total cost of $8,000.[166] IPA's estimated $4.000 repair cost per bridge consists of $2,000 for contractor labor, $1,000 for material and $1,000 for equipment rental.[167]

Even though IPA refers to three bridge repairs per year in its workpapers, UP accepts two emergency repairs per year, as described in IPA's Opening Narrative However, based on Mr. Hughes' experience as a Bridge and Building Supervisor with direct responsibility for bridge

[165] The $20.000 estimated annual expense for environmental cleanup equates to $99.16 per main track mile. This is a more conservative approach than the environmental costs estimates that the Board has accepted in a number of prior decisions. *See, e.g*. *WFA II*, slip op. at 44 ($148,422 or $366.88 per main track mile); *PSCo/Xcel I*. 7 S T.B at 660, 664 ($73,000 or $132 per main track mile); *Otter Tail*. slip op. at C-19, C-28 ($181,000 or $121.88 per main track mile)

[166] IPA Opening Nar at III-D-103. However, in its workpapers. IPA provides for three contracted emergency repairs annually at a total cost of $12.000 IPA Opening workpaper "MOW Costs.xls," Tab "Bridge Repair."

[167] IPA Opening Nar. at III-D-103.

maintenance on 1,000 track miles on Southern Pacific (now UP) lines. IPA's cost estimate is unrealistic, even for minor repairs.

Bridge repair is a specialized service requiring trained contractors. Such contractors would likely be located in Salt Lake City, rather than the more sparsely populated towns near the SARR. Moreover, a base in Salt Lake City would be closer to more railroad lines with bridges than if the contractor's base were located along IRR, which would allow the contractor to operate more efficiently. Each day, a contractor would have to mobilize resources for the project (labor, material and equipment), travel from his or her headquarters to the worksite and then travel each day between a local hotel and the worksite. Thus, after accounting for daily time spent loading and unloading material and supplies, and setting up equipment at the worksite, only about 4-5 hours of productive time would be available each day.

Under these circumstances, Mr. Hughes' experience indicates that a typical repair would require four working days (though some could be much longer, depending on the severity of the damage), rather than the two days IPA assumes. Mr. Hughes' determination of four working days includes allowance for travel time at the beginning and end of the job and daily travel time to and from a local hotel. In addition, IPA's daily labor cost per crew member of $250 ($1000/4) is not achievable.[168] IRR will be a non-union company, but it must pay prevailing wages. Mr. Hughes concludes that IPA's average cost for MOW labor of $552 per man-day or $2,208[169] per day for a crew of four, is a more realistic benchmark.

[168] IPA estimates $1,000 per day for a four-man crew. IPA Opening Nar. at III-D-103.

[169] Assuming 250 working days per year, the total labor cost of $4,553.647 for 33 MOW employees as shown in IPA Opening workpaper "MOW Costs.xls," amounts to $552 per employee per day, or $2,208 per day for a crew of four.

Mr Hughes has also determined that, in view of the likely scope of a repair project and the labor cost, at least $2.000 in materials is a more realistic estimate of material required. In addition, contract bridge repair cost should include a factor for overhead and profit Mr Hughes concludes that bridge repair cost would total $13,607 per bridge, including $8,832 for labor, $2,000 for material, $1,000 for vehicle and equipment cost, and 15 percent overhead and profit. Thus. the cost for two bridges would be $27,214 per year. which would be charged to operating expense.[170]

g. Equipment

IPA includes a cost for maintenance for vehicles and equipment equal to five percent of the purchase price However, IPA failed to include the capital cost of ownership (e.g., the capital investment for vehicles and equipment). For information technology equipment, IPA accounts for the capital cost of ownership by applying an 11.57 percent "cost of capital" to the assets' cost, applying a 10 percent residual (or salvage) value, and assuming an asset life consistent with the nature of the asset.[171] UP accepts that methodology and applies it to the vehicle and equipment expense to calculate capital cost of ownership. Based on his experience in the railroad industry, Mr. Hughes estimates a useful life of light vehicles at four years. heavy vehicles at seven years, and MOW equipment at 12 years.

Vehicles. IPA provides only a limited summary description of the MOW vehicle types it proposes. Based on this limited description, UP accepts the vehicle types for purposes of this case. However. UP does not accept IPA's vehicle "Unit Cost."[172] IPA constructs estimates of

[170] UP Reply workpaper "Reply MOW Costs xlsx," Tab "Bridge Repair."

[171] IPA Opening workpaper "IRR - Capital Budget.xls "

[172] IPA Opening workpaper "IRR - Capital Budget xls." Tab "Annual MOW Equipment Cost."

vehicle unit costs rather than relying on the factual cost information provided in discovery The vehicles on the list UP provided in discovery appear to be substantially identical in purpose and specifications to the vehicles described by IPA. Mr. Hughes concludes that UP's list constitutes more reliable evidence of railroad vehicle cost than IPA's unsubstantiated estimates.[173]

IPA's Opening MOW plan results in total vehicle purchase cost of $1,619,310 for 22 vehicles UP's Reply MOW plan results in total vehicle purchase cost of $2.022.007 for 25 vehicles. The principal cause of the $402,697 difference is the addition of three vehicles – one track maintenance gang truck and two signal maintainer trucks – that cost $311,717 The remaining $90.980 reflects UP's use of real-world cost information rather than IPA's estimates

Equipment for Track and Related Work. UP accepts IPA's evidence for the types of track and bridge equipment chosen by IPA and the Unit Cost for Equipment [174] However, UP alters the equipment quantities to comport with the UP Reply manpower plan Specifically, to equip one additional track gang. UP adds one backhoe, one dump truck and one backhoe trailer to IPA's list of Track Equipment.

Work Trains. UP accepts IPA's work train costs.

h. Scheduling of Maintenance

UP accepts IPA's proposal that IRR's MOW crews would perform spot maintenance on a flexible basis. However, program maintenance (*e.g* , replacement of ties and rails, track surfacing. and switch replacement) must still be done in planned maintenance windows. Mr.

---

[173] UP Reply workpaper "IPA II MOW Vehicle Spec Report xls" for uses, descriptions and costs of vehicles.

[174] IPA Opening workpaper "MOW Costs xls," Tab Annual MOW Equipment cost, lines 6 through 16.

Hughes developed a normalized figure for the time required for program maintenance.[175] and Mr. Wheeler included this time in the RTC model.[176]

Program maintenance consists of work processes that require long periods of track occupancy, multiple expensive machines and a large workforce To accommodate program maintenance. there must be enough track capacity constructed to allow the program maintenance to take place without undue delay to train traffic

Some program maintenance undoubtedly must take place during the DCF period. Moreover. no new railroad would ever be designed with siding spacing and siding length that did not provide adequate capacity to accommodate program maintenance as well as anticipated train traffic. IPA's DCF model includes the cost of program maintenance in the cash flows. To exclude the track capacity necessary to carry out that maintenance would be inconsistent.

5 Leased Facilities

UP accepts IPA's assumption that IRR has no leased track facilities.

6. Loss and Damage

UP accepts IPA's approach for calculating IRR's loss and damage expense and uses that approach to calculate the costs associated with handling the reply SARR traffic group.[177]

7. Insurance

UP accepts IPA's estimate of IRR's insurance expense as 3 89 percent of other operating expenses[178] and applies that factor to the IRR operating expenses UP developed for the reply case.

---

[175] UP Reply workpaper "Maintenance Windows for RTC.xlsx," Tab "Maint Calculations."

[176] *See* Section III.C.2.c.x.

[177] UP Reply workpaper "IRR Loss and Damage_Reply xlsx."

[178] IPA Opening Nar. at III-D-115.

8. Ad Valorem Tax

To calculate IRR's ad valorem tax obligation, IPA computed the amount of tax UP paid per route mile in Utah and then multiplied this figure by IRR's route miles.[179] This methodology is inappropriate because it fails to take into account how the State of Utah calculates ad valorem taxes for railroads and incorrectly assumes IRR would have the same tax liability per route mile as UP. Utah determines ad valorem tax based on fair market value of a railroad measured by net operating income.[180] IPA's assumption that IRR would be more profitable than UP, yet pay the same ad valorem tax per route mile, makes no sense

To assess a railroad's ad valorem tax, Utah calculates the railroad's fair market value using an income approach known as the "yield capitalization income indicator."[181] Under this approach, it is assumed that the value of an entity's property is equivalent to the entity's earnings potential. Factors considered are the following: (1) the entity's normalized cash flow, (2) the nominal, risk adjusted discount or yield rate, and (3) the expected growth rate of the cash flow. Thus, the present value of the railroad's future earnings determines the income value for a

[179] *Id.* In its Opening Narrative, IPA claims it calculated IRR's tax obligation using UP's tax liability for 2011. However, IPA's workpapers rely on UP's 2010 tax liability. IPA Opening workpaper "IRR Ad Valorem.xls." Applying IPA's approach to UP's 2011 tax liability would result in a tax liability for IRR of $1.2 million. UP Reply workpaper "IRR Ad Valorem_Reply.xlsx."

[180] Robert D. Fredericks, UP's Senior Director of Property Taxes, verifies information regarding Utah's calculation of ad valorem taxes for UP as well as for railroads in general Mr. Fredericks' verification appears in Part IV.

[181] Utah Admin. Code r. 884-24P-62(4)(b). Although Utah also applies a cost approach to determining fair market value, it gives little weight to the cost approach when computing ad valorem tax for railroads because there is little relationship between cost and fair market value for railroads. *Id.* at (6)(b) Assessment worksheets from the Utah State Tax Commission show that 100 percent of UP's fair market value is determined by the income approach UP Reply workpaper "Ad Valorem Calculation.pdf."

railroad An allocation percentage is used to determine the portion of the system value and, in turn, the portion of the cash flow, of the railroad attributable to Utah.[182]

Utah calculates cash flow as net operating income, with certain adjustments[183] IRR has substantially higher net railway operating income ("NROI") per route-mile than UP does. This higher income would translate into a higher income valuation and higher ad valorem taxes on a route-mile basis. By concluding that IRR would pay taxes at the same level per route mile as UP, IPA assumes that IRR would operate more profitably than UP without incurring a higher tax burden on those increased profits. That assumption is inconsistent with "real-world railroading."[184]

To better reflect how the state of Utah would view IRR's asset value, UP applies the income approach to calculate IRR's ad valorem tax obligation. To develop the higher taxes IRR would pay as a result of its greater profitability, UP calculates a "Unit Value Modifier" that measures the relative profitability of IRR compared with UP. This "Unit Value Modifier" reflects the relationship of the NROI per route mile of UP system-wide to the NROI of IRR per route mile[185] The Unit Value Modifier thus measures the extent to which the income value of IRR would exceed the income value of UP on a per-route-mile basis. UP applied the Unit Value Modifier to calculate total ad valorem taxes for IRR under the income approach Applying the Unit Value Modifier to IRR's revenues and costs that IPA proposed in its opening evidence

---

[182] Utah Admin. Code r. 884-24P-62(5)(b).

[183] *Id* at (5)(b)(i)(A)

[184] *AEPCO November 2011*, slip op. at 16 ("[A]ll assumptions used in the SAC analysis[] must be realistic, i.e., consistent with the underlying realities of real-world railroading.").

[185] UP Reply workpaper "IRR Ad Valorem_Reply.xlsx"

would result in a tax obligation of $2.3 million.[186] UP has determined that IRR would have significantly lower revenues and higher costs Due to this decreased profitability for IRR, applying the Unity Value Modifier to UP's reply case results in a tax obligation of $0 6 million.[187]

UP's approach is conservative because it allows IRR to take advantage of all the tax exemptions and benefits that UP enjoys UP's expert tax staff spends substantial time working with state tax assessors to ensure that UP receives fair treatment in this complex area and that it pays only the tax it owes. Because IPA does not provide IRR with this sophisticated in-house capability, it is unlikely that IRR could maximize its tax benefit to the same extent as UP UP's approach gives IRR the benefit of all the efforts of UP's ad valorem taxation professionals while properly reflecting IRR's higher profitability.

9. Calculation of Annual Operating Expenses

UP accepts IPA's approach[188] for calculating the operating statistics for the first year of SARR operations (November 2, 2012 to November 1, 2013) UP modifies the tonnage indices to reflect its reply SARR traffic group and also to break out further and index separately two groups of coal trains. the trains powered by locomotives in the dedicated pool (*i.e*, IPA trains from Provo and Sharp) and all other coal trains, which are powered by a "run-through" pool of locomotives.[189]

---

[186] *Id.*

[187] UP Reply workpaper "IRR Ad Valorem_Reply.xlsx." This workpaper contains a spreadsheet the Board may use to apply the income valuation methodology to IRR to compute ad valorem tax after the Board resolves all factual disputes regarding IRR revenues and operating expenses.

[188] IPA Opening Nar. at III-D-1 to III-D-2.

[189] UP Reply workpaper "IRR Operating Statistics Reply.xlsx."

UP rejects IPA's use of net ton-miles as the measure by which IRR operating expenses are adjusted in later years for changes in volumes. As explained in Section III.H below, the use of ton-miles creates a disconnect between SARR volumes and operating expenses when applied to a diverse traffic group such as IRR's. Use of ton-miles serves to overweight changes to coal volumes – which IPA and the EIA currently forecast to be relatively flat – and to underweight intermodal shipments (the lightest traffic), for which relatively higher volume growth is projected.[190] IRR car-miles provide a more accurate metric than ton-miles for adjusting operating expenses for traffic types with differing forecasted growth rates.

10 Impact and Costs of IRR Operations for the Residual UP

As a result of IPA's decision to insert IRR in the middle of Utah and to create hypothetical interchanges with the residual UP, operations of the residual UP will be affected. In these circumstances, Board precedent requires the complainant to identify and assume responsibility for any new costs that its operations impose on the residual incumbent.[191] IPA failed to address this issue in its opening evidence. In this case, IPA's proposed IRR operations will cause the residual UP to incur the costs of additional taxis to bring UP crews to or from trains at IRR's interchanges at Lynndyl, which is not an existing crew change location for UP

[190] To account for growth in intermodal shipments, UP relies upon the flatcar miles, a more conservative approach than using container-miles.

[191] *See, e.g.*, *Tex. Mun. Power Agency v. Burlington N. & Santa Fe Ry.*, 7 S.T.B. 803, 818 (2004) (explaining that a complainant may not increase SARR traffic through assumption that would create additional infrastructure or operational costs for the defendant, "unless the complainant shows that it has identified what these additional infrastructure and operational costs would be and ensured that these costs are fully accounted for"); *Duke Energy Corp. v. Norfolk S. Ry.*, 7 S.T.B. 89, 112 (2003) ("At a minimum, the complainant must fully account for all of the ramifications of requiring the residual carrier to alter its handling of [its] traffic and any changes in the level of service received by the shippers."); *Duke Energy Corp. v. CSX Transp., Inc.*, 7 S.T.B. 402, 443 (2004) ("[W]hile the proponent of a SARR can determine (within reason) how the SARR would operate, it cannot assume that a connecting carrier ... would alter its existing operations for the benefit of the SARR.").

today.[192] UP has quantified these new costs to the residual UP and, consistent with Board precedent, added them to the operating expenses incurred by the SARR

In order to pick up or deliver trains at IRR's interchange at Lynndyl, the residual UP will have to bring its crews to the interchange point (when IRR delivers a train to UP) or will have to pick up its crews from the interchange point and bring them back to their home terminal (when UP delivers a train to IRR). UP accepts the cost per mile that IPA assumed for taxiing IRR crews[193] Rather than assume that every UP crew at Lynndyl would be taxied, UP assumes that when a train was available, the crew would work in the return direction (*i.e.*, back to Salt Lake City), and not require an additional taxi run.[194] Thus, UP conservatively assumes that only a subset of the trains would cause the residual UP to incur an additional taxi expense. This analysis produced a total 2013 cost of $0.3 million that the residual UP would incur as a result of IRR's operations

IPA misstates Board precedent regarding inclusion in the SAC analysis of new or additional costs to be borne by the residual incumbent. In its opening evidence in this case, IPA, in responding to arguments that UP raised in Docket No. 42127, erroneously claimed that "The Board has never required that costs of this kind be reimbursed by a SARR except where they result from an external reroute."[195] In separate cases where Duke Energy and Carolina Power & Light brought SAC rate cases against Norfolk Southern, the Board accepted certain costs that the

[192] As the other IRR interchanges at Milford and Provo are terminals for certain UP crews, UP conservatively assumes that there would be no additional taxi costs associated with interchanges at those locations

[193] IPA Opening workpaper "IRR Crews Hotels &Taxis.xlsx"

[194] UP Reply workpaper "Residual UP Costs.xls."

[195] IPA Opening Nar. at III-C-32 to III-C-33.

residual incumbent would incur to retrofit its locomotives for DP operations – operations that were not a function of re-routed traffic.[196]

[196] *See Duke Energy Corp. v. Norfolk S Ry*, 7 S.T.B. 862, 872-73 (2004) (including as SARR costs the outfitting of foreign locomotives for assumed on-SARR DP operations).

III. E. NON-ROAD PROPERTY INVESTMENT

Non-road property investment costs, including costs for locomotives, railcars, and other equipment, are addressed in other sections of UP's reply evidence

III. F. ROAD PROPERTY INVESTMENT

UP's evidence regarding road property investment is sponsored by several engineering experts (collectively, "UP's engineering experts") The primary sponsor is Robert C Phillips of STV/Whitehead Engineering, with specialized assistance from Paul Bobby and Patrick Bryant on earthwork and drainage; Steve McMullen of Shannon and Wilson on geotechnical issues and tunnels, David Magistro on bridges and structures; George Zimmerman on track construction, Rick Ray of RR Railroad Highway Crossing Consultants, Inc. on signals and communications; Randall G. Frederick on public improvements; and Mark Peterson on buildings and facilities. The experts' qualifications appear in Part IV.

These experts have reviewed in detail IPA's proposed construction costs for IRR and have identified numerous significant flaws in IPA's opening evidence that understate construction costs

Table III.F.1 below compares the construction costs for IRR included in IPA's opening evidence with the properly developed construction costs detailed in this reply.

Table III.F.1
IRR Road Property Investment Cost
($ millions)

	Item	IPA	Reply	Difference
1	Land	$15.8	$18.5	$2 7
2	Roadbed Preparation	76 4	103.5	27.1
3	Track	174.7	197.9	23.2
4	Tunnels	-	-	-
5	Bridges	13.0	26.6	13.6
6	Signals, Communications & Other Equipment	23.1	32.6	9.5
7	Buildings & Facilities (including Fueling Facilities)	8.3	28.9	20.6
8	Public Improvements	4.1	5.1	1.0
9	Winter Costs	-	9.8	9.8
9	***Subtotal***	***$319.6***	***$422.9***	***$103.3***
10	Mobilization	7.6	10.5	2.9
11	Engineering	29.9	40.1	10.5
12	Contingencies	33 7	45 5	11.8
13	**TOTAL**	**$386.7**	**$519.5**	**$132.8**

1. <u>Land</u>

UP generally accepts IPA's valuation of the land for the IRR right of way and for microwave tower sites. UP rejects IPA's valuation of the land required for IRR facilities because the values do not include sufficient acreage to accommodate the facilities. UP also rejects IPA's assertion that it need not include a cost for parcels obtained through land grants.

IPA failed to include acreage to accommodate the IRR headquarters and maintenance of way facility in Lynndyl and its crew change facility in Milford. UP adds 1.9 acres in Lynndyl and 0 2 acres in Milford to accommodate these structures

UP rejects IPA's assertion that land initially acquired by UP's predecessor via land grant does not need to be acquired by the IRR for at least two reasons. First, the Interstate Commerce Commission ("ICC") has held that land obtained by land grant is properly included in the costs a new entrant would need to incur.[1] IPA argues that certain of the parcels along the IRR route – the very same parcels valued by the ICC in *Nevada Power I* – now include reversionary provisions that justify their exclusion from the IRR land valuation. IPA cites the ICC's explanation from *Nevada Power* regarding the treatment of easements, but that language says nothing about land acquired via land grant[2] IPA witness Burris cites multiple sources and electronic workpapers purporting to support his assertion, but IPA included none of those workpapers in its opening evidence. As such, IPA's assertion that values for parcels obtained via land grant should be excluded from the IRR land valuation is incorrect and unsupported.

Second, review of IPA's workpapers reveals that much of the land IPA proposes to exclude is labeled "No Title" and thus cannot be confirmed as land grant property, further demonstrating IPA's claim to be baseless.[3]

In calculating its reply land costs for the IRR, UP adds back land values for all of the parcels IPA excluded under land grants and easements, with the exception of an easement for a road crossing in Provo valued at $44,766.[4] UP also adds acreage required to accommodate the IRR's facilities. Based on these calculations, UP's total IRR land value is $18 5 million.[5]

Table III.F.2
Land Acquisition Costs
(millions)

Property Type	IPA	Reply
ROW – Fee Simple	$15.4	$15.4
Locomotive Shop and Other Facilities	3.2	3.2

[1] *See Bituminous Coal – Hiawatha, UT, to Moapa, NV*, 6 I C C 2d 1. 135-36 (1989) ("*Nevada Power I*").

[2] IPA Opening Nar. at III.-F-9.

[3] IPA Opening workpaper "IRR Opening Land.xlsx," Tab "100 ft ROW," Column J.

[4] IPA Opening workpaper "IRR Opening Land.xlsx "

[5] UP Reply workpaper "IRR Opening Land UP Reply xlsx "

Property Type	IPA	Reply
Microwave Towers	0.004	0 004
Land Grants & Easement	(2 8)	0 0
Total	$15.8	$18.5

2. Roadbed Preparation

IPA makes several fundamental errors in calculating roadbed preparation costs, which are detailed below A comparison of UP's reply IRR roadbed preparation costs with IPA's opening evidence is presented in Table III.F.3.

Table III.F.3
Roadbed Preparation Costs[6]
($ millions)

Item	IPA	Reply	Difference
1. Clearing and Grubbing	$ 0.1	$ 0.3	$ 0 2
2. Earthwork			
a Common	7.2	12 6	5 4
b. Loose Rock	0.7	0.9	0.2
c Solid Rock	0 5	0.9	0.4
d Borrow	65.3	70.9	5.6
e Land for Waste Excavation	0.0	0.5	0.5
3. Drainage			
a. Lateral Drainage	0 0	0.0	0.0
4. Culverts	1.3	3 8	2.5
5. Retaining Walls	0.0	0.0	0.0
6. Rip Rap	0 0	0 0	0.0
7 Relocation of Utilities	0.0	0 0	0.0
8 Topsoil Placement/Seeding	0.1	0 1	0.0
9 Water for Compaction	1.1	8 4	7.3
10 Environmental Compliance	0.0	0 0	0.0
11. Dust Control Work	0.0	0 3	0.3
12 Lighting for Nighttime Work	0.0	4 9	4.9
Total	$76.4	$103.5	$27.1

[6] UP Reply workpaper "IRR Grading Opening UP Reply.xlsx."

a Clearing and Grubbing

i. Clearing and Grubbing Quantities

UP accepts IPA's approach to developing IRR clearing quantities[7] Likewise, UP accepts IPA's determination that the IRR requires no grubbing per the ICC Engineering Reports.

ii. Clearing & Grubbing Costs

UP rejects IPA's clearing costs. IPA makes a significant error in determining the clearing costs for the quantities generated from the ICC Engineering Reports. Specifically, it applies the RS Means-derived costs for equipment that could not clear land and stockpile the cut material at the rate assumed by IPA. IPA also neglects to include the costs of equipment and labor necessary to load and haul away loose material created during clearing.

The RS Means unit cost that IPA used is based on a 200-horsepower dozer capable of clearing eight acres per day using a twelve-foot wide brush rake[8] This item only clears the vegetation and is incapable of stockpiling and removing the cut material However. IPA specifies only one dozer to both pull the rake to remove vegetation and stockpile organic materials. Completing the clearing operation requires the dozer passing over the area with the rake once to clear vegetation, followed by an additional pass over the same area to collect the material into stockpiles.[9] The dozer would therefore have to split its time between the two tasks,

[7] This method calculates clearing quantities (acres per track mile) by valuation section based on the clearing and grubbing quantities in the ICC Bureau of Valuation B V Form 561 ("ICC Engineering Reports") and related documents. Those amounts are then increased by the ratio of the current roadbed specifications to the original construction specifications. Next, the adjusted quantities by valuation section are applied to track miles (including yards and sidings) of IRR's line segments in the same manner as the grading quantities discussed below

[8] UP Reply workpaper "Construction Phase Diagram.pdf."

[9] *Id*

reducing efficiency. UP's engineering experts adjust the clearing rate to four acres per day to reflect this division of time.[10]

UP also adds the cost of two trucks and crews to load and remove stockpiled organic material. These crews would work fulltime in tandem with the dozer to clear and remove cut material from four acres per day after the material has been cut and stockpiled [11]

After reducing the clearing rate to a realistic four acres per day, and adding the cost of two trucks and two crews to load and haul away materials after clearing, the total daily rate of clearing and loading is $1,528.46 per acre.[12]

iii Other

(a) Stripping

IPA fails to include stripping costs While the Board has held that stripping costs are subsumed in waste costs in some circumstances, this does not excuse IPA's failure to include them elsewhere.[13] Specifically, stripping is required when building roadbed on embankments at ground level

The Board's *PSCo/Xcel I* holding does not obviate IRR's need for separate stripping when building roadbed on embankments because preparing the ground to accommodate the new embankment requires far more than simply removing a layer of soil. UP's engineering experts agree that a separate stripping cost is not needed for roadbed construction in cut sections. However, a separate stripping cost is necessary in fill sections where embankment is placed at

[10] UP Reply workpaper "Equipment Selection UP Reply.xlsx," Tab "Clearing Cost Adj."

[11] *Id*

[12] UP Reply workpaper "IRR Grading Opening UP Reply xlsx," Tab "IIIF Unit Costs."

[13] *See Public Serv Co. of Colo. D/B/A/ Xcel Energy v. Burlington N. & Santa Fe Ry*, 7 S.T.B. 589, 671 (2004) (holding that "because the top 6 inches of soil would be removed during excavation and because topsoil removal is included in waste costs," a separate stripping cost could be duplicative).

existing ground level that has not been excavated Before embankment can be placed, the base needs to be prepared by removing the top layer of soil. Removal of this top level of soil eliminates organics and other materials that will decompose and cause the embankment subgrade to compact and shift under pressure of train traffic In addition to stripping the top layer, the ground must be scarified, the moisture content adjusted, and the soil compacted to provide sufficient subgrade support for embankment construction.[14] Organic material removed also must be disposed of in waste pits. These costs of stripping are not included in the costs for common excavation – and IPA fails to include them elsewhere in its analysis.

To calculate the amount of the IRR roadbed that requires stripping, UP's engineering experts determined the portion of route miles under embankment based on the relative proportion of embankment to excavation calculated based on the ICC Engineering Report quantities. The amount of stripping needed to stabilize the roadbed and properly support embankment may vary from six inches to 18 inches depending on volume of organics and specific soil conditions. UP's engineering experts conservatively assume a stripping depth of six inches[15] This depth was then used to convert the stripping area to cubic yards. Unit costs for stripping were then developed from RS Means assuming scraper equipment and a roller to compact the underlying layer in preparation for embankment construction. Since this material is full of organics and would not be suitable for use in embankment construction, the material is wasted.[16]

---

[14] UP Reply workpaper "Construction Phase Diagram.pdf"

[15] UP Reply workpapers "Top Soil Utah.pdf," "Top Soil Utah 2 pdf," and "UP Specification 02230 scarifying (stripping).pdf."

[16] UP Reply workpaper "IRR Grading Opening UP Reply xlsx." Tab "Stripping."

(b) Over-Excavation

Modern roadbed construction requires at least twelve inches of over-excavation when solid rock is found at subgrade levels in cuts and replaced with at least twelve inches of select material. This material must be compacted to the same specifications as embankments[17] On many projects, subballast is used for the twelve inches of material to bring the level back to subgrade elevation However, UP Roadway Excavation Specifications 02230-4 state that the over excavation may be filled with embankment material that passes seven to eight percent through a No 200 sieve.[18] Materials passing seven to eight percent through a No. 200 sieve include gravel, small cobbles, and small boulders. UP's engineering experts utilize borrow material as the backfill in over excavation cuts.

UP's engineering experts use the standard roadbed width and average fill height of four feet provided from ICC Engineering Reports and over-excavation depth of twelve inches to calculate cubic yard quantities of solid rock over-excavation.[19] This estimate covers the required over-excavation in only rock cuts and UP adjusts the quantity of rock excavation accordingly, using the unit cost developed in Section III.F.2.b.iii.(d).[20]

b. Earthwork

UP accepts IPA's general method of determining earthwork quantities for common, loose rock, and solid rock excavation derived from the ICC Engineering Reports but rejects and corrects quantities excluded by IPA for free overhaul borrow, stripping, swelling of excavation. fine grading, wetland excavation, team overhaul, and solid rock over excavation. UP rejects

[17] UP Reply workpaper "UP Exc & Emb Specs.pdf."

[18] *Id.*

[19] UP Reply workpaper "IRR Grading Opening UP Reply.xlsx." Tab "Calc."

[20] UP Reply workpaper "IRR Grading Opening UP Reply.xlsx," Tab "Over-Excavate Solid Rock"; IPA Opening workpaper "IRR Grading Opening.xlsx."

IPA's common excavation unit cost and its assumptions regarding equipment necessary for solid excavation.

i IRR Earthwork Quantities and Costs

(a) IRR Line Segments

UP accepts the IRR route

(b) IRR Yards

IPA constructs three yards two small interchange yards and a locomotive repair facility at Provo. IPA developed the earthwork calculations for all of these facilities by assuming an average fill height of one foot. The one-foot fill assumption for yard tracks has been generally accepted for those locations in which a new stand-alone entrant has assumed that it would place its yards in the same locations in which they exist in the real world. However, the locomotive repair facility proposed at Provo is placed where no yards or similar facilities exist today such that the one-foot fill assumption does not apply.

Indeed, UP rejects this one-foot fill assumption for the Provo locomotive shop because of the special circumstances at the proposed location. UP accepts IPA's assumption of the need for subexcavation to a depth of three feet at the locomotive shop but rejects IPA's proposed unit cost because it does not consider that the proposed locomotive shop location is wetlands.[21] UP's engineering experts instead formulate a separate unit cost for wetland excavation. UP rejects the fill of the embankment at the Provo locomotive shop with common excavation since the undercut material, which resides in a wetland, is unsuitable for roadbed construction and will need to be removed with an excavator not a grader. UP uses borrow to estimate the embankment quantities at the Provo locomotive shop

[21] UP Reply workpaper "Locomotive yard Wetland Exhibit.pdf"

(c) Total Earthwork Quantities

As discussed above, UP rejects IPA's exclusion of stripping and over excavation quantities IPA also fails to include quantities for "Team Overhaul – 500' free haul" from the ICC Engineering Reports. "Overhaul" refers to the hauling of material excavated during construction beyond the distance the materials are hauled for free for use a fill. Overhaul quantities are the number of cubic yards hauled multiplied by the average distance hauled beyond the "free haul limit." "Team Overhaul – 500' free haul" describes material excavated during roadbed construction and hauled between 500 and 5,000 feet.[22] The ICC Engineering Reports include a unit cost of $.0125 per cubic yard station, demonstrating this as a pay item for the predecessor road and confirming it should be included in earthwork estimates for the replication of the IRR.[23] UP's engineering experts include Team Overhaul material as borrow, converting overhaul quantities to cubic yards by dividing by an average haul distance of 2,750 feet.[24] UP adds 84,000 CY of additional borrow from team overhaul for a cost of $2,335,200.[25]

[22] Historically, the material was hauled over these distances by teams of horses or oxen – hence the term "team" overhaul. The next ICC Engineering Report item for overhaul is "Train Overhaul," which applies to distances over 5,000 feet and under 10,000 feet."

[23] IPA Opening workpaper "ICC Engineering Reports.pdf," p 3.

[24] UP Reply workpaper "IRR Grading Opening UP Reply.xlsx." Average haul distance is obtained by adding the minimum and maximum haulage distance, and dividing by two ((500 + 5,000) / 2 = 2,750))

[25] UP Reply workpaper "IRR Grading Opening UP Reply.xlsx "

Table III.F.4
Earthwork Quantities by Type of Material Moved
(thousands of cubic yards)

Type of Earth Moved	IPA	Reply	Difference
1. Common Excavation*	1,793,514	2,223,993	430.479
2 Loose Rock Excavation	63,396	64,331	935
3 Solid Rock Excavation	33,519	43,521	10,002
4. Borrow	2,498,081	2,684,000	185,919
TOTAL	**4,388,510**	**5,015,845**	**627,338**

* - UP Reply for common excavation includes stripping and wetland excavation
Source. UP Reply workpaper "IRR Grading Opening UP Reply xlsx "

(d) Earthwork Unit Costs

Before addressing IPA's unit costs for specific types of earthwork. UP addresses one issue that affects all IPA's RS Means-based earthwork unit costs – shrinkage and swell.[26] IPA failed to include any adjustment in earthwork unit costs or quantities for swell or shrinkage of material during excavation, hauling, and compaction.

In order for embankments to properly support loads sustained under train traffic, soil particles in each lift must be packed tightly using mechanical compaction.[27] The process of excavating, hauling, and backfilling material involves three soil states: bank, loose, and compacted (or embanked), each having a different density:

- Bank Cubic Yard material ("BCY") has a medium density and is generally defined as undisturbed earth.

[26] Shrinkage and swell have not been an issue in the development of RS Means earthwork costs in earlier Board stand-alone cost proceedings because the unit price information published by RS Means before 2005 did not identify the characteristics of the cubic yard earthwork quantities to which its unit costs applied. Since 2005, RS Means has included the BCY, LCY. and ECY unit designations, as discussed in this section.

[27] Embankments such as roadbeds are typically constructed with a series of layers or lifts of suitable material. Lifts consist of dumped and compacted material approximately 6 inches in thickness. Final roadbed grades are constructed by layering several lifts of suitable material

- Loose Cubic Yard material ("LCY") is defined as soil or earth within a hauling vehicle or unconsolidated pile on an embankment (not compacted) and is the least dense soil state.
- Embanked or compacted Cubic Yard material ("ECY") is the densest, and is even more tightly compacted than original banked soil.

To accurately estimate the cost of excavating, hauling, and constructing a roadway embankment, these different soil densities for each phase of the process must be determined using swell and shrinkage factors. Failure to account for shrinkage and swell in estimates for excavation would result in a potential shortage of material for embankment construction and increase costs. For example, if a section of embankment called for 100 CY of dense, compacted material, but received only 100 CY of loose, unconsolidated material, the contractor would not have enough material to construct the planned embankment.

To quantify equivalent volumes for the three different soil states with varying soil densities, UP's engineering experts apply swell and shrinkage factors to the base unit cost of Wetland Excavation, Loose Rock, and Solid Rock. UP's engineering experts apply shrinkage and swell factors to earthwork estimates based on the following guidelines: BCY material is excavated and unconsolidated (density decreases); hauled as LCY; and then compacted to ECY (density increases). This approach represents a typical process: excavation of undisturbed soil, haulage of excavated material, and compaction of excavated material to build up a roadbed embankment. UP's engineering experts use typical soil volume conversion factors to develop earthwork unit costs, taken from Ringwald's "Means Heavy Construction Handbook," as set forth in Table III F 5 below.[28]

Table III.F.5
Swell Factors

Swell Factor	BCY to BCY	LCY to BCY	ECY to BCY
Wetland	1.00	1.25	0.90
Loose Rock	1.00	1.35	0.90
Solid Rock	1.00	1.50	1.30

Source: UP Reply workpaper "Swell and Shrinkage – Ringwald, Means heavy Construction Handbook.pdf."

It is important to note that blasted solid rock material never consolidates as tightly or densely after excavation. This reduction in compaction is reflected in the lower shrinkage factor for solid rock material from ECY to BCY. An example calculation utilizing swell and shrinkage factors for excavation. haulage, and compaction of loose rock material is as follows.

10 CY of LCY =10 BCY Excavated

10 BCY X (1.35 LCY / 1 BCY) = 13.5 LCY Hauled

10 BCY X (90 ECY / 1 BCY) = 9 ECY Compacted

The three units utilized in the above example correspond with earthwork equipment unit costs used by RS Means. IPA failed to account for such swell and shrinkage in its earthwork equipment costs For example, RS Means lists the cost per unit for a 42 CY hauler as dollars per LCY and not BCY. There is a 35 percent difference in volume between the two types of materials (using a 1.35 swell factor). By using BCY unit (which describes undisturbed soil) for the 42 CY hauler for loose rock excavation, IPA effectively underestimates haulage quantities by nearly one-third, lowering overall loose rock excavation costs. Swell and shrinkage factors are

[28] UP Reply workpaper "Swell and Shrinkage – Ringwald, Means heavy Construction Handbook pdf"

also explained in the 2013 RS Means Heavy Construction Cost Data text.[29] The section on "Building Sitework-Site Preparation," illustrates how to construct a cost per Cubic Yard of material from equipment and labor per pay item [30]

By neglecting to factor swell and shrinkage into earthwork material unit costs. IPA significantly underestimated the cost of embankment construction for the IRR.[31] UP corrects this error by modifying all of the excavation unit costs to account for swell and shrinkage.[32]

(i) Common Earthwork

IPA argues that the common excavation activity for the IRR would be comparable to UP's experience on its Shawnee-Jirch expansion project in Wyoming such that the unit costs for common excavation will be comparable. UP rejects this assertion and develops common excavation unit costs for the IRR based on RS Means.

IPA asserts that the 175 mile IRR route in Utah traverses similar terrain as the existing UP Shawnee-Jirch expansion line in the Powder River Basin ("PRB") area in Eastern Wyoming. Specifically, IPA claims that "[t]he [IRR] territory is easily graded because some of the land rests on what used to be part of the Bonneville Lake system and the balance of territory is on alluvial and colluvium soils that require no special equipment, blasting, scraping or other costly and more complicated activities."[33] To support this claim, IPA provided a series of maps depicting U.S Department of Agriculture ("USDA") shallow excavation data comparing the soil

[29] Reed Construction Data, *2013 RS Means Heavy Construction Data*, 456-457 (2013).

[30] UP Reply workpaper "RS-Means Site Prep Worksheet – swell and shrinkage factor.pdf."

[31] As noted above, the effects of swell and shrinkage are accounted for in UP's calculation of unit costs for the affected activities (including loose rock excavation and solid rock excavation).

[32] UP Reply workpaper "IPA Open Grading UP Reply," Tab "Unit Costs Modified," Columns F to P

[33] IPA Opening Nar. at III-F-11

conditions between the IRR route and the Shawnee-Jirch expansion project near Lusk, Wyoming UP rejects this basis of comparison as well as IPA's conclusion from the soil analysis.

Below, UP explains the numerous errors in IPA's comparison between the Shawnee-Jirch expansion project and the IRR

<u>Proximity of Shawnee-Jirch project to IRR</u>

IPA argues that since the Board accepted the Walker-Shawnee expansion common excavation unit cost in *WFA I*,[34] and what it characterizes as similar costs in *AEPCO*,[35] reliance on Shawnee-Jirch costs for the IRR is justified. In fact, the common excavation unit costs for *AEPCO* were derived from multiple expansion projects near the proposed AEPCO SARR route undertaken by BNSF Railway. In *WFA I*, the SARR traversed through eastern Wyoming very near the Walker-Shawnee expansion project

Conversely, the IRR, which runs from Provo to Milford, Utah, is not in close proximity to the Shawnee-Jirch project nor is it even close to the PRB in eastern Wyoming. The IRR, which lies within the Bonneville Lake System, is approximately 410 miles from Lusk. IPA's assertion that the geology in the Bonneville Lake system is the same as the PRB region (which lies adjacent to the Shawnee-Jirch project, the AEPCO SARR, and WFA SARR), lacks support and detailed engineering analysis [36]

---

[34] *Western Fuels Ass'n, Inc & Basin Elec Power Coop v BNSF Ry*, STB Docket No. 42088, slip op. 86 (STB served Sept. 10, 2007).

[35] *Ariz Elec. Power Coop., Inc. v. BNSF Ry & Union Pac R R*, STB Docket No. 42113, slip. op at 86 (STB served Nov. 22, 2011)

[36] UP Reply workpapers "Shawnee Distance to WFA and AEPCO.pdf" and "Shawnee Distance to IRR.pdf."

Comparative Soil analysis of Shawnee-Jireh project & IRR

IPA attempted to defend the dubious claim that the Shawnee-Jireh project and the IRR possess similar soil conditions with a series of maps depicting USDA "Shallow Excavation ratings" of the two project areas These maps were derived from Natural Resource Conservation Service ("NCRS") Soil Survey Shallow Excavation data which describe how soil behaves to excavation and construction to a depth of six feet. IPA asserts that, due to the similarities in Shallow Excavation ratings found at the Shawnee-Jireh project and IRR, the difference in effort required to perform common excavation through material at both sites is negligible.[37] As a result, IPA uses the Shawnee-Jireh Common Excavation unit cost to formulate estimates for the IRR. This approach is flawed and fails to present an accurate picture of the soil properties.

By contrast, UP's engineering experts performed a detailed spatial analysis comparing the soil characteristics between the IRR and Shawnee-Jireh project near Lusk. Shallow Excavation data from the USDA Soil Survey, which was the basis of comparison between the two sites on IPA's.analysis, was also used for UP's comparison. The USDA Soil Survey Manual states that "specific soil behavior predictions are commonly presented in terms of limitations imposed by one or a few soil properties."[38] The Manual provides examples of soil properties that increase difficulty of excavation, such as high shrink-swell, shallow depth to bedrock, high water table, wetness, flooding, and steep slopes These limitations would impact the level of effort while excavating and constructing embankment along the IRR. There are three ratings used to describe soil properties within the analysis. "Not Limited," "Somewhat Limited," and "Very Limited." The ratings are described below.

---

[37] IPA Opening Nar. at III-F-22

[38] *See* USDA Soil Survey Manual Ch. 6 (http://soils usda gov/technical/manual/contents/chapter6.html#4c)

Not Limited:[39] indicates good performing, very favorable soil which is easily excavated and good material for embankment construction.

Somewhat Limited:[40] indicates soil which is moderately favorable due to properties such as high water table, shallow depth to restrictive soil layers such as cemented soil, and medium soil strength This soil requires greater effort during excavation and construction operations

Very Limited:[41] indicates soil which is not favorable due to such properties as a high water table, shallow depth to restrictive soil layers including cemented soil and bedrock, and poor soil strength. This soil requires significantly greater effort during excavation and construction operations Major soil reclamation or even special design (subgrade preparation) may be required.

Ratings for the soils around the IRR route and Shawnee-Jirch project were both described as a result of the analysis.

UP then utilized a GIS Spatial analysis to quantify the amount of IRR alignment which traversed each of the three soil ratings Output from the GIS analysis includes both tabular (i.e. spreadsheet) and graphical data (viewable in Google Earth as kml) for ease of review.[42]

The results from UP's analysis, as seen in the Table III F 6 below, clearly illustrate the difference in soil properties between the material around the IRR in mid-Utah and Shawnee-Jirch project near Lusk

---

[39] UP Reply workpaper "USGS Shallow Excavation Info.pdf."

[40] *Id.*

[41] *Id.*

[42] UP Reply workpaper Folders "IRR Maps for ArcGIS" and "IRR Maps for Google Earth."

Table III.F.6
UP Shallow Excavation GIS Soil Analysis Results

	IRR UP Results		Shawnee-Jireh near Lusk	
Shallow Excavations	Alignment Length (Miles)	Percent of Alignment Length with Soil Survey Data	Alignment Length (Miles)	Percent of Total Alignment Length
Very Limited	41.6	31%	0.3	2%
Somewhat Limited	93.6	60%	14.6	98%
Not Limited	0.0	0%	0.0	0%
Total Analyzed	135.2		14.9	

****Note· Soil Analysis results above do not include approximately 40 miles of the IRR since no applicable soil survey is available from USGS*

UP's analysis shows that over 41 miles (31 percent) of the IRR route analyzed was rated as "very limited" while the remaining route with soil survey available was rated "somewhat limited." As described above, "very limited" soils are unfavorable and require higher levels of effort for excavation and construction operations versus less severe ratings. Features such as high water tables, shallow depth to restrictive soil layers including bedrock or cemented soil, low soil strength, and abundance of large rocks are prevalent in "very limited" areas. This increases level effort during roadway embankment construction and impacts common excavation operation costs

Although the analysis rates only 135 miles of the IRR due to lack of soil survey data within the Lynndyl subdivision,[43] it is obvious that the two areas do not possesses similar soil properties. Compared to the ratings from the 15-mile Shawnee-Jireh project, which resulted in only two percent of the route rated as "very limited," the IRR route contains a significantly higher amount of "very limited" soil (31 percent of the route analyzed). The high amount of "very limited" soil around the IRR does not suggest that terrain would be "...easily graded.. "

[43] Notably, IPA failed to point out this lack of data in its opening evidence This omission only further undermines its conclusion of comparability of the entire IRR route to the Shawnee expansion project.

and "require no special equipment, blasting, scraping or other costly and more complicated activities" as IPA asserts.[44] The results of UP's analysis suggest that the soils encountered along much of the IRR, would require increased effort during excavation and construction operations to account for the unfavorable soil conditions described above

As explained above, the Shawnee-Jirch project involved much less difficult soil conditions than those found on the IRR, which is basis alone to discredit the applicability of the common excavation unit cost by IPA. However. UP notes that IPA furthered erred in its presentation and analysis of the soil conditions between the two sites by: 1) understating the amount of "very limited" soil along the IRR by skewing its analysis boundaries and 2) failing to use prudent engineering judgment in evaluating its own findings.

First, a close look at the IPA USDA soil maps reveals that the proportion of "very limited" soil is understated. Basic examination of the soil survey exhibits provided in IPA's workpapers reveals obvious inconsistencies with the survey boundaries. These inconsistencies are most evident along the IRR where the survey boundary width is narrower through "very limited" rated areas and wider in "somewhat limited" rated areas As a result, IPA's calculated "very limited" rated soil areas are artificially reduced and the proportion of very limited soil is understated [45] The results from IPA's analysis and UP's analysis can be seen below

[44] IPA Opening Nar. at III-F-11.

[45] Two examples are the soils maps in IPA's workpapers "2203-IPA S of Clear Lake to N of Clear Lake.pdf" and "205-IPA Delta to Lynndyl.pdf."

Table III.F.7
UP vs. IPA Shallow Excavation Analysis Results

	IRR UP Results		**IRR IPA Results**		**Shawnee-Jirch near Lusk**	
Shallow Excavations	Alignment Length (Miles)	Percent of Alignment Length with Soil Survey Data	Alignment Area (Acres)	Percent of Alignment Length with Soil Survey Data	Alignment Length (Miles)	Percent of Total Alignment Length
Very Limited	41.6	31%	10,023 2	25%	0 3	2%
Somewhat Limited	93.6	60%	30,548 9	75%	14 6	98%
Not Limited	0.0	0%	0.0	0%	0 0	0%
Total Analyzed	135.2		40572 1		14.9	

****Note· Soil Analysis results (both UP and IPA) above do not include approximately 40 miles of the IRR since no applicable soil survey is available from USGS*

Second, IPA workpaper "Soils Narrative docx" states the "Shallow Excavation" analysis defines the IRR alignment as 75 percent "somewhat limited" and 25 percent "very limited."[46] The same document describes the Shawnee-Jirch project in Lusk, Wyoming, to be 98 percent "somewhat limited," and only two percent as "very limited "[47] From this analysis, IPA confidently asserts the soil composition, geologic characteristics, and all variables related to excavation from the Shawnee-Jirch project to be "no more of a grading challenge" than the IRR project.[48] This claim by IPA is not only based on inaccurate results but clearly lacks sound engineering judgment. Such a significant increase in "very limited" rated soil along the IRR cannot be dismissed. The increased difficulty and level of effort involved with excavation and construction of embankment through either 25 percent or 31 percent of the IRR would certainly

[46] IPA Opening workpaper "Soils Narrative docx."

[47] IPA Opening Nar. at III-F-12

[48] *Id*

add cost to common excavation compared to a project with nearly 100 percent "somewhat limited" soil ratings

Conclusion from Soil Survey Analyses

The disparity found between the soil properties at the Shawnee-Jireh project and proposed IRR alignment is evident in the above analyses. IPA's simple and inaccurate soil analysis failed to truly evaluate the soil conditions at either site. The disparities between the two projects provide evidence to reject IPA's application of unit costs derived from the UP Shawnee-Jireh expansion project near Lusk. UP's engineering experts conclude that the disparity in the percentages of very limited soils between the Shawnee-Jireh expansion project and the proposed IRR route support its rejection of IPA's proposed use of the UP unit costs. UP's engineering experts instead develop unit costs for the IRR common excavation from RS Means.[49]

UP also rejects IPA's claim that expansion projects are more expensive than new construction projects. IPA relies on *AEPCO November 2011*, to claim that "expansion projects, especially on busy lines such as the UP's feeder line to the PRB (Shawnee-Jireh), are often far more complicated due to interference from existing operations and having to protect the existing track and roadbed"[50] While the Board's *AEPCO November 2011* decision finds that expansion projects are not necessarily less expensive, it does not establish that expansive projects are always more costly than new projects.

IPA argues that expansion construction is far more complicated due to interference of ongoing traffic on adjacent lines, but it fails to describe the numerous benefits contractors utilize during expansion projects due to infrastructures already in place from prior construction. The ability to haul in material and equipment by low bed via existing track eliminates many costs

[49] UP Reply workpaper "Shallow Ex. Soil Analysis Summary pdf" provides detailed results.
[50] IPA Opening Nar at III F-23.

associated with green site or new construction. Roadbed expansion also saves cost by reducing material and excavation needed to build a new embankment. Constructing a third track along an existing two track embankment only requires partial earthwork because the existing embankment has already been constructed. Previously constructed access roads, existing soil borings, and site investigation data associated with initial construction – all of which would not be available for new construction – are benefits omitted from IPA's argument

UP also rejects IPA's claim that the Shawnee-Jireh Project constitute a "conservative" unit costs basis for the IRR.[51] Instead, UP's engineering experts developed unit costs using the RS Means prices for common excavation and added costs for equipment for shaping roadbeds and sideslopes. For common excavation UP selects an elevating scraper and an average 3,000 foot haul. However, self-propelled scrapers are not capable of shaping the roadbed or sideslopes. UP therefore adds unit cost for fine grading. UP discusses fine grading in Section III-F-2(b)(i)(v).

Finally, even if the Board accepts IPA's reliance on Shawnee-Jireh common excavation costs, it is necessary to adjust how mobilization costs are allocated when developing a unit cost Specifically, in calculating the unit costs from the UP expansion project, IPA removes 38.1 percent of grading costs that are classified as mobilization. IPA later adds back mobilization, but only 3 5 percent, effectively removing 34.6 percent of project costs. The common excavation unit cost from the Shawnee-Jireh project should be increased by 34.6 percent to correct this mismatch.[52]

---

[51] *Id*

[52] UP Reply workpaper "Common Excavation Unit Cost Adjustment.xlsx."

(ii) Loose Rock Excavation

For its loose rock excavation costs, IPA uses RS Means, an approach that UP accepts, subject to the following two modifications.

First, UP applies the volume changes in earthwork materials due to shrinkage and swell discussed in Section III F 2.b iii (d)[53] As explained in detail above, IPA failed to include necessary costs due to swell and shrinkage of hauled excavated and embanked materials in its calculation of unit costs for loose rock excavation and solid rock excavation. *See* Section III F.2(d). UP's engineering experts include these unavoidable costs in their calculation of unit costs for these earthwork categories.[54]

Second, UP increased the haulage to one mile (roundtrip) to account for the realistic placement of waste pits. One mile is described in the Land for Waste section and matches the specific haulage of the common excavation scrapers (3,000 feet one way). This haulage distance also reduces the number of waste sites required by 50 percent to a more reasonable amount.

(iii) Solid Rock Excavation

In developing solid rock excavation unit costs from RS Means, IPA makes three errors. First, IPA again neglects shrinkage and swell in its calculations (as discussed in Section III.F.2.b.iii.(d)). Thus, UP's engineering experts adjust costs to remedy this omission.[55]

Second, IPA failed to account for the realistic placement of waste pits. UP increases the haulage to one mile (roundtrip), which is described in the Land for Waste section and matches the specific haulage of the common excavation scrapers (3,000 feet one way).

---

[53] *Id.*

[54] UP Reply workpaper "IPA Open Grading_UP Reply.xlsx," Tab "Unit Costs"

[55] *Id.*

Third, IPA ignores the boulders produced by blasting solid rock. IPA's calculations assume that blasted rock produces only fine materials that can be handled by a three-cubic-yard bucket However, blasting produces large boulders as well.[56] A conservative estimate based on UP's engineering experts' observations of blasting operations is that one-tenth of the material left by blasting solid rock will be boulders.[57] Boulders, even under one cubic yard in volume, take significantly more time to handle and load than fine materials RS Means accommodates this by lowering the production rate when handling boulders.[58] UP's engineering experts include this reduced production rate, as well as swell from excavation, in IPA's solid rock excavation costs [59]

(iv) Embankment/Borrow

UP accepts IPA's unit cost for borrow

(v) Fine Grading

UP rejects IPA's omission of fine grading along the IRR.

Fine grading is the final shaping of the constructed roadbed in order to establish the cross sections that make up the profile of the engineering design. UP's engineering experts explain that fine grading costs cannot be included in normal grading because fine grading requires different equipment Specifically. the excavation and borrow unit costs use scrapers, bulldozers, and sheepfoot compactors to achieve a rough grade while fine grading uses motorgraders to

---

[56] UP Reply workpaper "Hondo Valley Equipment 030603 RCP.pdf," p. 5.

[57] UP Reply workpaper "US 70 Hondo Valley Project 021203.pdf."

[58] UP Reply workpaper "RSMeans_Blasting_Items.pdf."

[59] UP Reply workpaper "IRR Grading Opening UP Reply xlsx," Tab "IIIF_Unit Costs."

achieve a more precise final grade[60] Moreover, RS Means lists fine grading separately: RS Means at 31-22-16.10-0200 Finish Grading-Grade subgrade for base course, roadways.[61] This is consistent with the Board's decision in *Otter Tail*, recognizing that fine grading is an actual and necessary construction element for rail lines.[62]

Bulldozers roughly shape the roadbed section but are not capable of the finer tasks of creating the crown of the roadbed or the shape of the ditches Bulldozers can compact the slopes of roadbeds prior to seeding but they are only capable of creating grades within several inches. Because of this limitation on the use of bulldozers to achieve the final shape and form of the roadbed, railroad roadbed contractors use motorgraders to provide the final shape and smoothness desired on the crown of the roadbed during the final compaction process. Motorgraders operated by experienced personnel are capable of obtaining final subgrade elevations within one inch.[63] The RS Means crew designation for motorgraders is also illustrative. Motorgraders require twice the laborers required by a bulldozer[64] Laborers assist equipment operators in creating proper ground levels by measuring and surveying throughout the grading process. The level of accuracy of the final grade is a function of the amount of ground level monitoring and instruction provided by laborers during finish grading. Motorgrader crews

---

[60] UP Reply workpapers "IRR Grading Opening UP Reply," Tab "Unit Costs": "RSMeans_Scraper&Bulldozer_Crews.pdf"; "Motor grader pictures.pdf.", and "Fine Grading Crew B-11L.pdf."

[61] UP Reply workpaper "Fine Grading Unit Cost pdf."

[62] *Otter Tail v BNSF Ry*, STB Docket No. 42071, slip op at D-14 (STB served Jan 27, 2006); *PSCO/Xcel I*, 7 S.T.B at 678 (holding that fine grading was "an actual and necessary construction element for rail lines" in part because RS Means lists fine grading separately)

[63] UP Reply workpaper "UP Reply Fine Grading_2 pdf."

[64] UP Reply workpapers "IRR Grading Opening UP Reply xlsx," Tab "Unit Costs"; "RSMeans_Scraper&Bulldozer_Crews.pdf"; "Motor grader pictures.pdf"; and "Fine Grading Crew B-11L.pdf."

provide twice the level of ground level monitoring and assistance resulting in a more accurate and consistent subgrade level along the alignment.

Typical laborers take time to set string lines which guide motorgraders and are monitored to shape accurate grades.

Not only is it desirable to obtain the designed subgrade elevation, a smoothly shaped, well-compacted subgrade minimizes waste when placing the sub-ballast.[65] Inaccurate, poorly shaped subgrades contain dips, divots, and uneven swaths along the alignment which increase the volume of sub-ballast material. Failure to achieve a smooth compacted subgrade at the designed elevation would cause major overruns of sub-ballast quantities (and attendant costs) to achieve a uniform aggregate base thickness. UP provides, as workpapers, the identical materials that the Board found to be sufficient proof of the need for fine grading in *Otter Tail*.[66]

IPA neglected to account for the necessary function of fine grading, citing the Board's ruling in *WFA I*. In this ruling, fine grading was said to be included in the BNSF Shawnee to Walker Project.[67]

IPA contends that the Shawnee-Jireh Project fine grading cost is included in its earthwork unit cost. Since UP presents comprehensive evidence why the Shawnee-Jireh Project excavation unit costs cannot be used as a reliable basis for extrapolating the costs that would be incurred to construct the IRR, UP formulates a separate cost for fine grading from RS Means. UP's engineering experts determine the quantity of fine grading needed using IPA's specifications for the dimensions and parameters of single-track roadbed. UP calculates a total cost for fine grading using the RS Means unit cost for finish grading of $0.47 and the area to be fine graded.

---

[65] UP Reply workpapers "UP Reply Fine Grading_1.PDF" and "UP Reply Fine Grading_2.pdf."

[66] UP Reply workpaper "IRR Grading Opening UP Reply.xlsx," Tab "Finish Grading."

[67] *See WFA I*, slip op. at 88; *see also* IPA Opening Nar. at III-F-27.

Then, using the total amount of earthwork on the IRR a unit cost of $0 28 per cubic yard of earthwork is determined. UP then adds this to the unit cost for each earthwork type.[68]

(c) Land for Waste Excavation

UP rejects IPA's cost per acre of land for dumping waste material and rejects IPA's calculation of the area of land needed for this purpose. UP assumes a waste site for every mile of IRR alignment, which is consistent with the assumptions underlying the development of earthwork equipment costs. A total of 174 waste sites will be needed (one waste site per mile along the IRR) IPA assumes all waste sites would be located in rural areas (rural land costs equal $500/acre). However, the 14.41 miles along the north end of the IRR near Provo reside on land appraised from $50,900 to $325,000 per acre IPA failed to include cost of hauling waste from these urban areas to the rural waste pits. UP utilizes the average price of land to develop cost of waste sites. Use of the average land price is appropriate because waste sites are evenly distributed throughout the IRR alignment.

There are three major flaws in IPA's calculations. First, in calculating the area, IPA assumes that waste can be piled 15 feet in the air with a perfectly vertical sideslope. Without a sideslope or a retaining wall of some sort, such a pile of waste would immediately collapse into a wider, lower heap. UP corrects the footprint to include a 1 1 sideslope for the waste pile.[69] Second, IPA identifies an area of land identified that is exactly the same size as the area needed for the waste, leaving no way for equipment to work the site. UP's engineering experts corrected this by including land for a standard 20-foot setback from the toe of the slope to also allow equipment to move safely around the site [70] Third, IPA did not account for the swell of the

---

[68] UP Reply workpaper "IRR Grading Opening UP Reply xlsx," Tab "Finish Grading "

[69] UP Reply workpaper "IRR Grading Opening UP Reply xlsx," Tab "IIIF_12 Othr Cst."

[70] *Id.*

wasted material. This loose, unconsolidated material is not compacted at the waste sites thus resulting in an increased volume of waste site to accommodate this less dense material. UP corrects this error by accounting for swell of wasted material from excavation.

(f) Total Earthwork Cost

The adjustments described above increase the costs associated with total earthwork, including additional land purchases, for IRR to a total of $85.8 million, an increase of $12.0 million.

c. Drainage

i. Lateral Drainage

UP accepts IPA's assessment of the lack of Lateral Drainage in the ICC Engineering Reports for the IRR.

ii Yard Drainage

IPA has included yard drainage with the cost of the facilities Therefore, to the extent necessary, UP addresses yard drainage costs when responding to IPA's facilities costs

d. Culverts

UP rejects IPA's culvert costs and corrects IPA's culvert quantities

i. Culvert Inventory

UP rejects IPA's culvert unit cost estimates because those estimates either omitted or incorrectly applied costs associated with the installation of culverts. IPA also made many calculation errors in its worksheets.

IPA posited in its narrative that Aluminized Corrugated Metal Pipe ("CMP") culverts were used in most locations along the IRR to replace existing structures found on the UP Culvert inventory In some cases, IPA specified box culverts to be used where diameters exceed maximum CMP diameters.[71] IPA used the area of existing culvert structures to specify the diameter of their CMP and box culvert replacement estimates.

The UP existing culvert list, however, identifies a mix of circular and box shapes of culverts that use a variety of materials, specifically designed for each site.[72] Culverts with different shapes and materials possess a variety of unique hydraulic characteristics which can yield varying flow capacities. By replacing existing UP culverts with CMPs based solely on pipe area for the majority of the IRR, IPA failed to account for the existing flow capacities of each structure and understated the culvert requirements for the IRR While accepting IPA's CMP culvert specification, UP's engineering experts correct IPA's hydraulic flow oversight by specifying each new IRR culvert to match the existing hydraulic capabilities (or flow capacity) of the UP culverts

In addition to the culverts that exist today along the IRR route, IPA proposes to replace 28 existing bridges along the route with culverts. UP engineering experts do not dispute that certain of the bridges existing on the line today can be effectively replaced with culverts. UP however rejects replacement with culverts for twelve of the 28 bridges proposed by IPA. IPA specifies two categories of bridge replacements with culverts· (1) 13 long span bridges that no longer traverse "active waterways," and (2) 15 bridges that can be replaced with suitable culverts typically less than 20 feet. UP rejects twelve proposed replacements in the first category .

IPA claims that 13 bridges in category one can be converted to culverts because they traverse "inactive waterways."[73] IPA attempts to defend this claim on two grounds.

---

[71] IPA Opening Nar. at III-F-29.

[72] UP Reply workpaper "Culvert List 2012 UP Reply xlsx," Tab "Active."

[73] IPA Opening Nar. at III-F-29.

First, IPA observes that adjacent roadways to these IRR structures utilize small culverts, not equivalent sized bridges. However, unlike roadways, railroads are not designed to allow overtopping in any regard. Overtopping occurs when water levels rise above the top of a drainage structure and flows onto a roadway surface. Railroad embankments (as seen in field photos provided by IPA), are typically constructed several feet above ground level (four feet on average for IRR per ICC Engineering Report average fill height), compared to a roadway which typically rises no higher than 18 to 24 inches from ground level[74] As a result, railroad embankments restrict water flow and require larger drainage structures to accommodate higher flows than that of roadway culverts.[75] Without properly sized drainage structures throughout an embankment, flood event flows would undermine and eventually washout the railroad, necessitating costly capital to replace embankment material, ballast, ties, rail, and other track metal in that section. A washout would also disrupt revenue traffic from as little as several days to as much as several weeks, depending on location and severity of the washout. The Utah DOT typically designs drainage structures to allow overtopping at flows exceeding 100 year flood event levels.[76]

Second, IPA claims that three dams were constructed after the replicated railroad was built and now restrict flow of the Beaver and Sevier Rivers. Due to damming, IPA asserts that the "dry riverbeds" traversed by the structures do not produce sufficient flow to warrant the existing UP bridges[77] But, IPA fails to provide any flow calculations or data supporting this

[74] UP Reply workpaper "IRR Grading Opening UP Reply.xlsx," Tab "CALC," Column N ("Height of Fill").

[75] UP Reply workpaper "IRR Elevation Photos.pdf"

[76] UP Reply workpaper "UDOT Overtopping Spec pdf."

[77] IPA Opening Nar. at III-F-30

claim [78] Instead, IPA includes a single document describing the dams without supporting data. Examination of the document reveals that it does not support IPA's assertion that there is insufficient flow to justify existing UP bridges.[79] Indeed, dams and reservoirs are designed with an outflow to release some flow of water and spillway during flood events. While the document IPA references describes three dam projects built since the railroad was in place, the context of the document is almost exclusively focused on the chemical make-up of the reservoirs, assessing pollution in the reservoirs, and describing the use classifications of the reservoirs with regard to recreation. There is no discussion of the impact the reservoirs have had on water flows of nearby rivers and has no bearing on whether culverts are more appropriate than bridges. As explained below, UP's engineering expert analyzed data that demonstrates there is indeed water flow that warrants the existing bridges.

Moreover, the proposal to replace these bridges with culverts is inconsistent with a design element adopted by IPA IRR is constructed to have an average embankment height of four feet above ground level in fill sections The elevation difference between IRR embankment and roadway is easily seen in many of the field photographs of the proposed IRR route provided in opening evidence.[80] If the aforementioned 13 bridge structures were replaced with the culverts IPA asserted, flows during flood events would cause washouts because the flows in excess of culvert capacity will pool along the IRR's roadbed rather than flow "overtop" the right of way as occurs on nearby roads. Such washouts can severely interrupt revenue service

---

[78] IPA Opening Workpaper "Sevier and Beaver River Dams pdf."

[79] *Id.*

[80] UP Reply workpaper "IRR Elevation Photos.pdf."

Watershed Analysis

To determine the flow capacity required at the 13 locations where IPA converted bridges to culverts (based on the assertion they no longer traverse active waterways), UP's engineering experts delineated and analyzed the contributing watersheds for each site. The watersheds were determined using USGS StreamStats data, which is a web-based GIS that provides analytical tools for water-resource planning and engineering design applications.[81] Specifically, UP's engineering experts utilize the USGS StreamStats "State Application," which allows any point within specified states to be analyzed The results from the State Application include total watershed area and point peak flow estimates for flood conditions ranging from a two- year flood event to 100-year and 500-year flood events at each bridge to culvert site along IRR. Graphical and tabular data was downloaded from each analysis and are in the UP workpaper "Watershed Analysis Detailed.pdf."[82] The watersheds and contributing streams for each site may also be viewed using the "IRR Watershed Analysis.kmz" file in Google Earth.[83]

The results from the USGS watershed analysis reveal that twelve of 13 bridge-to-culvert sites require a bridge structure to accommodate flood flows during 100-year events. This was determined by analyzing the hydraulic capacity of the IPA proposed culverts and existing UP bridges, then comparing this capacity with the point peak flows estimated from the watersheds

The disparity between the peak flow estimates and the capacity of the culverts that IPA proposed is striking. The peak flows were, at a minimum, at least one order of magnitude *higher* than the capacity of the IPA-proposed culverts The largest difference shows peak flows three

---

[81] *See* "U.S Geological Survey, 2012, The StreamStats Program," *available at* http://streamstats usgs.gov.

[82] UP Reply workpaper "Watershed Analysis Detailed pdf"

[83] UP Reply workpaper "IRR Watershed Analysis.kmz."

orders of magnitude higher For example, the existing 40 foot concrete bridge at UP milepost 592 26 has an estimated hydraulic capacity of 2085 cubic feet per second (cfs) The USGS analysis determined that the 234 square mile (149,790 acre) watershed produces a peak flow of 1580 cfs during a 100 year flood event at the bridge located at milepost 592.26.[84] The proposed replacement of this structure by IPA – three 1.5 foot diameter CMP culverts – would allow only approximately 16 cfs of water to pass through until reaching capacity. There is no doubt that the embankment would suffer a washout during a 100-year flood event if replaced with IPA's proposed culverts Indeed, a washout would likely occur well before water flows reached the estimated 1,580 cfs level during a 100-year flood. A complete summary of the watershed and hydraulic analysis for the bridge to culvert sites are detailed in UP Reply workpaper, "UP Bridge watershed analysis summary.pdf."

IPA's assertion that existing bridges are no longer needed based on one field visit during favorable weather conditions is misguided and reflects poor engineering judgment IPA disregards fundamental engineering hydraulic methodology by neglecting to consider flood events around the IRR and simple roadway design characteristics such as overtopping.

ii. Associated Culvert Costs

UP rejects IPA's exclusion of haulage cost of transporting culverts from Provo to final installation locations along IRR IPA's culvert material quotes specified Provo, Utah, as the final delivery point but culvert locations span the alignment from Provo to Milford IPA's culvert estimates fail to account for the cost of transporting the culverts to the various locations on IRR. UP's engineering experts formulate a culvert haulage cost from Provo to the various locations of the culverts along the IRR route. UP uses IPA's truck haulage cost of $0.50/ton-

[84] UP Reply workpaper "UP Bridge MP 592 26 Watershed Calc pdf."

mile to estimate the cost for transporting culverts along IRR resulting in an added cost of $171.615.

IPA also neglected to include cost for backfill of culvert trenches on IRR. UP's engineering experts correctly quantify the backfill material required for each culvert trench per UP culvert specification Plan No 680000, which requires a minimum of two feet of cover above culvert for protection [85] RS Means unit cost of $48 00 per CY was used for placing the backfill material and compacting After the culvert is installed, backfill is filled into the trench typically in lifts (or layers) to allow sufficient compaction of material. The RS Means unit cost covers both material cost and cost of compaction Using the UP standard culvert trench dimensions, UP engineering experts formulate the volume required to backfill each culvert.[86]

UP adds approximately $298,000 for backfill material and compaction to the total culvert cost of IRR.

iii. Culvert Installation Plans

UP generally accepts IPA's culvert installation plan except for the trench dimensions used to calculate backfill. IPA specifies that culverts are covered one foot above the top of the pipe with backfill.[87] UP construction specification 02437 states all culverts are to be covered at least two feet with backfill to ensure proper protection.[88] UP's engineering experts formulate new trench backfill and excavation estimates based off this UP specification.

IPA also failed to provide culvert inlet protection during construction. Silt fences are cost-effective culvert protection devices. Silt fencing should be located at the inlet of storm

---

[85] UP Reply workpaper "UP Trench backfill spec.pdf"

[86] UP Reply workpaper "Culvert List 2012 UP Reply xlsx," Tab "Stone Cons.Culvert List," Column AU

[87] IPA Opening workpaper "CMP Bedding Detail.pdf."

[88] UP Reply workpaper "UP Trench Backfill Spec.pdf."

sewer culverts to prevent sediment from entering, accumulating, and transferring to the associated drainage system. This is typical construction practice for drainage structures prior to permanent stabilization of a disturbed project area. If sediment protection, such as silt fencing, is not used, additional maintenance cost to clear culverts of all sediment at the conclusion of construction must be considered. UP's engineering experts use an average of 100 linear feet of silt fencing around each culvert inlet on either single or multi barrels condition.[89] The total cost of providing silt fences at culvert outlets is $58,200.[90]

iv. Culvert Quantities

UP's engineering experts reject a number of IPA's culvert quantities UP's engineering experts also reject IPA's substitution of culverts for bridges as specified above. *See* Section III-F-2(d)(i).

IPA further erred in assuming that its replacement CMP culvert having the same diameter as a reinforced concrete pipe ("RCP"), ductile iron, or other material pipe, would carry the same flow This is incorrect A CMP's corrugations cause turbulence in the flow that reduces the flow volume capacity of a CMP culvert The same size and shape RCP carries approximately two times the volume as a CMP [91] Based on this ratio, two CMP culverts of the same size and shape would be needed to replace a single RCP This is demonstrated by the Manning's flow equation, which is used throughout the design industry to calculate flow in a pipe.[92] This equation has been in use since the 1890s and is based on the area of the pipe, the wetted

[89] UP Reply workpapers "Silt Fence at Culvert.pdf" and "Silt Fence at Multi Barrels.pdf."

[90] UP Reply workpapers "Silt Fence unit cost.pdf" and "Culvert List 2012 UP Reply.xlsx," Tab "Silt Fence."

[91] Friction coefficient of CMP = 024 is higher than that of RCP = .012 (see Manning's discussion bellow) resulting in decreased flow for CMP pipes.

[92] Manning's Eq.. Flow(Q) = (1.49/n) x Area x (Hyd.Rad. ^0.67) x (Slope^0 5)

perimeter of the pipe, slope of pipe, and the friction coefficient used in Manning's equation. The rougher the material, the higher the friction coefficient and the lower the flow capacity of the pipe Therefore, a CMP with a substantially higher friction coefficient will allow much lower flow capacity than RCP or other alternatives.[93]

Sound engineering practices require that the replacement culvert should have capacity to carry at least the same flow as the existing culvert. Anything less could restrict the flow and put the railroad and adjacent landowners at risk of flooding or wash outs of railroad roadbed.

To determine flow of the existing pipe, UP's engineering experts assume the pipe is flowing at full capacity and that the slopes for the existing and proposed culverts are based on the minimum velocity needed to keep the pipe clean.

This minimum velocity is three feet per second per accepted engineering guidelines.[94] The Manning's velocity equation is used to determine the minimum slope of each culvert necessary to maintain a minimum flow velocity of 3 cubic feet per second("cfs") CMP's friction coefficient values range from 0.024 to 0.028.[95] UP assumes a conservative friction coefficient of 0.024 for CMPs in its calculations. Concrete, steel, cast iron, ductile iron, and smooth plastic pipe's friction coefficient values range from 0.011 to 0 013. UP uses an average friction coefficient of 0 012 for all non-CMP. UP's engineering experts use these assumptions, the Manning's flow equation and the existing pipes' physical properties (size, shape, and the coefficient of friction) to determine existing culverts flow capacities.[96] For each culvert, UP then determines the equivalent number of CMPs needed to achieve the same flow. Because the top of

---

[93] UP Reply workpaper "workpaper III-F 2-d.-iii. Roughness coefficient.pdf."

[94] UP Reply workpaper "workpaper III-F.2-d._Lindeburg_Minimum_Pipe_Velocity.pdf."

[95] UP Reply workpaper "Roughness coefficient pdf"

[96] UP Reply workpaper "Culvert List 2012 UP Reply.xlsx," Tab "TOTAL PIPE COST."

a culvert pipe is typically placed at the calculated flood level, the proposed replacement pipes must be the same height as the existing pipe to ensure pipes are flowing full. UP has revised the culvert spreadsheet to calculate the additional pipe quantity.[97]

The hydraulic analysis results in UP increasing the diameter of approximately 50 CMP Culverts and altering the dimensions of 20 box culverts Most of the culverts remain unchanged from IPA's original estimate (approximately 250 culverts were sufficient diameter to accommodate flows from existing UP structures).

A specific example of an increase in culvert dimension occurred on the Sharp Subdivision at milepost 733.10. The existing UP structure diameter is 3 feet which has a hydraulic capacity to accommodate approximately 23 cfs of water but the IPA specified a replacement 3-foot CMP with a capacity of just 17.49 cfs. UP replaced the culvert with a 3.5 foot diameter CMP with a capacity of 23 cfs to accommodate maximum flow of the existing structure.

Finally, IPA committed an additional error in the development of their culvert excavation material estimate As stated in IPA's Culvert Installation section, trench excavation allows placement of bedding material, culvert pipe sections, and finally backfill material IPA correctly formulates figures for bedding material, but IPA used an equation that fails to fully account for excavation volume of the trench [98] Specifically, the equation used fails to account for the properly formulated bedding area.[99] As a result, IPA failed to account for nearly 10,000 CY of excavation material. UP corrects this error.[100]

[97] UP Reply workpaper "Culvert List 2012 UP Reply xlsx," Tab "Active," Column AF.

[98] IPA Opening workpaper "Culvert List 2012 xls." Column H.

[99] IPA Opening workpaper "Culvert List 2012.xls," Column F

[100] UP Reply workpaper "Culvert List 2012.xls."

v. Total Culvert Costs

UP determines the cost of culverts to be $3.7 million, rather than the $1.3 million calculated by IPA.[101]

c Other

i. Sideslopes

UP accepts IPA's average sideslope ratio of 1.5:1.

ii Ditches

UP accepts IPA's specifications of side ditches in trapezoidal sections with cuts two feet wide and two feet deep for all locations.

iii Retaining Walls

UP accepts IPA's findings that no walls exist along IRR.

iv. Rip Rap

UP accepts IPA's quantity of rip rap per culvert type and unit cost for culverts but rejects costs for slope protection Since the Shawnee-Jirch project costs have been discredited in above arguments, UP rejects the rip rap unit cost IPA used for side slope protection UP instead uses the RS Means unit cost IPA used for culverts at $59 per CY.

v. Relocating and Protecting Utilities

UP accepts IPA's costs for relocating and protecting utilities.

vi. Seeding/Topsoil Placement

UP accepts IPA's embankment protection costs and quantities.

vii. Water for Compaction

IPA miscalculates both the unit cost and quantity of the water needed for compaction.

[101] UP Reply workpaper "Culvert List 2012 UP Reply xlsx," Tab "Culvert Summary Sheet"

UP rejects IPA's water for compaction unit cost. IPA used a Utah DOT unit price referenced in IPA workpaper "Water for Compaction – Utah DOT pdf," which is actually a unit cost for "dust control" watering.[102] Dust control is a completely different operation with lower labor and material requirements. IPA included an incorrectly applied Water for Compaction unit cost from RS Means[103] IPA attempted to convert the dust control unit cost and RS Means unit cost into cost per gallon This conversion introduces unnecessary complexity and error to the calculation UP instead applies the RS Means price of water for compaction per cubic yard, as RS Means intended, to the IRR embankment and borrow quantities.[104]

IPA also erred in calculating the quantity of water needed for compaction IPA claims that it need only include the water for compaction for borrow, not embankment.[105] IPA makes this assertion because the invoices for the Shawnee-Jirch expansion project near Lusk, Wyoming, do not include a line-item for water for compaction.[106]

However, as described above, IPA's reliance on the Shawnee-Jirch project is misplaced As discussed in Section III.F.2.b.iii (d), the soil near Lusk is very different from the soil on the IRR route, meaning that the quantity of water needed to compact a cubic yard of embankment will not be the same. Water is used to adjust moisture content in material to optimize compaction UP engineering specifications and Utah DOT specifications call for compaction of embankment material to reach nearly 95 percent limits.[107] This level of compaction is very

[102] UP Reply workpaper "UP Reply_Water for Compaction - Utah DOT.pdf"

[103] UP Reply workpaper "IRR Grading Opening UP Reply.xlsx."

[104] UP Reply workpaper "IRR Grading Opening_UP_Reply.xlsx," Tab "IIIF_12 Othr Cst "

[105] IPA Opening Nar. at III-F-34

[106] *Id*

[107] UP Reply workpaper "UP Engineer Specs – Compaction Standards.pdf;" UP Reply workpaper "Utah DOT Specs – Compaction Standards pdf."

difficult to achieve without proper moisture content in any material Common excavation, which is described as mostly soil, is especially susceptible to sub-optimal moisture levels. A variety of weather conditions can affect this especially in an arid climate like Utah.[108]

IPA included water for compacting only embankment built with borrowed materials and did not include any water for compacting embankment built from excavated materials However, nearly 70 percent of what is excavated will be reused as embankment, thus requiring water. The remaining 30 percent of common excavation is wasted and does not require watering UP's engineering experts modify IPA's incorrect estimate to include common excavation in accordance with UP Moisture and Density Control Specification UP determines the cost of water for compaction to be $8.4 million, rather than the $1.1 million calculated by IPA.[109]

viii. Surfacing for Detour Roads

UP accepts IPA's costs for surfacing detour roads.

ix. Environmental Compliance

UP accepts IPA's costs of environmental compliance.

x. Lighting for Night Work

IPA did not include lighting crew cost for night time work during the seven-month roadbed construction period assumed to occur from January 2012 through June 2012[110] Working at night would require lighting for the entire grading and construction period if this

[108] UP Reply workpaper "UP engineer Specs – Compaction Standards.pdf." ("The application of water to embankment or borrow materials shall be done with sprinkling equipment consisting of tank trucks, pressure distributors, or other equipment designed to apply water uniformly and in controlled quantities and at variable widths. The Contractor shall be required to furnish sufficient water equipment to ensure proper moisture content of all materials.").

[109] IPA Opening workpaper "IRR Grading Opening xlsx," Tab "III_12 Othr Cst."

[110] IPA Opening workpaper "Construction Schedule 11-20-12.xlsx."

aggressive schedule is to be met. This becomes even more critical during the winter months, when available daylight is significantly diminished. This will require a lighting crew at night to move, setup, and maintain lights for construction equipment and crews UP calculates the total lighting crew cost per day, which includes lights with generators, pickup truck, labor foreman and laborer costs with location factor. UP then applies the total lighting crew cost per day to 25 days a month over the seven-month construction period for a total of $276,500 UP estimated one lighting crew would be needed for every ten miles over 175 total route miles for the project. Accordingly, the project would need 18 lighting crews. As a result, the total cost of lighting crew for six months of grading construction is approximately $4.9 million.[111]

xi. Dust Control Work

During construction, the contractor should provide adequate dust control Dust control is part of erosion control practices which include mulch, vegetation, minimization of soil disturbance, binding agents, and water spraying. Dust control can prevent air pollution and prevent pollutants from infiltrating storm water. According to United States Environmental Protection Agency ("EPA") Storm Water Management Fact Sheet Dust Control document EPA 832-F-99-003 and Natural Resources Conservation Service ("NRCS") Code 373 on Dust control on unpaved roads and surfaces, dust control should always be practiced during construction.[112]

Public complaint about dust pollution is an issue where there are communities located near the railroad and road construction site, and traffic volumes are high. Therefore, dust control should always be applied in urban areas to protect public and environmental health Water spraying is commonly used for dust control and affords protection for haul roads and other heavy

[111] UP Reply workpapers "Lighting for Nighttime work.xls" and "Lighting for Nighttime Work Crew.pdf."

[112] UP Reply workpapers "Dust Control Work NRCS CODE 373 pdf" and "Dust Control Work EPA pdf."

traffic roads. UP's engineering experts conclude that IPA would need a B-59 crew with water spraying as a dust control measure in urban area only. UP calculates the total adjusted cost of dust control Crew B-59 per day which includes costs for one truck driver, one truck tractor, and one water tanker Then UP applies the RS Means total dust control Crew B-59 cost per day to 25 days a month over the seven-month construction period to derive a cost of $125,085 per crew. UP estimates one Crew B-59 would be needed every ten miles over a total of 24 urban area miles.[113] The project thus conservatively needs two crews The total cost is $299,454.

3. Track Construction

UP rejects IPA's costs for track construction. The specific problems with those costs are detailed below.

Table III.F.8
Track Construction Costs
(millions)

Item	IPA	Reply	Difference
1. Geotextile Fabric	$0.03	$0.04	$0.01
2 Subballast & Ballast	32.9	29.8	-3.1
3. Ties	30.8	31.4	0.7
4 Rail	38.9	59.2	20.3
5. Other Track Materials	8.8	9.7	0.9
6. Turnouts	9.9	12.5	2.6
7. Track Installation/Labor	53.4	55.2	1.8
TOTAL	$174.7	$197.9	$23.2

Source: UP Reply workpaper "III - F - TOTAL - 2012 UP Reply.xlsx."

a Geotextile Fabric

UP accepts IPA's unit costs for geotextile fabrics under turnouts, but corrects the quantities under each type of turnout. IPA does not show how it calculated the quantities under

[113] UP Reply workpaper "Dust Control Work.xlsx."

turnouts but the quantities are not sufficient to cover the entire turnout length. UP calculates this number based on the actual turnout dimensions.[114]

However, IPA fails to present sufficient evidence to establish the costs for geotextile fabric under at-grade crossings. The document on which IPA relies includes a line-item for "Rebuild Crossings," but it does not specify whether geotextiles are included in that cost[115] UP engineers add in the costs of geotextiles for at-grade highway crossing at a rate of 1 40 square yards ("SY") per linear feet of crossing.

b. Ballast and Subballast

UP accepts the majority of IPA's ballast and subballast quantities. UP corrects the quantity of ballast per foot of yard track in order to be consistent with what is shown on IPA's opening track sections[116] UP makes additional adjustments to IPA's ballast and subballast quantities as a result of track-related changes discussed in other sections of this narrative.

i. Quantities

UP accepts the majority of IPA's ballast and subballast quantities other than the changes noted above.

ii. Unit Prices

As explained below, IPA incorrectly develops both its ballast unit prices.

(a) Ballast

UP rejects IPA's cost for ballast because it fails to account properly for transportation costs associated with its assumptions for laying the skeletonized rail

[114] UP Reply workpaper "Geotextile Quantities.xls."

[115] UP Reply workpaper "UDOT Page 2 of 17.pdf."

[116] IPA Opening workpaper "IRR TRACK TYPICALS.pdf," p 9; UP Reply workpaper "Ballast & subballast Worksheet 2012 UP Reply.xlsx," Tab "Sharp," cell D13.

IPA included unit shipping costs for transporting ballast four miles from its source at Milford quarry to Murdock, Utah IPA assumed the track contractor incurs the remainder of the charges – including all charges associated with transportation of the ballast over the remainder of the 175-mile IRR, except for 50,000 tons delivered by truck between Milford and Lynndyl.

IPA acknowledged that IRR will have to supply ballast to hold the skeleton track that will be built from the Lynndyl railhead by adding a portion of ballast that will be trucked from the Milford quarry to various points along the Lynndyl to Milford section However, IPA improperly computed the ballast amount that would fill the crib area of the track between the ties. Although IPA did not show how it calculated 50,000 tons, UP's engineering experts determined this would only cover 2.75 inches of the crib height (the height of a tie is seven inches) when distributed over the entire length of the section needing to be skeletonized To construct sufficiently stable skeletonized track, the entire crib area would need to be filled to secure the rail so that the contractor could move ballast trains over it.[117] The correct amount of ballast needed for the skeletonized track using trucked ballast is 127,043 tons[118]

Further, while IPA accounts for the added highway trucking cost, it does not account properly for the cost of dumping the ballast at the track location from an over-the-road dump truck, and then reloading the ballast onto hi-rail-equipped dump trucks for placement along the skeletonized track IPA did not receive a separate price quote from Ohio Track, Inc (the rail contractor used by IPA) for building skeletonized track, but instead used the same price as regular track laying.[119] From this it is apparent the contractor did not account for the additional work required to lay skeletonized track Using RS Means for prices for loading bulk materials

[117] UP Reply workpaper "Skeletonized track ballasting exhibit.pdf."

[118] UP Reply workpaper "Skeletonized Track xls."

[119] IPA Opening workpaper "Ohio Track Construction Cost.pdf"

and hauling on a dump truck similar to that used by rail contractors, an additional $807,148 should be added to the overall cost of ballast to account for the reloading and distribution of ballast on the skeletonized track from Lynndyl to Milford using hi-rail dump trucks.[120]

(b) Subballast

UP accepts IPA's cost for subballast.

c. Ties

UP accepts IPA's crosstie costs but corrects a mistake IPA made in developing its quantities. While the crosstie spacing specified in IPA's narrative are acceptable, not all were correctly applied in its workpapers.[121] As a result, IPA overstated the number of crossties (and accompanying plates, spikes and anchors) required for IRR.[122] UP's engineering experts correct this error.[123]

d Track (Rail)

UP rejects IPA's unit cost for 136 pound rail because it uses an inaccurate rail price and fails to correctly account for the costs of rail transportation.

First, IPA unnecessarily relies on an outdated quote for the price of rail and then uses an unexplained and clearly inaccurate indexing factor Even though IRR requires a construction estimate using prices current as of November 2012, IPA used a price of rail from a UP work order dated November 26, 2007, that includes approximately 1.5 track miles of 136 pound rail. IPA then increased this price by an undocumented index of 2.5 percent. There is no explanation of where this index factor came from or why it is valid.

---

[120] UP Reply workpaper "Skeletonized Track xls."

[121] IPA Opening workpaper "Track Quantities-2012.xls"

[122] UP Reply workpaper "Track Quantities – 2012 UP Reply.xls."

[123] *Id*

It is worth noting the variety of possible ways could have estimated rail costs to understand why IPA's approach is misleading. There are multiple prices of rail contained in work orders produced by UP in discovery that are from a variety of dates, all of which could have various index factors applied. Some work orders produced by UP to IPA that are more recent show significantly higher prices for rail that might also be selected with equal if not greater validity. There were also a variety of indices IPA could have chosen to use. For example, UP's R-1 Schedule 724 shows the price of rail increased by 28 percent between 2007 and 2012. UP provides a workpaper showing some of these possibilities.[124]

UP rejects IPA's "cherry-picking" approach for both selecting the base rail price and determining the resulting indexing factor. Given fluctuations in prices of steel (which has indexes related to the price of rail) and a myriad of rail purchases at different times and at different prices, there are many opportunities to distort the price. Instead, the fair and consistent approach is to use the representative, real-world rail prices paid by UP that are readily available from Schedule 724 of UP's R-1. Such prices have been proposed before in rail rate cases by both complainants and defendants. UP uses the 2012 Schedule 724 cost of 136 pound rail for the IRR.[125] Since this cost is current with the start date of IRR, this avoids the difficulty of contesting which is the valid index to use.[126]

Second, IPA understates the cost of transporting continuous welded rail ("CWR"). IPA's transportation cost for CWR applies the third party rail carrier rate to off-line rail transportation from Pueblo, Colorado, to the IRR railhead at Lynndyl. From there, IPA assumes the track

[124] UP Reply workpaper "Rail Prices.xlsx," Tab "Price Comparison."

[125] UP Reply workpapers "Rail Prices.xlsx," Tab "R1 Price" and "UPRR 2012 R-1 Schedule 724.pdf."

[126] UP Reply workpaper "Rail Prices.xlsx," Tab "R1 Price."

contractor will transport and distribute the CWR along the IRR route without additional charge.[127] UP engineers accept IPA's choice to source rail from Pueblo and the route to Lynndyl. However, UP's Schedule 724 costs do not include any off-line transportation costs incurred by UP in obtaining rail However, since the majority of the rail purchased by UP comes from the Pueblo facility and because UP serves the rail facility directly, UP's Schedule 724 does not include any off-line transportation costs and they need to be added in calculating IRR costs.

UP accepts IPA's calculation of the off-line miles from Pueblo to the IRR railhead at Lynndyl but rejects IPA's $0.035 per-ton mile shipping rate because it is long outdated, as discussed in Section III.F 3.b ii.(a). Moreover, even if that rate were the proper one for most materials, it would not be the correct rate for CWR. Shipping CWR requires a train made up of specialized railcars that can accommodate quarter-mile long strings of CWR. The cars are equipped with track rollers to support the rail base and to permit the CWR rail to move with the track curvature. In addition, the rollers allow the CWR to be threaded onto the train from one end, pulled across the rollers, and loaded. The specialized railcars also include a hold-down rack in the middle of the train. Finally, the specialized railcars include specially designed ends that protect the locomotive from sliding forward in case of an emergency stop and allow the rail to be offloaded from the ends so that it can be pulled for construction of a skeleton track.[128]

UP's engineering experts calculate freight transportation rates for rail based on publicly available UP rates found at www UPRR com.[129] A request through the website for the price of rail (delivered from the manufacturer in Pueblo to the IRR railhead at Lynndyl) yielded a price of

[127] IPA Opening Nar. at III-F-42

[128] UP Reply workpaper "Rail train cars and car data.pdf."

[129] UP Reply workpaper "UPRR Rates for rail shipping in specialty cars.pdf"

$4,080 per car, plus a $266 fuel surcharge per car. The same price was obtained for various shipping quantities.

To determine the cost for moving a rail train, a search was conducted for AAR Car Type M, Maintenance of Way cars — the type of cars that would make up a CWR train. Using the information for Type M cars on the website www.RailcarPhotos.com as well as the information supplied by IPA for the amount of rail loaded on rail trains, UP's engineering experts determined that 28 special rail cars would be needed to transport the CWR strands.[130] The total rail train transportation cost would be $122,703 37 per train at the UPRR published rate.[131] The cost of freight would be $0.080 per ton-mile for 136# CWR and $0.095 per ton-mile for 115# CWR.[132]

In addition, it is necessary to add the cost to rent a specialized rail train because this is omitted by freight transportation costs from UP. To calculate the cost of renting the necessary equipment to transport CWR, UP's engineering experts obtained a quote from Holland Company (at www.hollandco.com) that included a monthly rental price for a rail train and a daily cost for a train supervisor.[133] Based on the IRR construction schedule and the amount of required track, the total cost to rent and supervise the operations of the Holland CWR trains over the construction period would require an additional $2.3 million in costs.[134]

---

[130] UP Reply workpaper "Rail Train Cars and Car Data.pdf."

[131] UP Reply workpaper "Rail Freight Transportation Rate.xls."

[132] UP Reply workpaper "Rail Freight Transportation Rate.xls "

[133] UP Reply workpaper "Holland Rail Train Proposal.pdf."

[134] UP Reply workpaper "Rail Train Rental Cost.xls."

i. Main Line

UP accepts IPA's quantity of main line track needed, except as changed by the operating needs in track configuration, and applies the proper unit cost developed above to calculate the total cost of main line track for IRR [135]

ii. Yard and Other Tracks

UP accepts IPA's quantity of yard track and other track, except as set forth in Section III-B of this reply, and applies the proper unit cost developed above to calculate IRR's total cost for these tracks.[136]

iii. Field Welds

UP accepts IPA's quantities for field welds so far as welding of the mainline strands together UP corrects the number of field welds required to complete the installation of the panelized turnouts. IPA uses six field welds per turnout but the actual number of field welds required for a No. 10 turnout would be 18 each, and a No. 15 turnout would be 18 each.[137] This has been corrected on the track quantity spreadsheet

iv. Insulated Joints

Insulated joint requirements are addressed in the signals and communications costs discussed in Section III.F.6, below.

e. Switches (Turnouts)

UP accepts IPA's costs for turnouts but corrects the number of hand throw switch stands IPA included IPA placed hand throw switches on mainline switches that already have power switches rather than on the smaller non-mainline number ten turnouts.

---

[135] *Id*

[136] *Id*

[137] UP Reply workpaper "Turnout Field Welds.pdf."

f. Other

i. Rail Lubrication

UP generally accepts IPA's unit costs and quantities of rail lubricators for IRR, but makes the following correction.

IPA failed to include the cost of a protective mat at each lubricator location. These mats are necessary to protect the ballast around the lubricator. Without a mat, any rail lubricant that is thrown off by a train wheel will seep into the ballast As the oily lubricant coats the ballast material, it traps rainwater, rather than properly allowing drainage through the ballast and into the track drainage system This would result in saturation of the subballast/subgrade, causing the track's surface and alignment to shift, leading to increased track maintenance costs. Three mats are required per rail lubricator, one mat outside each rail and one mat between each rail. Due to the remote locations for these mats, UP's engineering experts selected the most absorbent mats to reduce maintenance costs.[138] Including the shipping, the mats add $703.64 per rail lubricator.[139] The unit cost for a rail lubricator, including shipping and the necessary matting, totals $16,703 64

ii Plates, Spikes, and Anchors

UP accepts IPA's costs and quantities for plates, spikes, and anchors, other than adjusting for the change in ties addressed in Section III.F.3.c.

iii. Derails and Wheel Stops

UP accepts IPA's quantities for derails and wheel stops, except as adjusted to accommodate the changes in quantity discussed in other sections. UP also accepts IPA's unit cost for derails and wheel stops.

[138] UP Reply workpaper "Lubricator Mat Costs.xls."

[139] *Id*

iv. Materials Transportation

All comments on transportation rates are included in the rail section.

v Track Labor and Equipment

UP generally accepts IPA's track labor and equipment costs and quantities, subject to the corrections discussed in other sections.

4. Tunnels

There are no tunnels on the IRR route.

5 Bridges

Several elements of IPA's opening bridge evidence are improper and require correction in order to represent reality.

Table III.F.9
Bridge Costs
(millions)

	IPA	Reply	Difference
Total Type 1 Bridge Cost	$8 7	$11 4	$2.7
Total Type 2 Bridge Cost	0 0	0.6	0.6
Total Type 3 Bridge Cost	0 0	1.2	1.2
Access Bridge Cost	0.0	5.0	5 0
Highway Overpass Bridge Cost	4.3	8.3	4.0
Total Costs	**$13.0**	**$26.5**	**$13.5**

Source: UP Reply workpaper "IPA Bridge Costs UP Reply.xls."

a Bridge Inventory

UP cannot accept IPA's bridge inventory as proposed for a number of reasons First, IPA made erroneous assertions as to where bridges may be eliminated in favor of culverts. *See* Section III.F.2(d)(i). Second, IPA failed to account for a number of bridge locations where the existing spans are longer than can be accommodated by IPA's standard bridge design Third, IPA failed to include a number of access bridges which run parallel and adjacent to the actual railroad bridges in some of the remote locations of UP's system that are being replicated by IRR. These objections will be discussed in further detail in the sections that follow, but the result of these failures is that IPA's bridge evidence does not reflect the proper number of bridges that should be built on the IRR, and the make-up of some of the bridges is unrealistic UP corrects these significant flaws by adding the bridges back into the inventory that IPA eliminated, by creating new bridge types to address the longer bridge spans that cannot be replicated with IPA's assumed universal "Type 1" bridge, and by adding access bridges into the inventory that IPA omitted

First, UP rejects IPA's elimination of bridges in favor of culverts for the reasons discussed in Section III.F.2(d)(i).

Second, UP rejects IPA's bridge inventory insofar as it failed to account for a number of bridge locations where the existing spans are longer than what the standard bridge design can accommodate. This will be discussed in more detail below in the section on Bridge Design. But the nature of UP's objection is similar to the preceding discussion replacing existing bridges with a type that has shorter spans and more piers can only be done if there is engineering analysis to prove that it is feasible No such proof was included with IPA's workpapers, so UP must correct this error by replicating these long-span bridges on the IRR with superstructure types that are capable of matching the span length of the existing structures.

Third, UP rejects IPA's bridge inventory because it failed to include access bridges for railroad vehicles. UP today provides access for railroad vehicles to the equipment and infrastructure in the most remote locations on their system, including sections of the IRR route IPA fails to show that the IRR could function without a similar degree of access to those same remote areas that the IRR is replicating. The design of these access bridges is discussed in more detail below in the section on Bridge Design.

b Bridge Design and Cost Overview

IPA uses a single bridge type – "a concrete deck bridge supported by steel piles" – for each location on the IRR route that requires a bridge.[140] For convenience, UP refers to these as "Type 1" bridges. UP accepts the design and details of this Type 1 bridge, but does not accept all locations for which it is used. IPA claims that the Type 1 bridge can be "scaled as needed for the particular bridge being built."[141] For the majority of bridge locations, this is valid. However, there are three bridge locations where such scaling does not work. These locations are Bridges 601.12 and 653.69 on the Lynndyl Subdivision and Bridge 742.55 on the Sharp Subdivision.[142] UP accepts the design for the Type 1 bridge to replicate all but these three bridges. The existing bridge span lengths at the three locations exceeds the maximum span length that can be used with the Type 1 bridge.

The three bridges mentioned above have existing span lengths of 90-feet, 60-feet and 80-feet, respectively, and contain no piers.[143] The Type 1 bridge cannot reach spans of 90-feet, 60-feet, or 80-feet due to load carrying capacity limits [144] Accordingly, when IPA replicates these structures on the IRR with a Type 1 bridge, IPA needs to add piers to the bridge.[145] Replacing these three long span bridges with a Type 1 bridge, and thus adding piers that do not exist on the

[140] IPA Opening Nar. at III-F-51.

[141] *Id.* at III-F-50.

[142] UP Reply workpaper "IPA Bridge Costs_UP Reply.xls," Tab "Bridge Segments," Rows 7, 27 and 72.

[143] IPA Opening Workpaper "IPA Bridge Costs.xls," Tab "Bridge Segments," cells T7, T27 and T69

[144] UP Reply workpaper "30 Inch Deep Double Void Box Beam Details.pdf."

[145] *Id*

real structure, directly conflicts with IPA's opening narrative which states "each IRR bridge either has the same number of spans, or has a decrease in span number."[146]

The required number of piers (*i.e.*, vertical supports other than the abutments at either end of the bridge) equals the number of spans minus one. IPA calculates the total required number of spans for each Type 1 bridge by dividing the total bridge length by 30 feet (rounding up to the next whole number).[147] UP accepts this calculation.[148]

The number of piers affects the clearance under a bridge because water can only flow through the space between the piers. To permit the same water flow as the existing UP bridges, IRR bridges cannot have more piers than the UP bridges they replace. IPA claims "each IRR bridge either has the same number of spans, or has a decrease in the span number, while keeping the length the same as the existing bridge."[149] Yet this is not reflected in its bridge cost spreadsheet. For example, the existing 80-foot UP bridge spanning the Spanish Fork River (MP 742.55 on the Sharp Subdivision) has only one span (and thus no piers), while IPA's substitute bridge has three spans (and thus two piers).[150] Additionally, the existing bridge utilizes a deep abutment, whereas IPA's Type 1 bridge would require a spill slope in front of the abutment which would further restrict the channel. In other words, far more water could travel under the existing UP bridge than if IPA's Type 1 bridge were used.[151]

---

[146] IPA Opening Nar. at III-F-51.

[147] IPA Opening workpaper "IPA Bridge Costs.xls," Tab "Bridge Segments," cells U2-U75

[148] UP accepts this design choice but notes that Type 1 bridges could have a span up to 36 feet UP Reply workpaper "30 Inch Deep Double Void Box Beam Details.pdf."

[149] IPA Opening Nar. at III.F-51.

[150] IPA Opening workpaper "IPA Bridge Costs.xls," Tab "Bridge Segments," cell U69

[151] UP Reply workpaper "UP Reply Sketch_Sharp 742.55 pdf"

IPA admits that "water flow increase/decrease was not taken into consideration in [IPA's] engineers' methodology."[152] IPA attempts to justify this omission on the ground that "no information was provided in discovery on the hydraulic area of the bridges."[153] The fact that UP did not have documents in its possession, custody, or control on this issue does not eliminate IPA's burden to demonstrate the feasibility of its proposed bridge design. To add more piers to a bridge than what exists in reality, IPA must prove that doing so is feasible through hydraulic analysis. IPA failed to do so

Moreover, the fact that UP (or its predecessors) built bridges with longer spans and fewer piers is itself evidence that more piers were not feasible If the railroad built bridges based only on cost, then it would build something very similar to the Type 1 bridge proposed by IPA. This is because utilizing shorter spans costs less than using longer spans when the shorter spans are safe, feasible, and any trade-offs are accounted for (*i.e* , increasing the number of piers reduces flow, etc.). Utilizing shorter spans is less expensive because they can be constructed with smaller equipment and less man-power. The material for shorter spans can be delivered on lighter, more maneuverable trucks and can be installed with smaller cranes. The railroad diverges from this preference of using shorter span structures only when conditions warrant such divergence. Similarly, IPA selects bridges that are made up of a larger number of spans with shorter lengths because they are cheaper However, IPA failed to acknowledge when shorter span bridges were inappropriate. IPA had the burden of showing that cheaper bridges made up of shorter spans with more piers were feasible – but, it failed to do so.

To remedy this oversight, UP's engineering experts developed additional bridge designs that keep the IRR bridge superstructures the same length as the UP bridges they would replace

[152] IPA Opening Nar. at III-F-51.

[153] *Id.*

without adding piers. The cost for the other bridge types differs from the Type 1 bridges, so UP's engineering experts have adjusted IPA's bridge costs accordingly.

i. Bridge Design

As explained above, IPA has not shown that its "universal" Type 1 bridge design is feasible for the three bridges on the IRR for which the number of piers would be greater than those on the UP bridges that they would replace. Therefore, UP's engineering experts have developed two additional bridge types that are feasible substitutes for those three UP bridges. UP's engineering experts have also generated two additional designs for the access bridges that must be inserted into the inventory. These new bridge types are discussed in more detail below.

(a) Type 1 Bridges

UP accepts IPA's bridge design for Type 1 bridges. These are trestle-style bridges supported on pre-cast caps with abutments supported by driven steel piles. The superstructure is made up of pre-cast concrete double-void box beams. IPA utilizes these spans at a maximum span length of 30 feet

(b) Type 2 Bridges

UP's engineering experts developed a bridge design for Bridge 653.69 on the Lynndyl Subdivision on the IRR where a bridge with a clear span of 60 feet is needed to replicate the number of piers in the existing UP structure, which is zero For convenience, this bridge is referred to as a "Type 2" bridge. Unlike the Type 1 bridge, the Type 2 bridge utilizes a steel deck girder span. UP's engineering experts relied on UP's steel beam standards in delineating the quantities and details for this type of bridge.[154]

[154] UP Reply workpaper "UP Bridge Standards - Steel Beam.pdf."

It is worth noting that this structure currently exists as a large arch in the real world. IPA elected to replace this structure with a bridge because it costs less than reconstructing another large concrete arch. UP takes no exception to replicating this structure as a bridge rather than a concrete arch. However, in doing so, IPA must maintain the structure with no piers since the existing arch provides 60 feet of clear span with no piers. IPA's Type 1 bridge cannot replicate this structure without piers. Instead, using their Type 1 bridge, IPA specifies a two-span structure, which would require one pier.[155] Additionally, a Type 1 bridge in this location would require a fill slope in front of the abutments which further restricts the channel. For this reason, UP must create a bridge design with a 60-foot clear span that can provide unrestricted flow to match conditions at the existing structure

UP's engineering experts selected a steel deck girder span for the Type 2 bridge because it is an economical type of span to use for a bridge being constructed under "typical" conditions at the span length required for this location. In addition, this type of span is economical because it utilizes rolled steel beams. Such beams require no complicated labor-intensive fabrication, which keeps them cost competitive It also insures a minimum amount of lead time for delivery. For these reasons, UP uses these standard details as often as possible when shorter concrete box beam spans cannot be used Therefore, to replicate Bridge 653.69 with a span length of 60 feet, UP's engineers developed quantities for the Type 2 bridge using UP's steel bridge standards, which are valid for span lengths ranging from 31 feet to 69 feet.[156]

Where UP accepts IPA's use of the Type 1 bridge, the replacement structure is essentially a replacement in-kind, with the new bridge closely representing the existing structure, including an abutment cap on driven piles with a spill slope in front of it However, in the case of the Type

[155] IPA Opening workpaper "IPA Bridge Costs xls," Tab "Bridge Segments," cell U27.

[156] UP Reply workpaper "IPA Bridge Costs UP Reply.xls," Tab "Type 2 Bridge Quantities."

2 bridge, using an abutment cap on driven piles would require that the spill slope in front of the abutment encroach on the flow area under the bridge. Therefore, UP's Type 2 bridge will be supported by deep abutments, such that the 60-foot span actually provides a 60-foot wide flow channel.[157] This will ensure that the IRR bridges maintain the same hydraulic area as the UP bridges for which they would substitute. Because this logic holds true for all IRR bridges that are not Type 1 bridges, UP's engineering experts developed a standard deep abutment design. The details for this standard deep abutment were determined based on an average height of 18 for the three IRR bridges requiring deep abutments.[158] These proportions were then used to calculate the quantities of items needed to construct the deep abutments, including concrete, reinforcing steel, excavation, damp-proofing, drainage, and porous backfill. The total cost of the abutments was then calculated using unit costs from RS Means.[159]

(c) Type 3 Bridges

There are two bridge locations on the IRR where UP's steel deck girder standards do not apply based on the span length of the existing structures. Bridge 601.12 on the Lynndyl Subdivision is a single-span bridge with a length of 90 feet and Bridge 742 55 on the Sharp Subdivision is a single-span bridge with a length of 80 feet. Similar to the Type 2 bridge, both of these locations currently exist as single-span structures on deep abutments. However, unlike the Type 2 bridge, both of these structures exceed the maximum span length of 69 feet that can be used with UP's steel deck girder standards. Therefore, UP's engineering experts developed a

---

[157] UP Reply workpaper "UP Reply Sketch_Lynndyl 653.69 .pdf."

[158] UP Reply workpaper "Deep Abutment.pdf"

[159] UP Reply workpaper "IPA Bridge Costs UP Reply xls," Tab "Standard Abutment."

bridge design for these two locations on the IRR. For convenience, these are referred to as "Type 3" bridges Type 3 bridges are steel through plate girder bridges.[160]

UP's engineering experts selected a through plate girder span because it is typically the most cost effective type of span for lengths exceeding 80 feet. This is true because the alternative—deck girders—require multiple design accommodations at this length. For example, the most common problem with using deck girders for longer spans is ensuring that the live load is distributed evenly among the girders in a lateral direction. The lateral distribution of the live load is contingent upon the depth of ballast under the ties. The deeper the ballast, the broader the load can be distributed in a lateral direction.[161] However, using deck girders with only eight inches of ballast as IPA proposed is simply not feasible.[162]

To utilize deck girders for span lengths exceeding 80 feet, it is common to see 24-30 inches of ballast under the ties to distribute the live load laterally to the point that a sufficient number of girders can contribute to carrying the load. Accordingly, to use deck girders at this length, IPA would have to deviate from its proposed 8 inches of ballast, requiring multiple design accommodations. Specifically, to maintain the superstructure bottom chord elevation on the replacement structures at a similar elevation as the existing bridge, using 30 inches of ballast under the ties instead of eight inches requires raising the rail profile 24 inches over the bridge. Assuming a typical vertical grade of about 1 percent, it would take over a mile in each direction away from the bridge to taper the rail profile back down to where it would otherwise be with only eight inches of ballast on the bridge. This was not counted in IPA's evidence

[160] UP Reply workpaper "Type 3 TPG Bridge.pdf."

[161] UP Reply workpaper "UP Reply Sketch_Live Load Distribution.pdf."

[162] IPA Opening Nar. at III-F-40.

Another common problem using deck girders for spans of this length is access for inspection and maintenance. Deck girders for bridges of this length have to be placed close together for proper live load distribution. But, there must be sufficient space between them to inspect or make necessary repairs to connections, gusset plates, diaphragms, bearings, bracing members, and the like.

For these reasons, railroads typically use through plate girder bridges where span lengths exceed 80 feet. Except when there are special circumstances due to adverse site conditions or construction sequencing, through plate girder bridges are the most economical type of bridge span for these lengths over the life cycle of the structure.

The average span length for the two existing Type 3 bridges is 85 feet. UP's engineering experts used this length to determine the required steel through girder beam size and associated materials (knee bracing, floor beams, stringers, deck plates, etc.). The total weight of steel was multiplied by the unit cost for steel and then divided by 85 feet to determine a unit cost per linear foot for Type 3 bridge superstructures.[163] This unit cost per linear foot of bridge was multiplied by the actual length of the bridges in the Type 3 category to estimate costs.[164]

The deep abutment cost discussed above was also added to the total cost of constructing Type 3 bridges.[165]

[163] UP Reply workpaper "IPA Bridge Costs UP Reply.xls," Tab "Type 3 Bridge Quantities."
[164] *Id*
[165] UP Reply workpaper "IPA Bridge Costs UP Reply.xls," Tab "Bridge Segments," cells AE7 and AE72.

ii Bridge Cost

UP accepts IPA's unit prices for Type 1 bridges and applies those prices to any items also used for Type 2 and Type 3 bridges For items in Type 2 and Type 3 bridges that are not found in Type 1 bridges, UP's engineering experts have used RS Means costs.

c. Highway Overpasses

UP rejects IPA's highway overpass costs because IPA has not justified its deviation from Board precedent IPA claims that IRR would need to pay only { } percent of highway overpass project costs.[166] However, IPA fails to justify this assertion, particularly in light of the ten percent that the Board has accepted in past cases. *See. e g , AEP Tex. N Co v BNSF Ry.*, STB Docket No. 41191 (Sub-No. 1), slip op. at 102-03 (STB served Sept 10, 2007)

IPA bases its { } percent assertion on only one project – namely, the highway overpass located at milepost 747.59 on the Sharp Subdivision.[167] In addition to the fact that IPA makes a generalization about all highway overpass projects based on only one, IPA's own narrative shows that this project is particularly unsuitable to be used as a basis for comparison for at least three reasons. First, IPA recognizes that the documentation upon which it relies "provide[s] few details of the project."[168] Second, the project cost in that documentation "is inconsistent with the draft contract that is publicly available."[169] Third, railroads incur costs associated with highway overpass construction that cannot be submitted to a Department of Transportation for

166 IPA Opening Nar. at III-F-54

167 *Id*

168 *Id*

169 *Id.* It should be noted that IPA makes this point because the publicly available draft did not assign any costs to UP. *Id* When there is a conflict between an unsigned draft contract and the executed version, obviously the terms of the executed version control. However, the broader point is that there are serious questions about the documents upon which IPA bases its entire highway overpass cost argument.

reimbursement. For example, railroads are typically solely responsible for the costs of installing warning devices

UP rejects IPA's assertion that a single project – much less an admittedly poorly documented one – can establish the proportion of the costs of all highway overpass projects for which IRR would be responsible. If that were the case, then UP would be entitled to assign { } percent of the cost of all highway overpass bridges on the IRR based on a grade separation project in Denver, Colorado.[170] UP accepts that IRR would have to pay only what UP paid for the milepost 747.59 overpass. However, for the remainder of the highway overpasses on the IRR route, UP applies the ten percent accepted in past rate cases before the Board [171]

6 Signals and Communication

Table III.F.10
Signals and Communication System Costs
(millions)

Item	IPA	Reply	Difference
1. CTC, Remote Switches, FEDs, AEI Scanners, and Related Equipment	$17.1	$25 7	$8 6
2 Communications	$6.0	$6.9	$0.9
Total	**$23.1**	**$32.6**	**$9.5**

Source: UP Reply workpaper "IPA Signals and Communications UP Reply.xlsx."

a Centralized Traffic Control

UP's engineering experts identified seven significant errors in IPA's development of the IRR Centralized Traffic Control ("CTC") costs. Each error is detailed below

i Missing Disaster Recovery Dispatcher

IPA failed to include the cost of a disaster recovery dispatcher ("DRD") site in CTC costs This is necessary to allow continued normal train operations in the event that the primary

170 UP Reply workpaper "Pecos Street Grade Separation AFE Request.pdf."

171 UP Reply workpaper "Highway Overpasses Costs UP Reply xlsx."

train dispatching location becomes inoperable due to a natural disaster or other calamity The DRD site must be far enough away from the primary site (such as Milford) so that no single event can simultaneously disable both. DRD office equipment was added to workpaper "IPA Signals and Communications UP Reply xlsx." at the same costs as the original estimated "CTC Office System "

ii. Unreliable Inventory of Signals Components

A fundamental problem with IPA's signals evidence is that its proposed system has little relationship to the actual IRR track configuration. IPA claims to have developed a signals inventory by considering the layout of the IPA as manifested in the IRR System Diagram III-B-1 [172] This does not, however, give an accurate picture of the signal equipment needed. But IPA's signal item counts and associated interlocking component inventories are irreconcilable with the IRR System Diagram. For example, IPA includes 24 control points requiring interlocking huts on the Lynndyl subdivision, but then applies a scaling factor to account for the costs of 26 6 interlocking huts However, the IRR stick diagram shows a total of 25 control points requiring an interlocking hut [173]

The inconsistencies in IPA's signals inventory are exacerbated by IPA's failure to provide documentation of the milepost locations of the automatic signals ("AS1") locations, Hold Signals, or rail/highway crossing signal devices on IRR. It is impossible to assess the adequacy of IPA's proposed signals network without knowing precisely where it proposes to place these network elements For example, IPA's failure to identify the locations of AS1 could cause the omission of necessary, additional unidirectional detection equipment needed to provide

[172] IPA Opening Narrative III-F-56.

[173] IPA Opening workpapers "IPA Signals and Communications.xlsx," Tab "Page Counts," and "IRR STICK DIAGRAMS.pdf"

adequate warning times to the public of an approaching train. Additionally, using only the IRR stick diagrams for making estimates can result in the omission of signal components. For example, IPA omitted a control point for connecting UP's main line to Salt Lake City at Lynndyl, milepost 665.72. Consulting the UP track charts provided to IPA would have prevented this omission, but IPA engineers only relied on the stick diagrams [174] Similarly, IPA omitted a rail/highway crossing signal at 2000 South in Provo. milepost 698.8.[175]

More generally, site-specific information is essential to locate control points, automatic signal locations, and rail/highway crossing signals to provide an accurate assessment of equipment and quantities needed as well as placement of such equipment. UP's engineering experts used a more site-specific approach – including for example, IRR stick diagrams, Track charts, satellite photos and analysis of equipment – in developing their assessment of communication and signal material requirements.

In short, IPA failed to provide documentation of its signals inventory or any reliable evidence that their proposed signals configuration would be adequate for the IRR. UP's engineering experts therefore developed their own count of required signals based on the proposed IRR network, using site-specific criteria and industry-accepted signal practices.

UP's engineering experts developed their analysis guided by the SAC principles that the SARR would be a least-cost, most-efficient operator, but must nonetheless have a feasible infrastructure that is consistent with the requirements of real-world railroading In some cases UP's approach resulted in less signal equipment than IPA posited and in other cases, demonstrated that IPA omitted necessary equipment. Specifically, UP's engineering experts identified the count of associated components for each individual signal site

[174] IPA Opening workpaper "Lynndyl Track Profile (2011 Tonnage).pdf," p. 23

[175] IPA Opening workpaper "Provo Track Profile (2011 Tonnage).pdf," p. 20.

For example, an end of siding ("EOS") on the IRR system diagram would require various components including one EOS hut, three 2-headed signals, one grounding kit, one 12-volt battery, one 24-volt battery, two track circuits and ten insulated joints and various cables. Concerning cables at EOSs, UP's engineering experts measured the distance from point of switch to clearance point for a #11 Turnout and #15 Turnout to develop an accurate amount of cable for track circuits, trackside signal circuits, and signals.[176] Next, UP's engineering experts compared IPA's estimated cable runs to UP's estimated cable runs and found IPA's estimates to be insufficient and unrealistic[177] Also, IPA failed to include costs for the three required hold signals in the dark territory immediately before CTC or remote control territory. These signals are needed to inform approaching trains of the status of the signal at these points. UP's engineering experts corrected for this omission[178] Lastly, UP's engineering experts developed a list of necessary signal facilities in milepost order relative to IPA's IRR System Diagram with major components calculated for each location.[179]

iii. Cables

IPA did not include the correct cable for connecting AC Power between the service drop and the equipment shelter. AC Service drops are wired for 240 volts, which requires a three conductor cable to hook up the two phases and the ground tap. UP's engineering experts

---

[176] UP Reply workpaper "UP E-mail – Switch Distances.xls."

[177] UP Reply workpaper "Signals and Communications UP Reply.xlsx," Tab "Cable Comparison"

[178] UP Reply workpaper "IPA Signals and Communications UP Reply.xlsx"

[179] UP Reply workpaper "IPA Signals and Communications UP Reply.xlsx," Tab "IPA Stick Drawing Data."

therefore used 3C#2 cable and developed the cost of cables from a an actual UP cost made available to IPA during discovery and used the same labor cost that IPA used for cabling.[180]

iv. Missing Grounding Kits

IPA did not include grounding kits for signal equipment shelters. Such kits are necessary to ground the signal shelter and protect railroad personnel from electric shock and to protect electronic equipment from damage due to lightning strikes or power surges. It is critical that signal equipment shelters have excellent grounding to avoid damage from foreign current that can lead to failure of the signal or crossing signal system. UP's engineering experts developed the cost of grounding kits based on actual UP costs made available to IPA during discovery and developed labor costs for installation based on a quote from Interrail Inc ("Interrail") (www interrail-signal com) [181]

v. Missing Track Connections

IPA omitted Track Connections (near and far) for all track circuits. Track Connections are necessary to make the physical connection between the rail and underground (track) cable as part of the track circuit. UP's engineering experts included track connections for all track circuits (*i e* , signals, crossing signals and electric locks) UP's engineering experts developed labor costs for installation based on a quote from Interrail and estimated the cost of track connections to be $104,000.[182]

vi. Missing Termination Shunts

IPA ignored the need for termination shunts for crossing predictor equipment. Termination shunts are necessary to terminate electronic train detection circuitry for crossing

[180] UP Reply workpaper "UP - End of Siding estimate.pdf."

[181] UP Reply workpapers "UP - End of Siding estimate pdf" and "Interrail Labor 072612 pdf"

[182] UP Reply workpapers "Interrail Labor 072612 pdf" and "XoRail Track Shunt and Connection.pdf"

signals and to establish the approach distance, as required by FRA regulations. Termination shunts usually are ordered separately due to variance of frequencies. IPA similarly ignored the need for (a) track connection kits needed to make the physical connection between the termination shunt and the rail; and (b) termination shunt cover assemblies needed to protect the termination shunt located between the tracks at the end of the approach. UP's engineering experts estimated material costs for termination shunts, track connection kits, and termination shunt cover assemblies and developed labor costs for installation based on a quote from Interrail.[183]

vii. PSO Tx/Rx System

IPA did not state how it planned to interconnect the electric lock locations along the IRR dark operating territory with the signal system. Such a connection is needed to place the train signals to 'Stop' if the electric lock or derail is not positioned in the normally closed or derail position. To interconnect, a cable or PSO (on the rail) frequency is sent back to the nearest signal location (either a Control Point or Automatic Signal) After a review of their typical material, UP's engineering experts determined that IPA did not include this interconnect and added a PSO System to their signal estimate.[184] Before including this piece of equipment UP's engineering experts first tried an all cable approach, but this involved a substantial increase in cost, so an alternative combination approach was developed which runs a cable between the electric locks on the setout tracks and then used a PSO to connect to the nearest signal location. This approach proved to be more cost effective. Therefore, PSO's were used for all single switch electric locks and a PSO was used on one end of the ten electric lock setout tracks. PSO information was obtained from Safetran (www invensysrail com) and labor was estimated as one

[183] *Id.*

[184] UP Reply workpaper "IPA Signals and Communications UP Reply.xlsx."

day each for an inspector and helper since equipment has to be programed and installed at two separate locations and then tested [185]

viii. Outdated Signal Equipment Prices

IPA consistently failed to use current prices for signals and communication equipment and instead relied on quotes dating back to 2005 For example, IPA uses a cost per signal of $4,510, which comes from a 2005 Safetran price quote. UP's engineering experts contacted Safetran and were quoted a price of $7,171 for the same item in 2012. Where UP engineering experts did not receive updated prices directly from vendors, a factor was applied to convert the historical prices to 2012 levels. Consistent with the Discount Cash Flow Model, UP uses the AAR Material, Wages, and Supplements Excluding Fuel Index for the Western Region to calculate these factors.[186]

b. Detectors

IPA proposed Failed Equipment Detectors ("FEDs") spacing of approximately 25 miles. asserting this to be in line with operating requirements and current industry standards [187] However, its reference to "current industry standard" is incorrect because it relies on a superseded AREMA Manual from 2001. The current, 2007 AREMA Manual removed this spacing guidance.

Current AREMA standards, suggest that FED placement and spacing requires consideration of a number of relevant factors, including the type of defect to be detected, the characteristics of train traffic, and the available locations that are suitable for installation of

[185] UP Reply workpaper "Safetran Phone - 031213.pdf."

[186] UP Reply workpaper "IPA Signals and Communications UP Reply xlsx," Tabs "Index" and "Reply Mat & Lab," Column G

[187] IPA Opening Nar. at III-F-58.

detectors.[188] Other factors specific to each line segment that could be used to focus the appropriate detector type and placement include:

- Freight Traffic Density – Gross Ton Miles
- Line Speed
- Hazardous Material Mix
- Environmental Impact Exposure
- Adjacent Property Use
- Past Rolling Stock Problems
- Physical Characteristics, Curves, Grade, Etc.

Based on its experience with FED equipment performance and historic operating patterns, UP's actual detector spacing on the IPA line segment averages 18.98 miles.[189] Since IPA incorrectly bases its FED spacing on an outdated industry standard without benefit of historical data or a current diagnostic study taking into consideration the factors listed above, UP's engineering experts believe the current spacing provides for the maximum use of equipment while still maintaining the safest operation. Closer spacing increases the likelihood of detection before a failure becomes a derailment. Therefore, UP's engineering experts adjusted FED spacing to more closely replicate existing UP spacing thereby increasing the number of FEDs from seven to ten.[190] This adoption was driven by the importance of ensuring the safety of the public and of the train crews, particularly for trains moving at high speeds or carrying significant volumes of hazardous materials.

---

[188] UP Reply workpaper "AREMA Section 5.3.1 – FED pdf"

[189] UP Reply workpaper "Existing UP Detector Mileposts.pdf."

[190] UP Reply workpaper "IPA Signals and Communications UP Reply xlsx."

c Communication System

In general, UP's engineering experts accept IPA's proposed Communications System subject to minor changes in material resulting from adjustments in the number of facilities which interface with the Communications System.[191]

d. Highway Grade Crossing Warning Systems

IPA's inventory of crossings with active warning devices did not include a crossing near the point where the IPA interchanges with the UP Provo Subdivision in Provo, Utah. UP's engineering experts included this crossing in their inventory, bringing the total number of crossings to 34.[192]

Other than this additional crossing, the primary differences between IPA's evidence and UP's evidence, is the amount of cable, AC power drop and trenching.[193] This is due in large part to the fact that no material is set aside for the seven unidirectional locations needed to extend approach circuits to the distance necessary for adequate warning time.[194]

e. Insulated Joints

IPA's insulated joint inventory is incorrect because it fails to include sufficient insulated joints at control point and electric lock locations to adequately establish the "OS" Track Circuitry or clearance point IPA uses seven insulated joints as standard for control points and three insulated joints as a standard for electric locks.[195] For maximum broken rail protection, ten insulated joints are required to separate the main line track circuit from the turnout track circuit

---

[191] *Id*

[192] UP Reply workpaper "IPA Crossings UP Reply.xlsx," Tab "Total Crossings," Row 3.

[193] UP Reply workpaper "IPA Signals and Communications UP Reply xlsx," Tab "Reply Mat & Lab."

[194] UP Reply workpaper "IPA Signals and Communications UP Reply.xlsx "

[195] IPA workpaper "IPA Signals and Communications xlsx, Tab "Typical," cells AC3 & AC10

Four insulated joints are needed at electric lock locations to insulate the turnout and establish the clearance point for the switch UP's engineering experts corrected the insulated joint count.[196]

f. Microwave and Fiber Optics

UP's engineering experts reviewed IPA's proposed microwave and fiber optic equipment for use with radio control equipment, communications, and data transmission and believe IPA's proposal to be adequate. However, some adjustments in the amount of equipment have been made due to changes in the number of locations interfacing with the system.[197]

g. Remote Control

In the Provo, Utah, area six locations have power switches and serve as interchange points with the UP and URC. It appears, given the number of interlocking huts and FAS-PAS locations listed in the IPA's estimate for Signals and Communications, that IPA proposes to operate these power switches using FAS-PAS remote control equipment. IPA did not provide any information as to how it intends these locations to operate in this confined area, or address the possibility of non-IPA train crews having access to the FAS-PAS control points. Based on information from Global Rail Systems, UP's engineering experts understand that the FAS-PAS system is intended for use in dark territory using track warrants, and that the control point identification number is posted on the approach to the control point location. UP's engineering experts foresee the following problems with IPA's proposal·

- Confusion as to which control point the posted identification number operates
- The possibility of more than one train crew attempting to access the same control point.

[196] UP Reply workpaper "IPA Signals and Communications UP Reply.xlsx."
[197] *Id.*

- The possibility of one train crew keying in the wrong location and routing another train over the wrong track or blocking another train crew's access to the route.
- The need for training for train crews of other railroads operating over these control points.

Therefore, UP's engineering experts maintain that the FAS-PAS system is not the optimum system for control of these locations, and that remote control by the dispatching center in Lynndyl would provide the best operation to prevent confusion, enhance traffic flow, improve safety, and facilitate train movement interchanges with the UP and URC Additionally, one control point has to be installed to connect the IRR with the UP on the Provo Subdivision track around MP 698.65. This is signalized UP territory and a FAS-PAS System cannot be installed at this location

Finally, IPA neglected to include signals for the UP #120 turnout track that connects with the IRR's coal wye tracks and MP 1.19.

h. FAS-PAS with Derail

IPA's Signals and Communications estimate included installation of 28 FAS-PAS remote power switch locations which would allow train crews to remotely pole for position and operate a power switch via DTMF Tones over a standard voice radio However, UP's engineering experts identified only 13 of these locations, eight of which are associated with industry tracks Currently, seven of the eight locations have a derail protecting the mainline switch to prevent standing cars, on-track equipment, or cars being moved by industry on-track equipment from getting loose and rolling out onto the main track. To continue this same level of protection for the main track these locations should have a power derail installed as part of the FAS-PAS System to work in conjunction with the main line switch. The cost of an FAS-PAS System with derail was obtained from Global Rail Systems.[198] Also, labor for installation of the FAS-PAS System with derail was increased by two days to cover the additional labor needed to install the power derail components.

i Other

UP's engineering experts noted that IPA incorrectly totaled the number of commercial power drops needed at wayside locations, microwave towers, and buildings. The primary difference between IPA's number of Commercial Power Drops and UP's number is due to the omission of Power Drops for the unidirectional installations, additional FED locations and setout tracks, and two additional Hold Signals UP's engineering experts have corrected the difference in quantity.[199]

Finally, UP's engineering experts have adjusted the quantity of cable and cable trenching needed on the IRR route based on the modifications and corrections discussed in other sections of this narrative.

7 Buildings and Facilities

Table III.F.11
Buildings and Facilities Costs
(millions)

Facility	IPA	Reply	Difference
1. Headquarters Building	$1 7	$2.8	$1 1
2. Locomotive Shop	$4.4	$20.2	$15 7
3 Crew, MOW/Roadway Buildings	$0 3	$0.9	$0 6
4 Yard Site Costs (Roads, Lighting, Drainage, Wastewater, etc.	$1.8	$5 0	$3.2
TOTAL	$8.3	$28.9	$20.7

Source. UP Reply workpaper "2012 Buildings UP Reply.xlsx "

[198] UP Reply workpapers "FAS-PAS Price – 03-14-13.pdf" and "IPA Signals and Communications UP Reply.xlsx."

[199] UP Reply workpaper "IPA Signals and Communications UP Reply.xlsx."

a. Headquarters

UP rejects IPA's headquarters building cost, but accepts IPA's base square foot unit cost, which IPA derived from a bid on a UP yard office and crew change facility in Maryville, Kansas.[200] UP also modifies the unit cost and building size to obtain an accurate cost estimate. IPA stated that it "modified the facility [in Maryville, Kansas] to accommodate the IRR's staffing and other needs."[201] However, the modifications are incomplete. In fact, IPA did not adjust the size or specifications of the Maryville facility. IPA's only changes involved reducing the sitework costs. By contrast, UP modified the unit cost and building size according to all relevant factors.

The Maryville facility that IPA uses as the basis of its costs is a crew change building and does not have all the functions and spaces that a typical headquarters building requires.[202] For example, a railroad headquarters building would have a central computer/server room,[203] a dispatch center,[204] greater file and storage areas,[205] additional conference rooms,[206] a backup generator,[207] uninterruptable power supply (UPS) for redundancy,[208] and CCTV and card access

---

[200] IPA Opening workpaper "Headquarters.pdf."

[201] IPA opening at III-F-62.

[202] IPA Opening workpaper "Headquarters.pdf."

[203] UP Reply workpaper "UP Reply_AREMA 2011 Excerpts for Facilities," Part 11 Forward and section 11.3.2.

[204] UP Reply workpaper "UP Reply_AREMA 2011 Excerpts for Facilities," sections 11.3.4 & 11.5.1

[205] UP Reply workpaper "UP Reply_AREMA 2011 Excerpts for Facilities," section 2.3.4

[206] UP Reply workpaper "UP Reply_AREMA 2011 Excerpts for Facilities," section 2.3.7.

[207] Drawing E4.1 in IPA Opening workpaper "Headquarters.pdf" indicates that a back-up generator is an optional bid-additive item and there is no evidence the IPA costs had included this item.

[208] UP Reply workpaper "UP Reply_AREMA 2011 Excerpts for Facilities," section 11.4.6

control for security measures.[209] UP has included the costs for these items based on RS Means.[210]

IPA removes the cost of landscaping from the Maryville bid but does not otherwise account for it in its site work However, landscaping is generally required by local ordinances and is recommended good practice per AREMA guidelines.[211] UP adds this cost back into the total bid cost.

In assessing how much the Maryville, Kansas, bid price should be adjusted when building in the Provo, Utah, area, IPA applies an inaccurate RS Means location factor of 93.7 percent. This factor is used to adjust a national average cost (like those reported in an RS Means handbook) to a location-specific cost. However, the correct factor to use is the ratio of the cost of building in the Maryville area to the cost of building in the Provo area Using this ratio, which is calculated using the RS City Means Index value for Topeka, Kansas, the closest major city to Maryville, UP obtains a more accurate location factor of 101.0 percent.[212]

The IPA bid does not include fire sprinklers (and associated fire alarm system) as noted on the front page of the "Headquarters.pdf." However, a typical railroad headquarters building would have fire sprinklers and a fire alarm system per AREMA guidelines,[213] plus a non-water (chemical) extinguishing system in the computer/server room.[214]

---

[209] UP Reply workpaper "UP Reply_AREMA 2011 Excerpts for Facilities," section 1 2 6.5

[210] UP Reply workpaper "2012 Buildings UP Reply.xls," Tab "Headquarters."

[211] UP Reply workpaper "UP Reply_AREMA 2011 Excerpts for Facilities," section 2.1.4.

[212] UP Reply workpapers "UP Reply WP 2012 City Cost Index Topeka KS.PDF" and "2012 Buildings UP Reply.xls," Tab "Headquarters"

[213] UP Reply workpaper "UP Reply_AREMA 2011 Excerpts for Facilities," section 11.4.4, & 2.8.

[214] UP Reply workpaper "UP Reply_AREMA 2011 Excerpts for Facilities," section 11 4.4.

UP rejects the size of the headquarters building proposed by IPA because the missing items typical of a headquarters office building noted above require a larger building than what IPA has proposed. A correct estimate of size is easily obtained using a simple space allocation matrix that assigns realistic office and room sizes to the required program, based on the staffing lists provided by both parties.[215] As noted above, although IPA acknowledged that it needed to make adjustments to the Maryville building to accommodate the staff of the IRR, it continued to use the unadjusted Maryville building as the basis for both design and costs.

Based upon the above items, UP's engineering experts have obtained an accurate size of 14,139 square feet and an accurate cost of $2.8 million based on the adjusted unit cost proposed by IPA.[216]

b. <u>Fueling Facilities</u>

UP accepts IPA's approach of performing locomotive fueling by truck on separate fueling tracks at the fueling facilities.[217] However, IPA's proposed fuel facilities are insufficient.

First, IPA proposed that locomotive fueling be performed by trucks through direct-to-locomotive ("DTL") fueling and specifically provided for three fueling spots. IPA states that the fueling area is "is equipped with water for filling cooling systems, lube oil, sand, and shop air for various repair work and testing."[218] However, although IPA identified the structural costs for the locomotive shop, it did not include separate costs for water or air. It appears that IPA assumed that the contractor would extend water and air systems from the locomotive shop area to a three-spot DTL fueling area without incurring additional charge. Such an assumption is unwarranted.

---

[215] UP Reply workpaper "2012 Buildings UP Reply.xls," Tab "UP Reply_Headquarters Size."

[216] *Id.*

[217] IPA Opening Nar. at III-F-62.

[218] IPA Opening Nar. at III-F-63.

and IPA has put forth no evidence in support. In addition, using locomotive shop facilities for nearby train fueling operations would over-burden a locomotive shop unless it was specifically designed to accommodate these operations IPA provides no evidence to this effect. Indeed, while IPA includes the cost of lube oil storage in the locomotive shop, it includes no delivery system either for the locomotive shop or fueling track. UP adds water, air systems, and lube oil distribution system adequate for a three-spot DTL fueling area.

Second, IPA assumes the oil-water separator in the locomotive shop can also treat the DTL fuel and water runoff. However, the runoff from the outdoor fueling area must connect to the public storm drain system whereas indoor water would go to the public sewer system; these systems must be separated per code and local ordinances so that a large storm event does not overburden the public sewer system. UP adds a separate oil-water separator system for the outdoor fueling area.

Third, although IPA provides track pans to catch fuel spillage and subsequent rainwater, an industrial water storage tank for water treatment best management practices (BMPs) is needed to limit the outflow of treated water to the public storm system UP included a cost for this as part of the added oil-water separated cost noted above

c <u>Locomotive Shop</u>

UP rejects IPA's designs and costs for its locomotive shop at Sharp because the facilities and equipment specified are inadequate to service IRR's locomotives. IPA bases the structural costs for the locomotive shop on a quote from Kessel Construction ("Kessel") for a 110.000 square foot building. The quote is based on specifications that fail considerably to meet the standards needed for this type of facility A review of the Kessel website (http://www.kesselco.com/) reveals that this contractor has no experience in constructing or estimating locomotive maintenance facilities. The lack of locomotive shop specific knowledge is reflected in the quote.[219] IPA shop's foundation and structural design is insufficient for the reasons discussed below

In contrast to IPA's flawed proposal, UP has provided a recent real world example of a functional and sufficient locomotive shop in the San Joaquin Regional Rail Commission ("SJRRC Project").[220] This project and the associated construction bids, form the basis by which UP replaces the design and costs proposed by IPA UP takes the square foot cost of the SJRRC Project and applies it to the modified square foot size of the IRR locomotive shop to determine an accurate building estimate. These account for required foundations, built in pits, jacking pads, and other necessary items for locomotive shops that are omitted from IPA's proposal. The actual designs of real world locomotive shop foundations are also included.[221]

i. <u>Inadequate Structural Elements</u>

First, the Kessel quote by IPA only proposes slab on-grade of 6" with wire mesh in the shop areas.[222] This is grossly inadequate and does not meet the required water loading per ASHTO design standards for a forklift of 10,000 pound capacity and 14,000 pound vehicle weight [223] The use of welded wire mesh, while common in low end residential construction is not adequate to limit cracking in commercial slabs. Office area slabs, having a minimum loading of 100 pounds per square foot ("psf"), should be reinforced with #4 (1'2" diameter) reinforcing steel at mid slab running in both directions. All shop and warehouse areas need to accept, at a

[219] IPA opening workpaper "Kessel Locomotive Shop.pdf."

[220] UP Reply workpaper "UP_LocoShopExamples.pdf," p 1, for the floor plan of the ACE project

[221] UP Reply workpaper "UP_LocoShopExamples.pdf."

[222] UP Reply workpaper "Kessel Locomotive Shop pdf"

[223] UP Reply workpaper "UP_LocomotiveShop - Floor Loading pdf"; *see also* International Building Code sections 7.12 2.1 and 10 5.4.

minimum, the forklift loading mentioned above with additional thickness required for special shop operations such as lifting locomotives on movable jack stands, described in more detail below Warehouse floor loading equates to 250 psf according to International Building Code standards.[224] A typical shop building would be provided with 8" thick slabs with #4 steel bars as demonstrated by the SJRRC Project [225]

Second, the Kessel quote did not provide reinforced jacking pads for raising locomotives to service them or remove parts that cannot be removed using a drop table, such as replacing a fuel tank or other smaller undercarriage components. It would not be feasible to lift a locomotive with a 35-ton bridge crane. Instead, a series of 60-ton portable jacks would be used in concert to lift a locomotive. The relatively small footprint of the jack translates into floor slab loading in excess of 20,000 psf. Specialized foundation is required to distribute this load to the ground.[226] A pit under the locomotive is also frequently required to access undercarriage parts given that jacks are typically limited to a lifting height of less than five feet A standard jacking pad would be 24" thick, 24'-0" wide and 135'-0" long [227]

Third. IPA's proposed cost for the special slabs and foundations for drop tables, wheel truing machines, and inspection pits is not realistic because it fails to account for the significant amounts of concrete, steel reinforcing, and labor needed to construct these complex pits.[228] IPA recognizes the Kessel quote does not include special concrete work to construct pits, and tries to account for this by applying RS Means costs for free-standing concrete walls to less than 100

---

224 UP Reply workpaper "UP_LocoShopSlab & Foundation Plan.pdf" and "UP_LocomotiveShop - Floor Loading pdf."

225 UP Reply workpaper "UP_LocoShopExamples pdf," p. 8C

226 UP Reply workpaper "UP_LocoShopExamples Jacking Pad Section.pdf."

227 UP Reply workpaper "UP_LocoShopExamples pdf," p. 12

228 UP Reply workpaper "UP_LocoShopExamples pdf," pp 2-8B for historic pit examples.

cubic yards of estimated pit areas. This approach is deeply flawed Forming a free-standing concrete wall is not comparable to forming a pit. Both drop tables and wheel truing machines require complicated formwork and numerous metal inserts that must be cast into the concrete. Further, to avoid categorization of the drop table as an OSHA confined space that would require special training and equipment to enter, *see* 29 C.F.R § 1910.146, additional mechanical ventilation and access stairs are required.[229] The construction assemblies associated with this piece of equipment are incredibly complex and are further complicated by the 23-foot depth of the pit.[230] Keeping ground water out of the pit at this depth also becomes a major concern such that pumping systems are required.

Fourth, IPA has not provided concrete pad footings at building columns. The 24"x8" footings noted by IPA are not adequate to support the 32' high building columns that are supporting the building's structure. A structure such as this would generally have concrete pad footings in the range of 6 ft x 6 ft x 24" deep to 10 ft x 10 ft x 24" deep[231]

Fifth, the structure that IPA proposes is not sufficient to withstand the seismic forces of earthquakes at the site The Kessel quote is based on a building located in a seismic zone 1. Provo, Utah, is located in a seismic zone D and would require larger steel members and additional steel bracing to properly withstand an earthquake.[232] IPA fails to consider this substantial cost. The SJRRC Project, is also located in a seismic zone D area and more accurately reflects the costs of building in this zone.

---

[229] UP Reply workpapers "UP_LocoShopExamples Drop Table Pit.pdf" and "UP_LocoShopExamples Drop Table Pit 2.pdf"

[230] *Id.*

[231] UP Reply workpapers "UP_LocoShopExamples.pdf," pp. 8C & 8D, and "UP_LocoShopSlab & Foundation Plan.pdf."

[232] Provo. Utah is listed as a D2 seismic zone which correlates with the zone D indicated in the International Building Code chapter 16. UP Reply workpaper "UP Reply_SeismicZone pdf"

Sixth, UP rejects the design and cost of the pre-cast inspection pit The quote used by IPA provides no data for Cooper E80 loading, which the rail industry uses to describe the loading from the wheels of a locomotive on the structure below it, no details regarding reinforcement, no information on how this pit is fabricated, and no installation costs. UP proposes a typical cast-in-place concrete pit that addresses all of these factors.[233] Further, IPA's proposed 65-foot structure is too small to ensure efficient operations. In contrast, UP's proposal provides sufficient space for two, 72-foot long locomotives. This is necessary to accommodate situations where, for example, one locomotive may be under repair while another locomotive is being inspected.

Seventh, IPA's proposal contains several safety hazards that must be corrected For example, ladder access at the ends of the pits is not fire department-approved for egress,[234] there is no pit lighting, and the pit lacks a central trench drain increasing the likelihood that employees will be subject to slip conditions. The drain system also contains no grinder pump to prevent blockage from effluent during wash downs In addition, there is no system distribution for compressed air or electrical outlets presenting significant logistical issues. Finally there is no pit exhaust ventilation which is necessary to ensure a healthy work environment and is required by the Mechanical Code [235] Finally, IPA's estimated costs do not match the exhibits provided. For example, IPA's cost estimate describes a three-foot to eight-foot wide pit, but none of the pit diagrams reflect this dimension. UP has provided costs for these accordingly [236]

---

[233] UP Reply workpaper "UP_LocoShopExamples pdf," p. 7.

[234] See generally International Building Code ("IBC"), Chapter 10; see also, IBC, Chapter 10, sections 1019 (egress balconies) and 1009 (stairways).

[235] International Mechanical Code Section 303 7.

[236] UP costs are accounted for in the overall foundation line item UP Reply workpaper "2012 Buildings UP Reply.xls," Tab "Reply_LocoShopUnitCosts," cell K12.

Eighth, while UP accepts the base cost for the 35-ton bridge crane, the proposal omits costs for: modifications to the pre-engineered Kessel building that will enable it to accept crane loads, beams and rails for the crane to run on, an access ladder and platform assembly from which the crane can be periodically inspected and serviced, and electrified rails to power the crane. UP has provided a complete cost in its estimate for all required components and systems interfaces.

ii. Neglected Items

The flaws in IPA's proposal go beyond structural issues. Indeed, many other necessary items to a functioning locomotive shop are neglected or insufficient. UP's engineering experts correct these items in the following ways.

First, IPA failed to satisfy the OSHA requirements for fall protection of workers performing maintenance more than six feet off the ground. Fall protection involves more than just the railings IPA included; it requires body harnesses tethered to a movable overhead trolley to secure workers on top of locomotives[237] UP includes the cost for this item in the SJRRC Project square foot basis.

Second, the embedded track cost assumptions proposed by IPA are not based on a competent design for the interior of a locomotive shop, but appear to be based instead on exterior roadway conditions. According to IPA, the embedded track includes geotextile, aggregate base, concrete ties, and curved track, yet none of these items would occur *inside* a locomotive shop for installing embedded track.[238] Ties are associated with a relatively flexible track section found in ballast rock. To perform precise maintenance work, embedded shop rails must be in adequate concrete foundations that transmit their loading directly to compacted soil The movement of

[237] 29 C F R. § 1926 502

[238] IPA Opening workpaper "2012 Buildings xls," Tab "Embedded Track."

ballasted track would break adjacent concrete service slabs in short order. UP has provided details for standard, interior, embedded track, and includes the proper cost.[239]

Third, the cost for a wash facility is not provided, despite IPA's claim to the contrary UP adds a trainwash building at Provo Best management practices require locomotives to be washed prior to maintenance so that maintenance personnel have a clean, slip free, and safe vehicle to work on This building must be a standalone building or isolated from the remainder of the shop building since the water and moisture must be separated from the interior functions of the locomotive shop. The trainwash is typically located at the entrance of the yard so that the trains can begin to dry before entering the shop UP engineers have provided a recent historic bid example of this cost.[240]

Fourth, IPA did not include an emergency generator, per AREMA standards and best operating practices, to ensure the railroad is still operating during a power failure (as noted in the Headquarters section). UP's SJRRC Project example includes a generator cost.

iii. Inadequate Design and Size

The design and size of the locomotive facility is also insufficient UP rejects the size of IPA's locomotive shop because 1) it lacks sufficient space for the functions that IPA proposes. 2) it lacks space for several items that are missing, and 3) it does not have the space required for all the staff required.

First, an analysis of IPA's shop floor plan reveals that it does not have adequate space for locomotive repair. IPAs opening narrative states that the shop must be able to remove large components from the locomotives and ship them out to an outside source for repair.[241] However,

[239] UP Reply workpaper "UP_LocoShopExamples.pdf," pp. 7 & 8A

[240] UP Reply workpaper "UP_LocoShopExamples pdf," pp 9-11, for floor plan reference.

[241] IPA Opening at III-F-65.

such an operation would require significant working floor space and a dedicated locomotive repair track in which a locomotive can undergo long term repair without interfering with the other two tracks provided UP corrects IPA's proposed floor plan to account for this space.[242]

Second, IPA's design is missing space for either 1) a transfer track for moving wheel sets from the drop table to an area where they can be picked up by an overhead crane or a wheel garden, or 2) a flatbed truck to enter the locomotive shop under the area of the overhead crane. There is also no space for an air compressor, back-up generator, fluid distribution, or electrical room UP corrects IPA's proposed floor plan to account for these items [243]

Third, the locomotive shop is only large enough to accommodate the maintenance team that is contracted to service and repair the locomotives It only has a total of two offices and 377 square feet of meeting, storage, and personal space. IPA indicates that the crew facility will be integrated in the locomotive shop[244] but its floor plan diagrams do not account for this additional space [245] In keeping with the stand alone crew change facility that IPA proposes at Milford, UP has accounted for a separate crew change facility at the Provo yard. Further, UP's operating experts have indicated that nine train inspectors will be performing inspections on the coal wye track next to the locomotive shop. UP's engineering experts have provided the required office space for this staff in the locomotive shop. For these three reasons, UP has taken IPA's locomotive floor plan and adjusted it to reflect an accurate building of 39,200 square feet for use in the cost calculations [246]

---

[242] UP Reply workpaper "UP Reply - Locomotive Repair Shop.pdf."

[243] *Id.*

[244] IPA Opening Nar. at III-F-66.

[245] IPA Opening workpaper "2012 Buildings Locomotive Shop.pdf."

[246] UP Reply workpaper "UP Reply - Locomotive Repair Shop.pdf."

iv. Incorrect Site Costs

UP also modifies IPA's proposed site costs at the locomotive yard.

First, UP adds parking lot space and site costs for the separate crew change facility building as stated above.

Second, UP provides for gravel parking lots. IPA proposes gravel for the parking lot area, but given the presence of snow at the site, asphalt paving in the parking lot areas is preferable to ensure efficient clearance after a snow event.[247] UP engineers have accounted for these costs, plus the associated catch basins and storm drainage piping.

Third, UP corrects the site work lighting plan for the Coal Wye tracks and surrounding yard where fueling is performed and train inspections occur *See* Section III F.7(h)

d. Car Repair Shop

UP accepts IPA's proposal for contracting out its major car repairs.

e. Crew Change Facilities/Yard Offices

UP rejects IPA's proposed cost and size of the crew change facilities UP accepts IPA's use of a Kessel Construction quote for a maintenance of way building in Bradford, Pennsylvania, but modifies the size of the IPA facilities and adjusts how the unit cost is derived Further, UP finds it more reasonable to rely on the floor plan diagrams shown in the Kessel quote rather than IPA's attempt to extract a unit price from the quote and apply it to a new floor plan.

UP modifies the size of the crew change facilities because IPA's proposed floor plan is not code compliant with respect to egress and accessibility.[248] For example, the International Building Code, which incorporates building standards for the Americans with Disabilities Act ("ADA") requires doors, showers, and restroom items to have specific required clearances

[247] UP Reply workpaper "IRR Climatic Data Winter Months xls "

[248] Per International Building Code chapter 10, 11, and ICC/ANSI A1117.1 standards

around them for a disabled person to properly use.[249] A proper design would require additional space at doorways, larger restrooms, larger showers, and a separate restroom and locker room for women. UP's engineering experts include a detailed diagram showing the design insufficiencies of IPA's proposed floor plan.[250] To correctly adjust for size, UP takes IPA's Kessel floor plan[251] and dedicates only a 2,025 square foot portion of the office area to the IRR crew change facility.[252] This portion includes all the spaces that IPA proposed on its floor plan (one office, a lunchroom, storage, hallways, and restrooms) yet it is realistic and code compliant.

UP also adjusts IPA's unit cost to account for the reduced economies of scale from constructing a smaller building than the 13,000 square foot facility in the Kessel quote. This difference is reflected in RS Means which shows that a comparable metal stud and steel roof deck building of 12,000 square feet has a cost of $167.45 per square foot whereas buildings of 3,000 square feet have a 21 percent higher cost of construction at $211.25 per square foot. Using this logic, UP has applied a 21 percent cost factor to IPA's proposed square foot cost to reconcile this issue.

UP also modified the sitework for crew change facilities in two ways. First, IPA provided no light poles for the parking area. It is not practical to light the entire 20 stall parking lot from wall lights on the building. UP has provided minimal site lighting using adjusted IPA unit costs. Second, UP provides for gravel parking lots for the same reasons discussed in the locomotive shop section.

---

[249] The International Building Code's accessibility chapter 11 is based on ADA standards provided by ICC/ANSI A117.1. See UP Reply workpaper "UP ANSI Scans.pdf" for excerpts.

[250] UP Reply workpaper "UP Reply_2012 Buildings Crew Change.pdf" for a summary of IPA's code deficiencies.

[251] IPA Opening workpaper "MOW & CREW BUILDINGS.pdf."

[252] UP Reply workpaper "UP Reply_2012 Buildings Crew Change.pdf."

Finally, as described in the locomotive shop section, there is no additional space to accommodate a crew change facility within the shop. Therefore, since IPA neglected to provide crew space at the Provo yard, UP has accounted for a separate crew change facility at this location and included the associated site costs [253]

f MOW Buildings

UP rejects IPA's MOW building size and costs for similar reasons discussed for crew change facilities. UP also adds facilities and equipment according to the needs of maintenance of way operations.

UP modifies the size of the MOW office. First, the office space is too small to account for the 30-person MOW team required on IRR. Further, it does not meet code requirements since there is not enough access space for similar reasons as explained above. IPA's proposed floor plan is not ADA code compliant and therefore not realistic. Code compliant restrooms are not provided. A corrected design would require additional space at doorways and restrooms, thereby requiring a larger building. UP's engineers include a detailed diagram showing the design insufficiencies of IPA's proposed floor plan.[254] Similar to the adjusted crew change size noted above, UP accepts a 2,703 square foot office area of the Kessel floor plan for the IRR MOW building which includes all the spaces IPA proposed while being code compliant.[255]

UP rejects the unit price for the MOW building based on the same economy of scale factors it used in rejecting the same unit price for the crew office. Likewise UP applies the 21% factor described in the crew change facilities section.

[253] UP Reply workpaper "2012 Buildings UP Reply.xlsx."

[254] UP Reply workpaper "UP Reply_2012 Buildings Maintenance of Way Office.pdf," p. 1.

[255] UP Reply workpaper "UP Reply_2012 Buildings Maintenance of Way Office pdf"

UP accepts the size of the MOW garage, but UP's operating experts indicate that one vehicle bay will be dedicated as a mechanic shop for light servicing of MOW and hi-rail vehicles.[256] UP adds cost for this bay to include a jib crane to handle hydraulic cylinders,[257] a vehicle exhaust ventilation system for winter work inside,[258] and 25' of embedded rail for installing/testing/servicing hi-rail assemblies.[259]

In accordance with operating needs, UP adds a small 576 square foot MOW compound at Milford to house one track maintenance crew and one track supervisor who report for duty there. This facility needs a fenced and lighted compound large enough to park one heavy vehicle, 3 smaller vehicles, plus 1000 square feet of outdoor lay down space. The interior includes a small locker room and lunch/meeting room, plus one desk station for a computer and printer. UP uses a real world historic cost example for this item.[260] To determine the cost of the site improvements, UP takes IPA's MOW site costs at Lynndyl and reduces it by 75% to represent the smaller site of the MOW compound.

g Wastewater Treatment

UP accepts IPA's wastewater treatment costs, except as discussed in Section III.F.7.b with regard to fueling facilities

h. Yard Air, Lighting, and Drainage

UP does not accept IPA's proposal insofar as it contains no yard air outside of that provided at the locomotive shop, DTL fueling areas, and MOW shop. Yard air is needed to efficiently replenish brake-air that may have leaked out due to disconnection from a locomotive,

---

256 UP Reply workpaper "UP Reply_AREMA 2011 Excerpts for Facilities pdf," section 9.1 6.a.

257 UP Reply workpaper "UP Reply_AREMA 2011 Excerpts for Facilities.pdf," section 9.2.1.b,

258 UP Reply workpaper "UP Reply_AREMA 2011 Excerpts for Facilities.pdf," section 9 2 4.f.

259 UP Reply workpaper "UP Reply_AREMA 2011 Excerpts for Facilities.pdf," section 9 2 1.a

260 UP Reply workpaper "UP_Reply_2 PersonSingalMaintainer.pdf"

as well as for pre-release brake test after dwell time. UP provides a cost for an air compressor that supplies air to a valve box located at each end of the track

UP rejects IPA's yard and site lighting costs UP's changes to lighting in parking lots is discussed above for the crew change buildings UP accepts IPA's yard light specification of 400-watt cobra head lights on 40-foot poles and the 2" conduit, but adds a pull box at the base of each light for the purpose of installation and maintenance The pull box serves as an access point so that the wiring of the light may be spliced with the power source in the conduit UP rejects IPA's assumption that one row of lights spaced 300 feet apart is sufficient UP uses light analysis studies (photometrics) to develop a cost-effective yet sufficient lighting plan for the IRR's yards. UP's engineering expert used industry standard software to calculate the acceptable light levels that are required for security lighting.[261] These calculations dictated the spacing of the light poles. Using these spacing requirements, UP then determined the correct quantities of lights needed at each yard Table III.F.12 below shows the corrected light pole quantities based on the following typical light scenarios: (1) security lighting for single yard track configuration, (2) security lighting for double yard track configuration; and (3) security lighting for triple yard track configuration. IPA neglects that multiple tracks side by side will require additional lighting to maintain the required illumination levels

[261] The "UP Generic Photometric Plans.pdf" represent the edge of the area illuminated at that footcandle level, i.e., the area between 4 and 5 will have an illumination level between 4 and five footcandles on the ground. These are security levels based on IES (Illuminating Engineering Society) recommendations of between 1 and 5 footcandles for parking lots. this should also be adequate for track safety. The AREMA requirement for the safety walkway along light rail lines is 0 5 fc on the ground. The exhibits are prepared using software AGI 32 version 2.2 from Lighting Analysts Inc

UP then applies these typical scenarios to the actual IRR yard configurations to determine quantities and applies this to IPA's modified unit cost to determine the lighting estimates.[262] For example, for one thousand feet of double track, UP would place five light poles.[263]

Table III.F.12
Light Spacing Specifications

Light Spacing Specifications	Number of Yard Lights		
	Sharp	Lynndyl	Milford
Single Track Spacing (217' each)	23	6	5
Double Track Spacing (181' each)	3	70	53
Triple Track Spacing (120' each)	12	8	7
Fueling Track (UP accepts IPA's quantities here)	2	0	0
TOTAL	40	84	65

Source. UP Reply workpaper "2012 Building Sites UP Reply.xlsx," Tab "Lighting Summary."

UP rejects IPA's selection of only one drainage inlet per yard (two at Lynndyl). IPA's workpapers do not demonstrate there is only one low point between the two yard tracks into which all water would supposedly flow, which in some cases would be more than a mile away from the drain. UP places drainage pipes between yard tracks running parallel to the tracks.

8. Public Improvements

a Fences

In its opening narrative, IPA claims that it had no way to verify UP's fencing observations in Docket No. 42171.[264] However, UP's engineering experts photo-documented their comprehensive hi-rail trip in September 2011 and concluded that the majority of UP's right-of-way is fenced on both the Sharp and Lynndyl Subdivisions Nevertheless, acknowledging the

[262] UP Reply workpaper "UP Yard light Corrections.pdf"

[263] 1000 feet double track/181 feet spacing between lights = 5.5 = 5 rounded down.

[264] IPA Opening Nar at III-F-68.

subjectivity inherent in assessing the percentage of fenced right-of-way, UP's engineering experts accept the total miles of fenced right-of-way as introduced by IPA.

UP rejects IPA's fencing unit costs. The unit cost of $2.04 per linear foot ("LF") for fencing, which IPA alleges is based upon data provided by UP in discovery, is not adequately documented or supported. A comprehensive review of the discovery data reveals multiple bid summaries which outlined fencing costs ranging from $2.00 LF to as much as $5.00 LF for fencing[265] The only other supporting workpaper from IPA is a write-up in the "Ag Decision Maker" from Iowa State University, reflecting unit costs for a variety of types of agricultural fencing.

UP has documented and substantiated fencing costs from Mountain States Fence, a Salt Lake City, Utah company, which has performed past fencing work on the UP right-of-way. The documented fencing cost for the 47-inch high wire mesh agricultural fencing used along the UP route replicated by IRR (including installation) is $3.24 per linear foot.[266]

Additionally, IPA's unit cost for fencing does not include the cost of gates. UP's engineering experts have added the cost of one, twelve-foot wide gate for every mile of fencing, to allow crossings in fenced areas along the IRR route.[267] The unit cost for gates has been applied to the total stated fencing costs.[268] Based upon these calculations, the total fencing and gate costs for the IRR ROW is $3.239,322.[269]

[265] UP Reply workpaper "390881- UP Discovery Fencing Cost pdf."

[266] UP Reply workpaper "Mt States Fencing Estimate.pdf."

[267] UP Reply workpaper "ROW Fence and Cattle Guard UP Reply.xlsx."

[268] *Id.*

[269] UP Reply workpaper "III-F-8 TOTAL REBUTTAL.xlsx."

UP's engineering experts accept the quantity and cost of cattle guards proposed by the IPA.

b Signs and Road Crossing Devices

UP accepts IPA's assumption of a standard package of railroad signs including mileposts, whistle posts, yard limit, ENS, and cross-buck signs and posts and the associated costs.

c Grade-Separated and At-Grade Crossings

Because all of IRR's grade-separated crossings are highway overpasses, these costs are addressed in Section III F 5 c. UP accepts IPA's at-grade crossing unit costs, but seeks to correct an error in IPA's calculations.

Specifically, IPA calculated at-grade crossing quantities based upon linear feet. However, material quantities for grade crossing installations are measured in track feet (*i e* a one-foot section of two side-by-side rails, anchored on ties sitting on a standard ballast roadbed) [270] Therefore, when discussing a rail-seal crossing surface material, two linear feet of rail-seal material would be required to accommodate one railroad track foot [271] UP accepts the 40 foot crossing length per crossing and has applied the corrected track feet unit in its spreadsheet

[270] UP Reply workpaper "Track feet v Linear feet.pdf."

[271] *Id.*

9. Mobilization

UP accepts IPA's calculation of mobilization costs but adjusts it to reflect revised IRR construction costs.

10. Engineering

UP accepts IPA's engineering additive but applies it to the correct costs

11. Contingencies

UP accepts IPA's contingency factor but applies it to the correct costs

12. Other

a. Construction Time Period

Construction of the IRR route begins at Provo, Utah, at an approximate elevation of 4500 feet above sea level The route climbs out of Provo between two smaller mountain ranges through Nephi to Sharp. which is the crest of the grade approaching 5200 feet above sea level Runoff from the larger mountain ranges in the Wasatch east of the line comes into this valley. Drainage north of Sharp runs into the Mona Reservoir adjacent to the main track and then into Utah Lake at Provo This puts the IRR route in the bottom of the drainage basin and consequently vegetation is more significant in this area of the Sharp Subdivision than other areas. Farmers add to this drainage/moisture problem with irrigation channels that create runoff. UP experiences annual roadbed problems due to this excess moisture.

South of Juab the route turns west along the Sevier River. Streams and rivers meander through this valley requiring the railroad route to cross Chicken Creek four times and the Sevier River eight times. Runoff from the winter thaw in the Wasatch and spring rains wreak havoc on this line. Past washouts are evidenced by the tons of rip rap that currently protect the roadbed. A majority of this section can only be reached by the railroad maintained maintenance road adjacent to the tracks IPA will need to build access roads to access these eight bridge locations and provide track maintenance.[272]

The main line connects into the Lynndyl Subdivision at Lynndyl, at an elevation of approximately 4800 feet. Here, the route turns south to Milford on the eastern edge of the Sevier Desert. The route is fairly straight with elevations running between 4700 and 4800 feet above sea level. The major challenge for construction will be obtaining borrow for the elevated roadbed. Photos of the route are included in UP workpapers.[273]

IPA's construction schedule requires building the IRR route during the winter and spring of 2011 and 2012. While UP accepts this schedule, IPA is not entitled to ignore the costs of adhering to that schedule. The winter brings extreme cold and snowfall, followed by a thaw and heavy rain in the spring. Both sets of circumstances increase the costs and difficulty of constructing, operating, and maintaining a railroad. Weather's impact on construction is addressed here, while its effects on maintenance and operations are addressed in their respective sections.

UP's engineering experts have identified several sources that document the financial impact of performing construction in cold weather conditions.[274] This impact is not captured by any sources used by IPA and UP's engineering experts, including the RS Means catalog's labor, equipment, or production rates.[275]

---

[272] UP Reply workpapers "Chicken Ck & Sevier Rvr google earth pdf," "Chicken Ck & Sevier Rvr photos.pdf," "Chicken Ck & Sevier Rvr topo.pdf," and "Chicken Ck & Sevier Rvr track charts pdf."

[273] IPA Opening workpaper "Field Photos Lynndyl Sub.pdf."

[274] UP Reply workpapers "Human Time Study-Env Aspect.pdf," "INDOT Hwy Production Study-selected pages pdf," and "Productivity Losses-Weather pdf."

[275] UP Reply workpaper "RS Means Pages_IX&X.pdf."

Decreased productivity due to cold temperatures is well documented[276] Work crews performing labor outdoors in extreme cold are less efficient than in more temperate weather. Similarly, equipment requires more time to do the same work because machinery takes longer to start and hydraulics take longer to warm up to efficient operating levels.[277]

Sub-freezing temperatures also cause problems with construction materials. Materials from one day's operation freeze overnight, requiring additional time the following day to thaw and dry (or additional costs to replace it).[278] For example, the moisture in ballast and subballast freezes, turning the entire mass into a solid block. Unloading the material becomes virtually impossible without arranging for the railcars to be heated, which is impractical in the field. Similarly, water used in compacting subballast freezes, making it difficult to reach the necessary moisture levels to produce the proper density necessary to distribute adequately axle loads.

Even when the temperature is above freezing, there are significant problems with track construction. Whenever the ambient air temperature falls below 40° F, concrete will not set unless it is heated and cured under insulated blankets or controlled heated air.[279] Track laid in winter will expand when the temperature increases in the spring, even when rail heaters are used.[280] Rail therefore must be adjusted in the spring or summer.[281] Failure to do so can lead to "buckled track" derailments.[282]

---

[276] UP Reply workpapers "Human Time Study-Env Aspects.pdf," "INDOT Hwy Production Study-selected pages pdf," and "Productivity Losses-Weather.pdf."

[277] UP Reply workpaper "Memo Winter Working Conditions Al Lee 090803 RCP 2011 pdf"

[278] UP Reply workpaper "UP GRADING DURING FREEZING.pdf."

[279] UP Reply workpaper "UP REIN CONC pdf."

[280] UP Reply workpaper "UP Track Buckling Prevention pdf."

[281] *Id*

[282] *Id.*

To quantify the costs due to cold temperatures, UP's engineering experts relied on the reference materials cited above[283] and records showing the weather conditions along the IRR route, including decrease in temperature due to wind chill[284] The weather conditions were quantified by month and by subdivision. Based on this data, UP's engineering experts determined that equipment and labor costs are 1.19 to 1.28 times higher (depending on the months of winter worked) for the Sharp and Lynndyl Subdivisions during the winter months.[285]

Table III.F.13
WINTER CONSTRUCTION COSTS[286]
(millions)

Item	IPA	Reply	Difference
1 Earthwork	0.0	4.5	4 5
2. Culverts	0.0	0 1	0.1
3. Track Labor	0.0	1 5	1.5
4. Subballast	0.0	0 5	0 5
Total	**0.0**	**$9.8**	**$9.8**

Source: UP Reply workpaper "III - F - TOTAL - 2012 UP Reply.xlsx."

The engineering experts then applied these multipliers to equipment when the temperature drops below freezing and to labor that must occur in the open air.[287] When RS Means costs or costs from other sources that identified cost breakdowns were used, the appropriate coefficient was applied to the line items When costs were derived from sources that do not identify separate costs (labor, equipment material), UP's engineering experts estimated the proportions of costs due to each type of cost based on similar construction methods listed in

[283] UP Reply workpapers "Human Time Study-Env Aspect.pdf," "INDOT Hwy Production Study-selected pages.pdf," and "Productivity Losses-Weather.pdf"

[284] UP Reply workpapers "SHARP SUB weather data.pdf," "LYNNDYL SUB weather data.pdf," and "Climatic Data Winter Months.xls."

[285] UP Reply workpaper "IRR Winter Costs by Subdivision.xls."

[286] UP Reply workpaper "IRR Grading Opening UP Reply xlsx "

[287] UP Reply workpaper "Productivity Losses-Weather.pdf," Figure 5-1.

RS Means. The total effect of cold weather was then calculated using the adjusted unit costs. minus the material cost for that item for winter months shown in IPA's construction schedule.[288]

The total additional cost due to productivity losses during winter months totals $9.8 million or roughly 2.6 percent of the total roadbed construction costs.[289]

---

[288] IPA Opening workpaper "Construction Schedule 11-20-12.xlsx."

[289] UP Reply workpaper "IRR Winter Costs by Subdivision xls "

III. G. DISCOUNTED CASH FLOW ANALYSIS

IPA's discounted cash flow ("DCF") model departs from the Board's standard DCF application in several respects.[1]

1. Cost of Capital

IPA used the railroad industry's cost of capital for the first two years (2010 and 2011) of the SARR's construction as determined by the Board. Because the Board's 2012 cost of capital determination is not yet available, IPA used the 2011 cost of equity and cost of debt as a proxy for 2012. UP accepts this approach

2. Equity Flotation Costs

Until 2007, the Board had rejected arguments by railroad defendants in SAC cases that the costs of raising the equity necessary to finance the construction of the SARR must be included in the SAC cost analysis. The Board's rationale was that there was not sufficient evidence of the "existence and size of equity flotation fees associated with equity issuances of a similar size."[2] In 2007, the Board changed its approach. In the SAC case involving AEP Texas, AEP Texas objected to the evidence submitted by BNSF Railway as to the size of an appropriate equity flotation fee and argued that the best evidence of the existence and size of an equity financing fee for a major railroad project was set forth in the ICC's railroad industry cost of capital determination for the year 1991, in which the ICC acknowledged that the Burlington Northern Railroad had incurred equity flotation costs of about 3.9 percent in 1991 in connection

[1] IPA has also improperly changed the Board's long-standing debt amortization practice, which UP addresses in Section III.H.

[2] *Pub Serv Co of Colo. D/B/A Xcel Energy v. Burlington N. & Santa Fe. Ry.*, 7 S.T.B. 589, 659 (2004).

with the issuance of over ten million shares of new common stock.[3] However, AEP Texas argued that the Board should treat that evidence of equity flotation fees in the SAC analysis the same way those fees were treated in the 1991 cost of capital determination, *i e.*, by spreading the impact of the equity flotation fees across the entire railroad industry.[4] The Board agreed with AEP Texas.[5]

IPA ignored the Board's decision in *AEP Texas North* and failed to include any costs associated with the raising of the financing necessary to construct and operate IRR in its SAC evidence. UP believes that IRR is responsible for its cost of raising equity and also believes that the Burlington Northern 1991 experience is a fair representation of the necessary costs UP also recognizes that the Burlington Northern stock issuance occurred over 20 years ago and reflects market conditions associated with those times. In *AEPCO*, the Board rejected the defendants' arguments regarding equity flotation costs because they did not provide evidence of the required equity-flotation fee for a stock issuance of a similar size as that needed by the SARR [6] IRR will need to raise approximately $400 million in equity. UP has identified several IPOs that took place in 2012 of roughly the size of IRR's. On average these companies involved paid equity-flotation fees of 7.3 percent.[7] UP therefore relies for its reply upon the experience of those companies to add equity flotation costs for IRR of 7.3 percent.

---

[3] *See* Rebuttal Evidence of Complainant AEP Texas North Co. at III-G-4, *AEP Tex N Co. v BNSF Ry*, STB Docket No 41191 (Sub-No. 1) (July 27, 2004).

[4] *Id*

[5] *See AEP Tex N Co. v BNSF Ry*, STB Docket No 41191 (Sub-No. 1), slip op. at 108 (STB served Sept. 10, 2007) ("*AEP Texas North*")

[6] *See Ariz. Elec Power Coop., Inc v BNSF Ry*, STB Docket No. 42113, slip op. at 138 (STB served Nov. 22, 2011).

[7] UP Reply workpaper "Equity Flotation xlsx."

UP also believes that the Board incorrectly concluded in *AEP Texas North* that the cost of the equity flotation fee should be assessed to the SARR only to the extent the cost was reflected in a hypothetical change to the railroad industry cost of capital in the years in which the SARR needed to raise capital to finance construction of the SARR. For the reasons set out below, UP urges the Board to include the full 7.3 percent equity flotation fee in this case as a direct cost to IRR.

The SARR's cost to raise equity is a cost that is borne directly by the SARR, just like other direct costs associated with construction of the SARR The fee that must be paid to underwriters to raise the necessary financing is no different in kind from the fee that the SARR must pay to its engineers to design the SARR It is a cost incurred by a new entrant to construct and operate a major railroad project, and it should be reflected in the SAC analysis.

The Board's *AEP Texas North* approach effectively eliminates the impact of the equity flotation costs. In *AEP Texas North*, the Board multiplied the flotation cost percentage by the percentage that the SARR's market valuation was of the total railroad industry market value. The Board added this reduced cost to the weighted industry-average cost of equity capital This approach implicitly assumes that an equity flotation cost is associated only with a small percentage of the railroad industry equity. That assumption is erroneous Railroads have not recently raised equity but they incurred the flotation costs in the past when they did raise equity. The Board's approach assumes that the SARR can avoid all but a small percentage of the equity flotation costs that real world railroads have, a kind of reverse entry barrier In 1991, the Burlington Northern incurred equity flotation costs when it raised equity. While the railroad industry cost of capital increased slightly in that year to account for the flotation costs, the Burlington Northern incurred the full extent of the costs itself. By recognizing the SARR's equity flotation costs only to the extent that those costs would be reflected in the railroad industry cost of capital for a year in which the SARR is the only firm that raises equity, the Board is allowing the SARR to avoid responsibility for a cost that real world railroads incur.

In *AEP Texas North*, the Board claimed that its approach to equity flotation costs is consistent with its treatment of debt flotation fees[8] But that assertion is not correct. Debt flotation fees are in fact incurred by all railroads as they regularly raise debt. Therefore, the fees that a SARR would incur would be reflected in the debt component of the cost of capital for the railroad industry. In the context of the equity flotation fees, the SARR's costs are diluted because no other member of the industry raised equity in the year when the SARR raised the equity. In the area of debt, the SARR's costs would not be diluted because other railroads incur debt flotation fees in the year in which the SARR is assumed to incur those costs, and the costs are therefore reflected in the railroad industry cost of capital.

3. Inflation Indices

IPA used actual AAR cost indices and Global Insight's September 2012 forecasts to calculate annual inflation forecasts.[9] UP does not dispute IPA's road property asset and operating expense DCF inflation indexes derived from these sources and, consistent with Board precedent, updates those indices in circumstances where new actual and forecasted index values have become available.

4 Tax Liability

IPA's DCF incorporates four errors affecting the calculation of IRR income tax liability. First, IPA misapplied the guidelines relative to bonus depreciation and overstated the amount of the benefit that would be available to the IRR. Second, IPA incorrectly assumed this temporary

[8] *AEP Texas North*, slip op at 108.

[9] IPA Opening Nar. at III-G-11.

bonus depreciation measure would apply to IRR assets at the times of their replacements. Third, IPA used the wrong tax life for certain of the IRR road property assets. Fourth, IPA improperly changed the longstanding and critical assumption in the DCF model that, because the IRR cost of debt is locked in at the debt rate in place during the IRR construction period, the IRR debt is amortized over an assumed 20-year financing term. The first three errors are discussed in more detail in Section III.H.1.f below; the fourth error is discussed in more detail in Section III.H.1.d below. UP corrects these errors as explained in the referenced sections.

5. Capital Cost Recovery

IPA calculated the capital recovery cost of IRRs property using 10-year DCF period in accordance with the Boards decision in *Major Issues In Rail Rate Cases*, STB Ex Parte No. 657 (Sub-No. 1) (STB served Oct. 30, 2006). UP accepts IPA's capital recovery calculations except as set forth in other sections of UP's III.G and III.H reply evidence.

III H RESULTS OF SAC DCF ANALYSIS

In this section, UP discusses the results of its base SAC DCF analysis and the application of the Board's Maximum Markup Methodology ("MMM") and the Board's *PPL Montana/Otter Tail* cross-subsidy test[1] to the evidence in this case. UP also discusses the results that would be obtained if the Board were to adopt a cross-subsidy test that reflects the Board's post-*Otter Tail* adoption of ATC Finally, UP discusses the results that would be obtained if the Board were to adopt the alternatives for addressing IPA's exploitation of ATC and cross-over traffic that the Board proposed in *Rate Regulation Reforms*,[2] if the SAC test were conducted without any cross-over traffic, or if the Board were to use efficient component pricing as an alternative to ATC.

1. Results of SAC DCF Analysis

IPA used a variation of the Board's DCF model to estimate the revenue stream that IRR would need to cover its capital costs and provide a reasonable return on capital. UP identifies several problems with IPA's DCF model in Section III G. There are other problems with IPA's DCF inputs and assumptions that UP could have discussed in Section III.G; however, because IPA discussed these other issues in Section III.H, UP addresses them in Section III H as well The DCF implementation problems discussed here include IPA's improper change to the Board's standard debt amortization pattern, overstatement of the amount of bonus depreciation available to IRR, extension of the benefits of bonus depreciation to the replacement cost of assets as they reach the end of their useful lives, and use of the wrong tax depreciation lives for certain IRR road property assets. IPA also changed substantially the format of the standard DCF model that

[1] *See Otter Tail Power Co. v BNSF Ry.*, STB Docket No. 42071 (STB served Jan. 27, 2006) ("*Otter Tail*"); *PPL Montana, LLC v. Burlington N. & Santa Fe Ry.*, 6 S.T.B 286 (2002).

[2] *Rate Regulation Reforms*, STB Ex Parte No. 715 (STB served July 25, 2012).

has been used for the last several cases UP generally accepts IPA's modifications to the model, with minor exceptions noted below. UP's corrected DCF analyses are set out in Exhibit III.H-1.

a. Cost of Capital

As discussed in Section III G 2 above, IPA failed to include equity flotation costs in calculating the railroad cost of equity component. UP corrects this shortcoming and adds the costs to the total SAC, as shown in Table A of Exhibit III.H-1.

b. Road Property Investment Values

UP's calculations for road property investment values are detailed in Table C of Exhibit III H-1. UP replaces IPA's road property investments with those specified above in Section III.F. UP accepts IPA's IRR proposed construction schedule.

c. Interest During Construction

UP calculates interest during construction ("IDC") on construction funds outstanding during 2010, 2011, and 2012 using the same methodology as IPA

d. Amortization Schedule of Assets Purchased with Debt Capital

In its opening evidence, IPA proposed to change the Board's long-standing practice of amortizing SARR debt over 20 years.[3] However, IPA improperly assumes that IRR could be financed with a single debt instrument that has a 20-year term, while also assuming that the terms of the instrument would reflect the railroad industry cost of debt, which is calculated based in part on instruments with much shorter intervals to maturity, and thus correspondingly lower yields.

As justification for its proposed change, IPA asserts that a SARR's debt capital would mirror the type of debt instruments issued by US Class I railroads included in the Board's annual cost of capital determination, and it cites the Board's decision in *West Texas Utilities Co v.*

[3] IPA Opening Nar. at III-H-2 to III-H-3

Burlington Northern Railroad as supporting its claim.[4] IPA also suggests that more than 90 percent of the railroad industry debt consists of corporate bonds, notes, and debentures that incorporate coupon payments of interest, rather than periodic payments with principle and interest components.[5]

IPA's assertions are misleading in at least two respects. First, while the *WTU* decision supports the notion that a SARR's *cost* of debt should be based on the Board's cost of capital determinations, it also confirms that a SARR's debt financing establishes a set interest rate over a set time period.[6] The Board's DCF in that decision also amortized SARR debt over twenty years.[7]

Second, and more importantly. IPA's proposed change to the type of debt instrument creates a disconnect with its assumption that IRR's cost of debt would reflect the railroad industry's cost of debt. When the Association of American Railroads ("AAR") calculates the railroad industry cost of debt for the Board's annual cost of capital determination, it calculates the average yield of the bonds, notes, and debentures that were traded during the year. These bonds, notes, and debentures include instruments with relatively short intervals to maturity and correspondingly low yields, and those with longer intervals to maturity and correspondingly higher yields. Table III.H.1 below segregates the 2011 traded debt instruments that the AAR used in its calculations between those with yields below the 2011 average yield of 3.91 percent and those with yields above the average.

---

[4] *Id* at III-H-2 (citing *West Tex Utils. Co. v Burlington N.R R* , 1 S.T.B. 638, 712 (1996)).
[5] *Id* at III-H-3
[6] *See WTU*. 1 S.T.B at 712.
[7] *Id* at 713.

Table III.H.1
Breakdown of AAR 2011 Cost of Debt
Between Those With Yields Below and Above the Average Yield
($ millions)

2011 Instruments	Count	Market Value	Weight	Weighted Avg. Yield	Maturity Range	Weighted Avg. Years to Maturity
Below Avg.	28	$11,516 7	51.01%	2.82%	2013-2020	6.0
Above Avg.	40	$11,062.4	48.99%	5.05%	2020-2111	29.3
Combined	68	$22,579.1	100 00%	3.91%		17.4

Source· UP Reply workpaper "AAR 2011 Cost of Capital Debt Details xlsx."

Table III.H.1 shows that 28 of the 68 debt instruments used by the AAR to determine the 2011 railroad industry average cost of debt have yields below the average, with an average yield of 2 82 percent, and that these instruments will mature and be paid in full in an average of 6.0 years. If, as IPA suggests, IRR were financed with a single note with a 20-year term and a maturity date of 2032, then the interest rate would have to be recalculated to reflect the longer term nature of the financing because, as demonstrated above, longer term debt carries a higher than average interest rate By contrast, the long-standing assumption in the DCF model that debt will be amortized over a 20-year period, rather than that the principle will be paid in full at maturity, incorporates the concept that the cost of debt will reflect a mix that includes some instruments with shorter terms until maturity. In other words. IPA's decision to use the railroad industry average cost of debt and the accompanying mix of short and long term maturities is consistent with the long-standing assumption in the DCF model that debt will be amortized throughout the 20-year period. not with an assumption that IRR could be financed with a note under which no principal would be paid for 20 years Thus IPA's attempt to claim a lower interest rate associated with a diversified mix of maturity dates that average less than 20 years. while assuming use of a note with a 20-year term should be rejected as improper The current debt amortization schedule in the DCF was first introduced by the Interstate Commerce

Commission ("ICC") in its 1990 decision in *Coal Trading Corp v. Baltimore & Ohio Railroad.*[8] That amortization assumption is consistent both with the AAR's calculation of the average debt yield and with the maturity schedules of the underlying instruments.

e Present Value of Replacement Cost

UP makes three modifications to IPA's calculation of the replacement cost of IRR assets Two of the corrections relate to the DCF replacement cost calculations of tax depreciation-related items that are discussed more fully below in Section III.H.1.f. First, UP eliminates IPA's overstatement of the tax benefit that IRR would receive from bonus depreciation, which resulted from IPA's improper assumption that current temporary bonus depreciation allowances would be available decades in the future at the time IRR assets are scheduled to be replaced Second, UP corrects IPA's erroneous use of 15 years rather than 20 years as the assumed tax depreciation lives for certain IRR assets Third, UP corrects an error that stems from IPA's elimination of the long-standing assumption that SARR debt would be amortized over 20 years discussed in Section III.H 1 d above Specifically, IPA eliminated the calculation of the future tax benefits available from tax deductible interest payments in the "Replacement-Depreciation" tab of the DCF model because under its proposed approach. these payments are already counted in the Investment SAC tab. UP reestablishes the Board's original DCF assumption that the new debt acquired for future asset replacement would be amortized over 20 years.[9]

[8] *Coal Trading Corp. v. Balt. & Ohio R.R.*, 6 I.C.C.2d 361 (1990)

[9] With its restructuring of the DCF model. IPA created a flag on the Inputs tab for whether or not Interest During Construction ("IDC") is calculated in the Investment SAC This flag however drives not just IDC, but also whether debt interest is calculated at all on replacement assets. UP corrected the label on the Inputs tab to accurately describe the function

f Tax Depreciation Schedules

IPA's tax depreciation schedules contain three errors. First, IPA assumed that IRR would take full advantage of the bonus depreciation benefit for all road property assets as a lump sum in the first year of operation. IPA assumes that $180 million of the IRR's road property investment, or more than 50 percent of IRR depreciable investment, would be written off in the first year of IRR operation as bonus depreciation.[10] In *AEPCO*, the Board expressed skepticism as to whether bonus depreciation allowed under the prior and current tax law should be allowed in SAC presentations.[11] UP agrees that allowing a SARR to take full advantage of temporary tax provisions that seemingly allow bonus depreciation for virtually all SARR assets placed in service would inappropriately place the SARR at an unfair *advantage* relative to the incumbent. This is because, unlike the SARR, which benefits from the stand-alone assumption of unconstrained resources that allows all SARR construction to occur during the temporary bonus depreciation tax window, UP built its system and periodically replaces components of its system over many years.[12] As such, UP's ability to take advantage of the limited window of opportunity for bonus depreciation is constrained. To allow a SARR to obtain an oversized benefit from a temporary tax shelter because of a simplifying stand-alone cost assumption would result in a reverse barrier to entry that would bestow cost savings to a new hypothetical entrant that were not available to the incumbent. This is precisely the sort of abuse of bonus depreciation that concerned the Board in *AEPCO*.[13]

[10] IPA Opening Nar. at III-H-5 to III-H-6; IPA Opening Exh III-H-1, Tab "Tax Depreciation."

[11] *See Ariz. Elec. Power Coop., Inc. v BNSF Ry.*, STB Docket No. 42113, slip op. at 141-42 (STB served Nov 22, 2011) (*AEPCO November 2011*).

[12] The bonus depreciation provisions on which IPA relies apply to certain investments made between 2008 and December 31, 2012 IPA Opening Nar. III-H-5 to III-H-6

[13] *AEPCO November 2011*, slip op at 141-42.

UP corrects this abuse by assuming that IRR would enjoy the benefits of bonus depreciation only to the extent that UP itself has been able to enjoy such benefits. Specifically, using its tax returns. UP calculates that it enjoyed system-wide bonus depreciation benefits over the 2008 through 2011 time period totaling $5.1 billion. Since 2012 tax filings are not yet available, UP estimated its 2012 bonus depreciation benefits to be $1.2 billion based on asset additions reported in its 10-K [14] Because IRR replicates only 0.55 percent of the UP network on a route-mile basis,[15] UP limits the amount of bonus depreciation available to IRR to 0.55 percent of UP's total 2008-2012 benefit of $6 3 billion, or $34.6 million.

Second, as identified in Section III.H.1.e above, IPA assumed that the bonus depreciation benefit, which is not applicable to assets placed in service after January 1, 2013, will be available in perpetuity [16] Specifically, IPA modified the "Replacement-Depreciation" tab of the Board's DCF model to apply 50 percent bonus depreciation to assets replaced at the end of their projected useful lives. The shortest lived IRR road property asset – ties – has an average service life of 21 years. The DCF assumes that IRR will incur the investment required to replace ties in the year 2033, well after the temporary bonus depreciation benefit is scheduled to expire UP removes the bonus depreciation benefit from the asset replacement tabs of the DCF in its reply evidence.

Third, as identified in Section III.H 1.c above, IPA's tax depreciation schedules used the wrong tax depreciation lives for certain of IRR's road property assets.[17] Specifically, IPA assumes certain accounts to qualify for 15-year lives when, under IRS rules, they actually qualify

[14] UP Reply workpaper "Bonus Depreciation xlsx "

[15] IPA assumes IRR replaces UP for 175 of UP's 2012 reported total route miles of 31,868, or 0 55 percent of the full UP network.

[16] IPA Opening Nar at III-H-5. UP provides the applicable IRS rules in its workpapers. UP Reply workpaper "GPO_IRS_26_168_K_2.pdf"

[17] IPA Opening Nar. at III-H-4 to III-H-5.

as 20-year properties. Section 168(e) of the Internal Revenue Code specifies the rules for the classification of property for purposes of computing the cost recovery allowance provided by the Modified Accelerated Cost Recovery System ("MACRS") – the tax depreciation system used in the United States. Property is classified according to class life as determined in Revenue Procedure 87-56 unless statutorily classified otherwise in Code Section 168[18] There are no exceptions to this rule The following assets are specifically listed under asset class 40.2, each carrying a 20-year tax life.

- Account 6 - Bridge & Trestles
- Account 13 - Fences & Roadway Signs
- Account 17 - Roadway Buildings
- Account 19 - Fuel Stations
- Account 20 - Shops & Enginehouses
- Account 39 - Public Improvements

For each of these asset categories, UP changes the depreciation period from 15 years to 20 years and updates the depreciation percentages to comply with the proper 20-year MACRS table.

g. Average Annual Inflation in Asset Prices

UP accepts IPA's inflation assumptions for assets

h. Discounted Cash Flow

UP corrects IPA's calculation of the terminal value of the SARR as of year 10 to capture properly the timing of the use of the tax benefits beyond year 10.

In its opening evidence, IPA claimed to have identified a flaw in the Board's DCF model. IPA observes that the DCF model explicitly assumes that the SARR's capital structure will remain constant in perpetuity.[19] This means that the amounts of common equity and debt carried

[18] UP Reply workpaper "IRC 168.pdf."

[19] IPA Opening Nar. at III-H-8 to III-H-9

on the IRR's financial statements will remain the same forever. However, the Board's DCF model assumes that after year 20, and until the first assets are replaced in the replacement round of the DCF model, the railroad has no debt and no tax shielding interest payments. Stated differently, the model assumes, from a tax payment perspective, that the railroad is 100 percent equity financed after year 20 and before its first replacement cycle. According to IPA, this creates an irreconcilable mismatch between IRR's cost of capital and its cash flows The cost of capital assumes that IRR is carrying debt and its associated interest payments, but the cash flows reflect no benefits from the interest tax shields.

IPA proposes to correct the perceived mismatch by assuming that interest payments would continue beyond year 20 and in perpetuity, contrary to long-established Board precedent and contrary to its own explicit assumption that the term of the IRR debt is 20 years.[20]

The mismatch "discovered" by IPA has been a mainstay of the Board's DCF model since *Coal Trading* and *McCarty Farms*.[21] And, it was affirmed by the Board in *Major Issues In Rail Rate Cases*, where shippers' proposal to change to the amortization of debt assumptions in the DCF model was rejected by the Board as beyond the scope of the proceeding[22] IPA's improper attempts to again raise the issue in the context of this proceeding should be similarly rejected.

Further, contrary to its assertion. IPA's proposed solution – to extend the IRR interest payment in perpetuity – does not remedy the perceived mismatch As discussed above in Section III.H.1 d. the IRR cost of debt is locked in at the rates in place during the IRR construction period, and the rates are based on a collection of short and long term debt instruments. IPA's

---

[20] *Id* at III-H-9.

[21] *McCarty Farms. Inc. v Burlington N , Inc.*, 2 S.T B. 460 (1997)

[22] *Major Issues In Rail Rate Cases*, STB Ex Parte No. 657 (Sub-No 1), slip op. at 65 (STB served Oct. 30, 2006) ("*Major Issues*")

assumption that these rates will remain in effect in perpetuity creates a new mismatch between the interest rate and the debt term.

If the Board were so inclined, the correct way to eliminate the perceived mismatch raised by IPA would be to revert to the ICC's approach in *Coal Trading* and recalculate the IRR capital structure as the debt is amortized. In *Coal Trading*, the ICC agreed with defendants' position that the DCF debt to equity ratio would not remain constant and that, as the SARR amortized debt, the debt to equity ratio will change, resulting in a greater portion being equity capital.[23] This approach would maintain both the relationship between the locked in debt rate and the terms associated with those rates and make the capital structure consistent with the debt amortization schedule. A version of the DCF model implementing such a change is included in UP's workpapers.[24]

I. Computation of Tax Liability – Taxable Income

UP accepts IPA's assumed federal tax rate of 35 percent and Utah state income tax rate of five percent.

J. Operating Expenses

UP updates the base year operating expenses in the DCF model as detailed in Section III.D above. For the annual adjustment of operating expenses, IPA used ton-miles instead of the Board's standard use of tons, purportedly to more accurately account for the mix of traffic on IRR.[25]

UP rejects IPA's use of ton-miles and instead indexes IRR operating expenses based on annual changes in car-miles. Use of ton-miles to index changes in IRR operating expenses

---

[23] *Coal Trading*, 6 I.C.C. at 427.

[24] UP Reply workpaper "Alternative DCF.xlsm."

[25] IPA Opening Nar. at III-H-12.

overweighs changes to coal traffic volumes – which IPA and the EIA forecast to be relatively flat[26] – and underweighs intermodal – the lightest traffic – for which relatively high volume growth is projected. IRR car-miles provide a more accurate metric than ton-miles for adjusting operating expenses for changes in volume for a SARR with a diverse traffic base that has very different forecasted volume growth. In using car-miles, UP relies upon the flat-car miles for intermodal shipments, which tempers their impact more than if container miles were used.

UP makes one other correction to IPA's IRR operating expenses. UP corrects IPA's distribution of IRR startup and training expenses to include all startup and training costs. IPA added IRR startup and training costs to the year 1 (2012) general and administrative expenses.[27] But because IRR is assumed to commence operations November 2, 2012, only one-sixth of the full year 2012 operating expenses, including startup expenses are applied to IRR. IRR provides no explanation of why most of the startup costs should be eliminated, and indeed there is no reason. UP corrects IPA's DCF to treat startup and training costs as an annual operating expense spread over the first full year of SARR operations, consistent with Board precedent.[28] UP divides the annual startup and training expense by twelve months and spread the monthly expenses evenly over the first twelve months of IRR operations.[29]

---

[26] In fact, there is an excellent chance that coal traffic volume on the IRR will decline significantly. NV Energy has recently announced that it plans to accelerate its switch from coal to natural gas at three units of its units at Moapa to 2014 and another to 2017. UP Reply workpaper "NV Energy Shutdown pdf." The Moapa coal represents twelve percent of IRR base-year coal tonnage.

[27] IPA Opening Exh. III-H-1, Tab "Operating SAC."

[28] *Pub Serv. Co of Colo D/B/A Xcel Energy v. Burlington N Santa Fe Ry*. 7 S.T.B. 589, 658 (2004).

[29] UP Reply workpaper "Exhibit III-H-1 Reply.xlsm," Tab "Operating SAC."

k. Summary of SAC Analysis

UP's stand-alone costs and revenues for IRR are presented in Table L of UP Reply Exhibit III.H-1 on a quarterly and annual basis and summarized in Table III.H.2 below.

Table III.H.2
Summary of DCF Results – 2012 to 2022
($ millions)

Year (1)	Annual Stand-Alone Requirement (2)	Stand-Alone Revenues (3)	Overpayments or Shortfalls (4)	PV Difference (5)	Cumulative PV Difference (6)
2012	$20 7	$14.3	-$6 4	-$6.5	-$6.5
2013	127 9	88 2	-39 8	-36.7	-43 2
2014	130 0	90.1	-39.9	-33.0	-76 2
2015	134.3	92.9	-41 4	-30 8	-107.0
2016	138.3	94.1	-44 2	-29.4	-136 4
2017	144.7	100.0	-44.8	-26.8	-163 2
2018	150.7	104.7	-46.1	-24.7	-188 0
2019	156 2	107.9	-48 3	-23.3	-211 2
2020	161.6	112.0	-49.6	-21.5	-232.7
2021	166.4	115 9	-50.5	-19 6	-252.3
2022	143.0	100.5	-42.6	-14.8	-267.2

Source: Exhibit III H-1

The results in Table III.H.2 show that the revenues available to the SARR are not sufficient to cover the full SAC costs of the SARR over the ten-year analysis period In fact, IRR would experience a cumulative revenue shortfall of $267 million. Thus, IPA has not demonstrated that the challenged rates are unreasonably high.

Additionally, UP presents full SAC results for various traffic and revenue scenarios that are discussed further in Section III A In each of these scenarios the IRR would experience a significant cumulative revenue shortfall. The results are summarized in Table III.H.3 below.

Table III.H.3
Summary of DCF Results – Additional Scenarios
($ millions)

	Alternative Scenario	Description	Cumulative PV Overpayments/ Shortfall
1	EP 715 Proposal 1	Traffic limited to SARR-originated or SARR-terminated	-$275 8
2	EP 715 Proposal 2	Traffic limited to UP trainload service	-244 1
3	No crossover	Traffic limited to local SARR traffic, including UP interchange points	-271.8
4	Efficient Component Pricing (ECP)	Crossover traffic is assigned sufficient revenue to cover UP's URCS variable costs only	-499.2

2 Maximum Rate Calculations

If the Board carries out a SAC analysis based on UP's reply evidence, it will have no reason to apply MMM. However, if the Board finds that IRR's SAC revenues exceed its SAC costs, it should apply MMM by developing the variable costs used to calculate the revenue-to-variable cost ("R/VC") ratio for the movements in the traffic group in accordance with the costing methodology that it ordered the parties to apply in *AEPCO* [30]

The Board developed MMM to "allocate the total SAC costs among all of the movements in the traffic group to determine if the challenged rate is unreasonably high, and if so by how much."[31] The allocation of SAC costs is based on each movement's "relative share of the services provided, as measured by URCS variable costs."[32] MMM calculates a maximum revenue-to variable cost ratio that limits the contribution from any single movement to a prescribed ratio based on each movement's "share of the services provided "

---

[30] *See Ariz Elec. Power Coop., Inc. v. BNSF Ry*, STB Docket No. 42113, slip op. at 2 (STB served June 27, 2011) ("*AEPCO June 2011*")

[31] *Major Issues*, slip op at 9.

[32] *Id* at 14

Logically, each movement's share of services provided should be based on the SARR's costs because MMM is allocating the costs of services provided by the SARR. However, because of IRR's relatively small size and a traffic base that consists primarily of trainload service, there is not likely to be a wide variance between costs distributed using a SARR specific URCS and those distributed with a proper implementation of UP system-average URCS.

In *AEPCO*, the Board recognized that a "mismatch" would occur where, as occurred in that case, a complainant posits a SARR that would move traffic in trainload service, but calculates the variable costs for that traffic using defendant's costs as though the traffic was moved in carload and multi-car service.[33] The Board therefore ordered the parties to revise their variable cost calculations for carload and multi-car shipments to account for the efficient, low-cost characteristics of those movements over the portion of the through movement replicated by the SARR.[34]

Like the complainant in *AEPCO*, IPA designed its SARR so that carload and multi-car shipments would move in intact trainloads over the portion of the through movement replicated by the SARR. Accordingly, if the Board reaches the MMM portion of its rate reasonableness analysis, it should, at a minimum, apply MMM using the costing approach it identified in *AEPCO*.[35]

IPA's application of MMM in this case ignored the Board's decision in *AEPCO*. To illustrate the potential impact of this issue, UP reruns IPA's MMM model following the Board's instructions to the parties in *AEPCO* to have MMM variable costs reflect the proposed operations

---

[33] *AEPCO June 2011*, slip op. at 2.

[34] *Id.*

[35] UP continues to believe that the correct means of applying the theory behind MMM is to use the SARR's costs.

on the SARR. Specifically, UP costs the overhead IRR intermodal and merchandise shipments as unit train shipments, with a corresponding substitution of actual empty return ratios for the URCS unit train default assumption of two.

In addition to its failure to adhere to the Board's instructions in *AEPCO* regarding the matching of MMM costing assumptions with the service provided by IRR, IPA's MMM run contained an implementation error Even though UP's reply evidence demonstrates that IRR costs exceed revenues by a substantial margin over the ten-year DCF period, UP develops an MMM model template that corrects the IPA MMM model's error

Specifically, IPA used the wrong index to adjust the MMM URCS costs for the years 2012 through 2022 Instead of using the RCAF-A as instructed by the Board in its 2009 decision in *AEP Texas North*,[36] IPA relies on a strained interpretation of the Board's decision in *OG&E*[37] and uses the Board's standard URCS indexing approach in its MMM runs.[38] The *OG&E* decision involved short term indexing of URCS costs to inflate only for specific quarters within one year. and not across years. In that proceeding. longer run productivity is reflected in each subsequent year's URCS release. The IPA MMM model, on the other hand, is forecasting ten years into the future from a single year's URCS UP follows the Board's *AEP Texas North* guidance and uses a forecast of the RCAF-A as the basis for forecasts to forecast variable costs in the MMM model

Table III H.4 below compares IPA's opening maximum R/VC ratios derived from its MMM model with the MMM R/VC ratios generated when the merchandise and intermodal IRR

[36] *AEP Tex. N Co. v. BNSF Ry.*, STB Docket No. 41191 (Sub-No 1), slip op. at 14 (STB served May 15, 2009)

[37] *Oklahoma Gas & Elec Co v. Union Pac. R.R.*. STB Docket No 42111 (STB served July 24, 2009).

[38] IPA Opening Nar. at III-H-12.

shipments are costed consistent with the service provided by the IRR and with the correct index used for URCS variable costs.

Table III.H.4
IPA MMM Results Corrected to Reflect Service Provided by IRR

Year	IPA Maximum R/VC	Corrected Maximum R/VC
2012	218 0	232.4
2013	219.3	233 5
2014	199.5	216 0
2015	193.8	212 0
2016	189.3	206.6
2017	186 3	203 5
2018	185.2	202.0
2019	183.5	201.3
2020	178.7	197.1
2021	177.4	198.1
2022	177 0	199.8

Source: UP Reply workpaper "IPA MMM with RCAF-A and AEPCO Move Types.xlsm "

3. <u>Cross-Subsidy</u>

Even if the Board were to conclude that SARR revenues exceeded SARR costs, it would still have to analyze the SARR for potential cross-subsidies before it could award any relief to IPA. In this section, UP discusses application of the Board's *PPL Montana/Otter Tail* cross-subsidy test and proposes an alternative test that is more appropriate in light of the Board's adoption of ATC.

The Board's threshold internal cross-subsidy analysis is designed to ensure that a shipper does not prevail in a SAC case by relying on a SAC presentation that creates a cross-subsidy in favor of the issue traffic. As the Board has explained, a shipper cannot "prove an impermissible cross-subsidy by shifting 'responsibility for paying for facilities it uses to other shippers who do not benefit from those facilities.'"[39] Because the IRR traffic group includes traffic moving on the IRR line segment between Milford and Lynndyl that does not share any facilities with the IPA issue traffic moving on the IRR lines between Provo and Lynndyl, UP administered the threshold internal cross-subsidy test to the IRR lines between Provo and Lynndyl

UP's workpapers illustrate how, in the event the Board were to find that IRR revenues exceed costs, the threshold internal cross-subsidy analysis should be performed Because UP's reply SAC analysis does not result in overpayments, UP's illustration applies the procedures and assumptions the Board used in *Otter Tail* to IRR revenues and costs presented in IPA's opening evidence UP first estimates the road-property investment that is attributable to the Lynndyl-Provo portion of the IRR system. UP then estimates the portion of each operating expense category that should be attributed to traffic that moves over any portion of the Lynndyl-Provo segment, using a bottom-up approach to calculate direct operating expenses,[40] and an URCS-based approach to calculate indirect operating expenses,[41] just as the Board did in *Otter Tail* (without any further refinements to the Board's approach).[42] Finally, UP performs a DCF analysis for the Lynndyl-Provo part, which shows that overpayments are reduced from $171.3 million for the full SARR to $114 5 million for the cross-subsidy segment

The next step of the Board's *PPL Montana/Otter Tail* test would be to apply MMM to the results of the first stage of its analysis to determine whether traffic using only the Milford-Lynndyl segment is responsible for reducing the prescribed MMM ratio. As the Board has

[39] *Otter Tail*, slip op. at 24 (quoting *PPL Montana, LLC v. Burlington N & Santa Fe Ry.*, 6 S.T.B. 752, 757-58 (2003)).

[40] UP Reply workpaper "IRR Operating Expense XSub_Open.xlsx."

[41] UP Reply workpaper " Exhibit III-H-1 Opening Cross Subsidy.xlsm," Tab "Indirect Expenses."

[42] *See Otter Tail*, slip op. at 25-29.

explained, its "cross-subsidy analysis serves as both a threshold inquiry and a limit on potential rate relief."[43] UP ran the cross-subsidy DCF results through the MMM model, and the results are summarized in Table III H 5 below.

Table III.H.5
IPA Cross-Subsidy MMM Results

Year	IPA Maximum R/VC	Cross-Subsidy R/VC
2012	218.0	221.1
2013	219 3	217.0
2014	199.5	212.6
2015	193.8	214.2
2016	189.3	213.3
2017	186.3	211 7
2018	185 2	212.1
2019	183.5	212.4
2020	178 7	205.8
2021	177 4	208.6
2022	177.0	212.5

Source: UP Reply workpaper "IPA Cross-Subsidy MMM.xlsm."

This analysis shows that the SARR traffic that uses only the Milford-Lynndyl segment is responsible for reducing the maximum R/VC levels produced by the application of MMM It shows that, without cross-subsidization from traffic using only the Milford-Lynndyl segment, the R/VC ratio for the issue traffic would have to be an average of 21 2 percentage points higher than the R/VC ratios that IPA claims would be the maximum R/VC ratios for the issue traffic, including 35 5 percentage points higher by the final year of the analysis The additional reduction to the R/VC ratio is a result of traffic that uses only the Milford-Lynndyl segment and reflects an impermissible cross-subsidy of the issue traffic

While these results demonstrate a clear cross-subsidy of the issue traffic. UP believes the Board's *PPL Montana/Otter Tail* test does not fully capture the extent to which traffic moving

[43] *Otter Tail*, slip op at 11

on SARR segments not used by the issue traffic can inappropriately lower prescribed MMM R/VC levels.

The Board's adoption of ATC provides the Board with a more direct means of testing for the presence of a cross-subsidy than was possible when it adopted the *PPL Montana/Otter Tail* test, at least if the Board believes ATC accurately assigns revenue to line segments: the Board should determine whether the Provo-Lynndyl segment would be self-supporting based on the revenues allocated to that segment by ATC.

Under the *PPL Montana/Otter Tail* test, the Board asks whether a SARR's core facilities (*i.e.*, the facilities used by the issue traffic) rely on revenues from traffic that uses only the SARR's "secondary" facilities (*i.e.*, the facilities not used by the SARR traffic). In performing that analysis, the test assigns all the contribution above the SARR operating expenses from cross-over traffic that uses both core and secondary facilities to the core facilities and it asks whether the contribution would be sufficient to cover the collective attributable costs of building the core facilities.[44] The Board's assignment of all the cross-over contribution to the core facilities arguably was justified at that time because the Board's then-existing method of allocating cross-over revenue between various portions of a movement – a modified mileage prorate – was not sensitive to the amount of traffic available to share the fixed costs of a particular segment and thus could not reliably be used to allocate revenues in concert with attributable stand-alone cost for a particular segment. But ATC was adopted to address that very issue.[45] Indeed, in *Rate Regulation Reforms*, the Board reiterated the points that cross-over revenues should be allocated in accordance with the stand-alone costs for the facilities replicated

[44] *PPL Montana*, 6 S.T.B. at 296.

[45] *See Major Issues*, slip op. at 24-36.

by a SARR[46] and that it adopted ATC as the best method of performing that allocation short of requiring a "Full-SAC" analysis.[47] Accordingly, ATC's allocation of revenues between SARR core and secondary facilities should be used when conducting a cross-subsidy analysis.

To illustrate the potential impact of such a modified cross-subsidy test, UP tests for a potential cross-subsidy created by the Milford-Lynndyl segment using IPA's opening SAC and MMM evidence, adjusted only to limit the inquiry to the Lynndyl-to-Provo core segment. To perform this version of the cross-subsidy analysis, rather than attribute to the core segment the full revenue and operating expense for cross-over traffic that uses both the core and secondary facilities of the SARR, as is done under the Board's *PPL Montana/Otter Tail* test, UP re-ran ATC to isolate revenues for the Provo-Lynndyl segment, and only included expenses associated with that segment. As shown in Table III H.6 below, IRR would not fail the new cross-subsidy test outright, but the second stage of the test would impose a stricter limit on potential relief than the second stage of the *PPL Montana/Otter Tail* test.

[46] *See Rate Regulation Reforms*, slip op. at 6-7 ("Thus, to distribute revenues equitably in relation to the costs incurred to generate those revenues, the portion of the revenue allocated to those facilities replicated by the SARR ideally equals the total revenue from that movement, multiplied by the share of total SAC costs represented by the cross-over segments of the movement (i.e., multiplied by the ratio of the truncated SAC costs for the cross-over traffic to the Full-SAC costs for the cross-over traffic).").

[47] *See id* at 7 (explaining that the Board adopted ATC because requiring a "Full-SAC" analysis "would defeat the simplifying purpose of using cross-over traffic in the first place").

Table III.H.6
Summary of IPA Provo-Lynndyl Cross-Subsidy DCF Results – 2012 to 2022
($ millions)

Year (1)	Annual Stand-Alone Requirement (2)	Stand-Alone Revenues (3)	Overpayments or Shortfalls (4)	PV Difference (5)	Cumulative PV Difference (6)
2012	$6.1	$8.2	$2.1	$2.2	$2.2
2013	38 0	48 9	11.0	10.1	12 3
2014	39.3	50.7	11.4	9 5	21.7
2015	40.5	51 7	11.1	8.3	30.0
2016	41.9	52.6	10 7	7.2	37 2
2017	43.5	54.7	11 2	6.7	43.9
2018	45.0	55.7	10.8	5.8	49 7
2019	46.5	56.9	10.4	5 0	54.7
2020	48.4	60 3	11 9	5.2	59.9
2021	49.4	60.6	11.2	4.4	64.2
2022	42 2	50.7	8.5	3.0	67 2

Source: UP Reply workpaper "Exhibit III-H-1 Opening Cross Subsidy Provo Lynndyl.xlsm "

UP ran these DCF results through the MMM model, and as the table below demonstrates, the resulting R/VCs are significantly higher than for IPA's full SAC

Table III.H.7
Cross-Subsidy MMM Results on IPA's Opening

Year	IPA Maximum R/VC	Cross-subsidy R/VC	Provo-Lynndyl R/VC
2012	218.0	221 1	260.1
2013	219.3	217.0	261.1
2014	199.5	212.6	261.3
2015	193.8	214 2	265 4
2016	189.3	213 3	265 4
2017	186.3	211.7	263.1
2018	185.2	212.1	264.5
2019	183.5	212 4	267 7
2020	178 7	205 8	260 8
2021	177.4	208.6	266.8
2022	177.0	212 5	274.9

Source: UP Reply workpaper "IPA Cross Subsidy MMM Provo Lynndyl.xlsm."

If the Board concludes after evaluating IPA's and UP's evidence that SARR revenues exceed SARR costs, the Board should apply UP's proposed cross-subsidy test before awarding any relief.

MICHAEL R. BARANOWSKI

Mr. Baranowski is a Senior Managing Director at FTI Consulting, Inc., an economic and consulting firm with offices located at 1101 K Street, NW, Washington, DC 20005. Since 1980, Mr. Baranowski has been involved in various aspects of transportation analysis including operations, engineering, facility requirements, valuations and costing.

Mr. Baranowski holds a Bachelor of Science degree in accounting from Fairfield University in Fairfield, Connecticut. In 1980, he joined the consulting firm of Wyer, Dick and Company in Livingston, New Jersey as a consultant. He participated in a variety of studies for railroad, shipper and other clients including line abandonments, operations analysis, terminal switching studies, labor protection and rail facility and equipment valuation.

In late 1981, Mr. Baranowski became a consultant with Snavely, King and Associates with offices in Morristown, New Jersey and Washington, D.C. While at Snavely, King, he was involved in rail merger, traffic, switching, liquidation and valuation studies for a variety of rail and rail related clients. He was also responsible for engineering, operating and costing components in a number of Section 229 proceedings.

Mr. Baranowski joined Klick, Kent & Allen ("KK&A") in 1988 as a Senior Consultant. He became a principal of KK&A in 1989 and remained in that position until its acquisition by FTI in 1998.

Mr. Baranowski has presented testimony before the Interstate Commerce Commission, Surface Transportation Board, Federal Communications Commission, Federal Regulatory Commission and a variety of state regulatory agencies. Mr. Baranowski's curriculum vitae, which identifies representative engagements and cases in which he has sponsored expert testimony, is attached hereto.

Mr. Baranowski is sponsoring Sections III.G and III H of defendants' Reply Evidence. Mr. Baranowski has signed a verification of the truth of the statements contained therein. A copy of that verification is attached hereto.

VERIFICATION

I declare under penalty of perjury that I have read the Reply Evidence in this proceeding that I have sponsored, as described in the foregoing Statement of Qualifications, and that the contents thereof are true and correct. Further, I certify that I am qualified and authorized to sponsor this testimony.

Michael R. Baranowski

Executed on April 11, 2013

Michael R. Baranowski

Senior Managing Director – Economic Consulting

mike.baranowski@fticonsulting.com

FTI Consulting
1101 K Street, NW
Suite 8100
Washington DC 20005
Tel (202) 312-9100
Fax (202) 312-9101

Education
B.S. in Accounting, Fairfield University

Supplemental Finance Studies, Kean College

Mike Baranowski heads FTI's Network Industries Strategies practice and provides strategic, financial and economic consulting services to the telecommunications and railroad and pipeline transportation industries He has special expertise in analyzing and developing complex costing and cash flow models, conducting detailed operations analysis, and transportation engineering Much of his work involves providing oral and written expert testimony before courts, arbitration panels and regulatory bodies

He is a recognized expert in railroad regulatory economics and has assisted FTI's railroad clients in a broad range of litigation and regulatory engagements involving pricing of services, contract disputes, damage calculations and analyses of the specific effects of pending or proposed changes in policy or regulation

Some of Mr. Baranowski's representative experience includes

- Development of strategic litigation approach for large railroad rate proceedings based on the theory of Constrained Market Pricing and the Stand-Alone cost test Theory assumes the existence of a hypothetical, efficient competitor and involves detailed analysis of railroad operations, expenses, captial expenditures and revenues
- Development of a suite of modeling tools to assess the regulatory risk of railroad rates for a mix of commodities based on key cost drivers and forecasts
- Design and development of modeling tools designed to simulate the cost of competitive entry into local telecommunications markets and directing the efforts of a nationwide team of testifying experts presenting the cost model results in multiple proceedings across the country.
- Detailed analysis, critique and restatement of complex cost models developed for the railroad, telecommunications, pipeline and trucking industries
- Designing modeling tools for use in calculating the costs of competitive entry into railroad, telecommunications and pipeline markets
- Conducting detailed analyses of railroad operations and developing the associated capital requirements and operating expenses attributable to specific movements and the incremental capital and operating expense requirements attributable to major changes in anticipated traffic levels

Mr. Baranowski holds a B S in Accounting from Fairfield University in Fairfield, Connecticut and has pursued supplemental finance studies at Kean College in Union, New Jersey

TELECOMMUNICATIONS TESTIMONY

Federal Communications Commission

February 1998	File No E-98-05 AT&T Corp v. Bell Atlantic Corp Affidavit of Michael R. Baranowski
March 13, 1998	File No E-98-05. AT&T Corp v Bell Atlantic Corp. Supplemental Affidavit of Michael R. Baranowski
June 10, 1999	CC Docket No 96-98. Implementation of the Local Competition Provisions of the Telecommunications Act of 1996. Reply Affidavit of Michael R Baranowski, John C Klick and Brian F Pitkin.
July 25, 2001	CC Docket No 00-251, 00-218. In the Matter of Petition of AT&T Communications of Virginia, Inc and WorldCom, Inc., Pursuant to Section 252(e)(5) of the Communications Act, for Preemption of the Jurisdiction of the Virginia State Corporation Commission Regarding Interconnection Disputes with Verizon-Virginia, Inc. Panel
June 13, 2005	WC Docket No 05-25,RM-10593 In the Matter of Special Access Rates for Price Cap Local Exchange Carriers, AT&T Corp. Petition for Rulemaking to Reform Regulation of Incumbent Local Exchange Carrier Rates for Interstate Special Access Services, Joint Declaration on Behalf of SBC Communications, Inc
July 29, 2005	WC Docket No. 05-25;RM-10593 In the Matter of Special Access Rates for Price Cap Local Exchange Carriers; AT&T Corp Petition for Rulemaking to Reform Regulation of Incumbent Local Exchange Carrier Rates for Interstate Special Access Services, Joint Reply Declaration on Behalf of SBC Communications, Inc

Public Service Commission of Delaware

February 4, 1997	PSC Docket No 96-324. In the Matter of Bell Atlantic - Delaware Statement of Terms and Conditions Under Section 252(F) of the Telecommunications Act of 1996. Testimony of Michael R Baranowski

Public Service Commission of the District of Columbia

March 24, 1997	Formal Case No. 962. In the Matter of the Implementation of the District of Columbia Telecommunications Competition Act of 1996 Testimony of Michael R Baranowski
May 2, 1997	Formal Case No 962 In the Matter of the Implementation of the District of Columbia Telecommunications Competition Act of 1996. Rebuttal Testimony of Michael R Baranowski

Public Service Commission of the State of Maryland

March 7, 1997	Docket No 8731, Phase II In the Matter of the Petitions for Approval of Agreements and Arbitration of Unresolved Issues Arising Under Section 252 of the Telecommunications Act of 1996 Direct Testimony of Michael R Baranowski

April 4, 1997	Docket No 8731, Phase II. In the Matter of the Petitions for Approval of Agreements and Arbitration of Unresolved Issues Arising Under Section 252 of the Telecommunications Act of 1996 Rebuttal Testimony of Michael R Baranowski
May 25, 2001	Case No. 8879 In the Matter of the Investigation into Rates for Unbundled Network Elements Pursuant to the Telecommunications Act of 1996 Panel Testimony on Recurring Cost Issues

Public Service Commission of the State of Michigan

January 20, 2004	Case No U-13531 In the Matter, on the Commission's Own Motion to Review the Costs of Telecommunication Service Provided By SBC Michigan Initial Testimony of Michael R. Baranowski and Julie A Murphy
May 10, 2004	Case No. U-13531 In the Matter, on the Commission's Own Motion to Review the Costs of Telecommunication Service Provided By SBC Michigan Final Reply Testimony of Michael R. Baranowski and Julie A. Murphy

New Jersey Board of Public Utilities

December 20, 1996	Docket No TX 95120631. Notice of Investigation Local Exchange Competition for Telecommunications Services Rebuttal Testimony of John C Klick and Michael R Baranowski.

North Carolina Utilities Commission

March 9, 1998	Docket No. P-100, Sub 133d In the Matter of Establishment of Universal Support Mechanisms Pursuant to Section 254 of the Telecommunications Act of 1996 Rebuttal Testimony of Michael R. Baranowski.

Pennsylvania Public Utility Commission

January 13, 1997	Docket Nos. A-310203F0002 et al. MFS-III. Application of MFS Intelenet of Pennsylvania, Inc et Al. (Phase III) Rebuttal Testimony of Michael R. Baranowski.
February 21, 1997	Docket Nos A-310203F0002 et al MFS-III Application of MFS Intelenet of Pennsylvania, Inc et Al. (Phase III) Surrebuttal Testimony of Michael R. Baranowski
April 22, 1999	Docket Nos P-00991648, P-00991649 Petition of Senators and CLECs for Adoption of Partial Settlement and Joint Petition for Global Resolution of Telecommunications Proceedings Direct Testimony of Michael R Baranowski
January 11, 2002	Docket No R-00016683. Generic Investigation of Verizon Pennsylvania, Inc 's Unbundled Network Element Rates. Panel Testimony on Recurring Cost Issues

State Corporation Commission Commonwealth of Virginia

April 7, 1997	Case No PUC970005. Ex Parte to Determine Prices Bell Atlantic - Virginia, Inc Is Authorized To Charge Competing Local Exchange Carriers In Accordance With The Telecommunications Act of 1996 And Applicable State Law Affidavit of Michael R Baranowski
April 23, 1997	Case No. PUC970005. Ex Parte to Determine Prices Bell Atlantic - Virginia, Inc Is Authorized To Charge Competing Local Exchange Carriers In Accordance With The Telecommunications Act of 1996 And Applicable State Law. Direct Testimony of Michael R. Baranowski
June 10, 1997	Case No. PUC970005 Ex Parte to Determine Prices Bell Atlantic - Virginia, Inc Is Authorized To Charge Competing Local Exchange Carriers In Accordance With The Telecommunications Act of 1996 And Applicable State Law Rebuttal Testimony of Michael R Baranowski

Washington State Utilities and Transportation Commission

December 22, 2003	Docket No. UT-033044. In the Matter of the Petition of Qwest Corporation To Initiate a Mass-Market Switching and Dedicated Transport Case Pursuant to the Triennial Review Order Direct Testimony of Michael R Baranowski
February 2, 2004	Docket No UT-033044 In the Matter of the Petition of Qwest Corporation To Initiate a Mass-Market Switching and Dedicated Transport Case Pursuant to the Triennial Review Order Response Testimony of Michael R. Baranowski

Public Service Commission of West Virginia

February 13, 1997	Case Nos 96-1516-T-PC, 96-1561-T-PC, 96-1009-T-PC, 96-1533-T-T Petition to establish a proceeding to review the Statement of Generally Available Terms and Conditions offered by Bell Atlantic in accordance with Sections 251, 252, and 271 of the Telecommunications Act of 1996 Testimony of Michael R. Baranowski.
February 27, 1997	Case Nos. 96-1516-T-PC, 96-1561-T-PC, 96-1009-T-PC, 96-1533-T-T Petition to establish a proceeding to review the Statement of Generally Available Terms and Conditions offered by Bell Atlantic in accordance with Sections 251, 252, and 271 of the Telecommunications Act of 1996 Rebuttal Testimony of Michael R Baranowski
June 3, 2002	Case No. 01-1696-T-PC, Verizon West Virginia, Inc Petition For Declaratory Ruling That Pricing of Certain Additional Unbundled Network Elements (UNEs) Complies With Total Element Long-Run Incremental Cost (TELRIC) Principles. Direct Testimony of Michael R Baranowski
July 1, 2002	Case No 01-1696-T-PC, Verizon West Virginia, Inc Petition For Declaratory Ruling That Pricing of Certain Additional Unbundled Network Elements (UNEs) Complies With Total Element Long-Run Incremental Cost (TELRIC) Principles Supplemental Direct Testimony of Michael R. Baranowski

RAILROAD TESTIMONY

Interstate Commerce Commission

March 9, 1995	Finance Docket No 32467 National Railroad Passenger Corporation and Consolidated Rail Corporation – Application Under Section 402(a) of the Rail Passenger Service Act for an Order Fixing Just Compensation
October 30, 1995	Docket No. 41185 Arizona Public Service Company and Pacificorp v The Atchison, Topeka and Santa Fe Railway Company

Surface Transportation Board

July 11, 1997	Docket No. 41989 Potomac Electric Power Company v CSX *Transportation, Inc Reply Statement and Evidence of Defendant CSX* Transportation, Inc
August 14, 2000	Docket No 42051. Wisconsin Power and Light Company v Union Pacific Railroad Company, Reply Verified Statement of Christopher D Kent and Michael R Baranowski
September 20, 2002	STB Docket No. 42070 Duke Energy Corporation v CSX Transportation, Inc , Reply Evidence and Argument of CSX Transportation, Inc
September 30, 2002	STB Docket No 42069. Duke Energy Corporation v Norfolk Southern Railway Company, Reply Evidence and Argument of Norfolk Southern Railway Company
October 11, 2002	STB Docket No. 42072. Carolina Power & Light v Norfolk Southern Railway Company, Reply Evidence and Argument of Norfolk Southern Railway Company
November 12, 2002	Docket No 42070 Duke Energy Corporation v. CSX Transportation, Rebuttal Evidence and Argument of CSX Transportation
November 19, 2002	Docket No. 42069 Duke Energy Corporation v Norfolk Southern Railway Company. Rebuttal Evidence and Argument of Norfolk Southern Railway Company
November 27, 2002	*Docket No 42072 Carolina Power & Light Company v Norfolk Southern* Railway Company, Rebuttal Evidence and Argument of Norfolk Southern Railway Company
January 10, 2003	STB Docket No. 41185 Arizona Public Service Co And Pacificorp v The Atchison, Topeka and Santa Fe Railway Company, Petition of the Burlington Northern and Santa Fe Railway Company to Reopen and Vacate Rate Prescription
February 19, 2003	STB Docket No 42077, Arizona Public Service Co. And Pacificorp v The Burlington Northern and Santa Fe Railway Company, and STB Docket No. 41185, Arizona Public Service Co. And Pacificorp v. The Burlington Northern and Santa Fe Railway Company, Reply of the Burlington Northern Santa Fe Railway Company in Opposition to Petition for Consolidation.

April 4, 2003	Docket No. 42057 Public Service Company of Colorado D/B/A Xcel Energy v The Burlington Northern and Santa Fe Railway Company, Reply Evidence and Argument of The Burlington Northern and Santa Fe Railway Company
October 8, 2003	Docket No. 42071 Otter Tail Power Company v. The Burlington Northern and Santa Fe Railway Company, Reply Evidence of The Burlington Northern and Santa Fe Railway Company
October 24, 2003	Docket No 42069 Duke Energy Corporation v. Norfolk Southern Railway Company, Supplemental Evidence of Norfolk Southern Railway Company
October 31, 2003	Docket No. 42069 Duke Energy Corporation v. Norfolk Southern Railway Company, Reply of Norfolk Southern Railway Company to Duke Energy Company's Supplemental Evidence
November 24, 2003	Docket No 42072 Carolina Power & Light Company v. Norfolk Southern Railway Company, Supplemental Evidence of Norfolk Southern Railway Company
December 2, 2003	Docket No 42072 Carolina Power & Light Company v. Norfolk Southern Railway Company, Reply of Norfolk Southern Railway Company to Carolina Power & Light Company's Supplemental Evidence
December 12, 2003	Docket No 42069 Reply of Norfolk Southern Railway Company to Duke Energy Corporation's Petition to Correct Technical Error and Affidavit of Michael R. Baranowski
January 5, 2004	Docket No 42070 Duke Energy Corporation v. CSX Transportation, Inc., Supplemental Evidence of CSX Transportation, Inc.
January 26, 2004	Docket No 42058 Arizona Electric Power Cooperative, Inc v The Burlington Northern and Santa Fe Railway Company and Union Pacific Railroad Company, Joint Supplemental Reply Evidence and Argument of The Burlington Northern and Santa Fe Railway Company and Union Pacific Railroad Company
March 22, 2004	Docket No 42071 Otter Tail Power Company v The Burlington Northern and Santa Fe Railway Company, Supplemental Reply Evidence of The Burlington Northern and Santa Fe Railway Company
April 9, 2004	Docket No 41185 Arizona Public Service Company and Pacificorp v. The Burlington Northern and Santa Fe Railway Company, The Burlington Northern and Santa Fe Railway Company's Reply Evidence on Reopening
May 24, 2004	Docket No 41191 (Sub-No 1) AEP Texas North Company v The Burlington Northern and Santa Fe Railway Company, Reply Evidence of The Burlington Northern and Santa Fe Railway Company
June 23, 2004	Docket No 42057 Public Service Company of Colorado d/b/a Xcel Energy v The Burlington Northern and Santa Fe Railway Company, Petition to Correct Technical and Computational Errors
March 1, 2005	Docket No 42071 Otter Tail Power Company v BNSF Railway Company, Supplemental Evidence of BNSF Railway Company

April 4, 2005	Docket No. 42071 Otter Tail Power Company v BNSF Railway Company, Reply of BNSF Railway Company to Supplemental Evidence
July 20, 2005	Docket No 42088 Western Fuels Association, Inc and Basin Electric Power Cooperative, Inc v BNSF Railway Company, Reply Evidence of BNSF Railway Company
May 1, 2006	Docket No Ex Parte 657 (Sub-No 1) Major Issues in Rail Rate Cases, Verified Statement Supporting Comments of BNSF Railway Company
May 31, 2006	Ex Parte 657 (Sub-No 1) Major Issues in Rail Rate Cases, Verified Statement Supporting Reply Comments of BNSF Railway Company
June 15, 2006	Docket No 42088 Western Fuels Association, Inc and Basin Electric Power Cooperative, Inc v BNSF Railway Company, Reply Supplemental Evidence of BNSF Railway Company
June 15, 2006	Docket No 41191 (Sub 1) AEP Texas North Company v. BNSF Railway Company, Reply Supplemental Evidence of BNSF Railway Company
June 30, 2006	Docket No Ex Parte 657 (Sub-No 1) Major Issues in Rail Rate Cases, Verified Statement Supporting Rebuttal Comments of BNSF Railway Company
February 4, 2008	Docket No 42099 E.I. DuPont De Nemours and Company v CSX Transportation, Inc., Opening Evidence of CSX Transportation, Inc
February 4, 2008	Docket No 42100 E I. DuPont De Nemours and Company v. CSX Transportation, Inc , Opening Evidence of CSX Transportation, Inc.
February 4, 2008	Docket No. 42101 E I DuPont De Nemours and Company v CSX Transportation, Inc , Opening Evidence of CSX Transportation, Inc
May 1, 2008	Docket No. Ex Parte 679 Petition of the AAR to Institute a Rulemaking Proceeding to Adopt a Replacement Cost Methodology to Determine Railroad Revenue Adequacy, Verified Statement of Michael R Baranowski
July 14, 2008	Docket No 42088 Western Fuels Association, Inc and Basin Electric Power Cooperative, Inc. v BNSF Railway Company, Third Supplemental Reply Evidence of BNSF Railway Company
July 14, 2008	Docket No AB-515 (Sub-No 2) Central Oregon & Pacific Railroad, Inc -- Abandonment and Discontinuance of Service -- in Coos, Douglas, and Lane Counties, Oregon (Coos Bay Rail Line)
August 8, 2008	Docket No 41191 (Sub-No 1) AEP Texas North Company v BNSF Railway Company, Fourth Supplemental Evidence of BNSF Railway Company
August 11, 2008	Docket No. 42014 Entergy Arkansas, Inc and Entergy Services, Inc v Union Pacific Railroad Company and Missouri & Northern Arkansas Railroad Company, Inc ; Finance Docket No 32187 Missouri & Northern Arkansas Railroad Company, Inc – Lease, Acquisition and Operations Exemption – Missouri Pacific Railroad Company and Burlington Northern Railroad Company, Reply Evidence and Argument of Union Pacific
September 5, 2008	Docket No 41191 (Sub-No 1) AEP Texas North Company v. BNSF Railway Company, Fourth Supplemental Reply Evidence of BNSF Railway Company

September 12, 2008	Docket No AB-515 (Sub-No 2) Central Oregon & Pacific Railroad, Inc -- Abandonment and Discontinuance of Service -- in Coos, Douglas, and Lane Counties, Oregon (Coos Bay Rail Line), Rebuttal to Protests
August 24, 2009	Docket No 42114 US Magnesium, L L C v Union Pacific Railroad Company, Opening Evidence of Union Pacific Railroad Company
October 22, 2009	Docket No. 42114 US Magnesium, L L C v. Union Pacific Railroad Company, Rebuttal Evidence of Union Pacific Railroad Company
January 19, 2010	Docket No. 42110 Seminole Electric Cooperative, Inc v. CSX Transportation, Inc , Reply Evidence of CSX Transportation, Inc
May 7, 2010	Docket No. 42113 Arizona Electric Power Cooperative, Inc v BNSF Railway Company and Union Pacific Railroad Company, Joint Reply Evidence of BNSF Railway Company and Union Pacific Railroad Company
November 22, 2010	Docket No 42088 Western Fuels Association, Inc and Basin Electric Power Cooperative, Inc v BNSF Railway Company, BNSF Comments on Remand, Joint Verified Statement of Michael R Baranowski and Benton V. Fisher
January 6, 2011	Docket No 42056 Texas Municipal Power Agency v BNSF Railway Company, BNSF Reply to TMPA Petition for Enforcement of Decision, Joint Verified Statement of Michael R Baranowski and Benton V. Fisher
October 28, 2011	Docket No FD 35506 Western Coal Traffic League - Petition for Declaratory Order, Opening Evidence of BNSF Railway Company, Joint Verified Statement of Michael R Baranowski and Benton V Fisher
November 10, 2011	Docket No. 42127 Intermountain Power Agency v Union Pacific Railroad Company, Reply Evidence of Union Pacific Railroad Company\
November 28, 2011	Docket No FD 35506 Western Coal Traffic League - Petition for Declaratory Order, Reply Evidence of BNSF Railway Company, Joint Reply Verified Statement of Michael R Baranowski and Benton V Fisher
May 10, 2012	Docket No. 42056 Texas Municipal Power Agency v. BNSF Railway Company, BNSF Reply to TMPA Petition to Reopen and Modify Rate Prescription, Joint Verified Statement of Michael R Baranowski and Benton V Fisher
November 30, 2012	Docket No 42125 E I DuPont De Nemours & Company v Norfolk Southern Railway Company, Reply Evidence of Norfolk Southern Railway Company
December 7, 2012	Docket No Ex Parte 715, Rate Regulation Reforms, Reply Comments of the Association of American Railroads, Verified Statement of Michael R. Baranowski
January 7, 2013	Docket No 42130 SunBelt Chlor Alkali Parttnership v Norfolk Southern Railway Company, Reply Evidence of Norfolk Southern Railway Company
March 1, 2013	STB Ex Parte No 711 Petition for Rulemaking to Adopt Revised Competitive Switching Rules, Opening Comments of the Association of American Railroads, Verified Statement of Michael R Baranowski and Richard W Brown

US District Court for Northern District of Oklahoma

January 2, 2007	Case No 06-CV-33 TCK-SAJ, Grand River Dam Authority v. BNSF Railway Company, Report of Michael R Baranowski

February 2, 2007	Case No 06-CV-33 TCK-SAJ, Grand River Dam Authority v BNSF Railway Company; Reply Report of Michael R Baranowski

Circuit Court of Pulaski County, Arkansas

August 17, 2007	Case No CV 2006-2711, Union Pacific Railroad v Entergy Arkansas, Inc and Entergy Services, Inc., Expert Witness Report of Michael R Baranowski
December 14, 2007	Case No CV 2006-2711, Union Pacific Railroad v. Entergy Arkansas, Inc. and Entergy Services, Inc , Reply Expert Witness Report of Michael R Baranowski

U S District Court for the Eastern District of Wisconsin

February 15, 2008	Case No 06-C-0515, Wisconsin Electric Power Company v Union Pacific Railroad Company, Expert Reply Report of Michael R Baranowski

Arbitrations and Mediations

March 7, 2005	Arbitration Case #181 Y 00490 04 BNSF Railway Company and J B Hunt Transport, Inc , Expert Report on behalf of BNSF Railway Company
March 28, 2005	Arbitration Case #181 Y 00490 04 BNSF Railway Company and J B Hunt Transport, Inc., Rebuttal Expert Report on behalf of BNSF Railway Company
April 12, 2005	Arbitration Case #181 Y 00490 04 BNSF Railway Company and J B. Hunt Transport, Inc , Supplemental Expert Report on behalf of BNSF Railway Company
April 19, 2005	Arbitration Case #181 Y 00490 04 BNSF Railway Company and J B Hunt Transport, Inc , Supplemental Rebuttal Expert Report on behalf of BNSF Railway Company
April/May 2005	Arbitration Case #181 Y 00490 04 BNSF Railway Company and J.B. Hunt Transport, Inc., Hearings before Arbitration Panel
February 20, 2007	In the Matter of the Arbitration between the Detroit Edison Company, et al, and BNSF Railway Company, Expert Report of Michael R Baranowski
March 19, 2007	In the Matter of the Arbitration between the Detroit Edison Company, et al, and BNSF Railway Company, Supplemental Expert Report of Michael R Baranowski
February 12, 2009	In the Matter of the Arbitration between Wisconsin Public Service Corporation and Union Pacific Railroad Company, Rebuttal Expert Report of Michael R Baranowski
October 16, 2009	In the Matter of Arbitration Between Norfolk Southern Railway Company and Drummond Coal Sales, Inc , Expert Report of Michael R Baranowski
July 25, 2011	American Arbitration Association Case No. 58 147 Y 0031809, BNSF Railway Company and Kansas City Southern Railway Company, Expert Report of Michael R. Baranowski

PAUL BOBBY

Paul Bobby is an Associate and serves as the Director of Railroad Engineering for the Midwest Region at STV Incorporated, an Engineering Consulting Firm with offices located at 200 West Monroe Street, Suite 1650, Chicago, IL 60067. Since 1997, Mr. Bobby has been involved in all aspects of design and construction for transportation facilities and has specialized in the railroad industry.

Mr. Bobby has a Bachelor of Science in Civil Engineering from the University of Wisconsin – Platteville, and holds Professional Engineering Licenses in the States of Illinois, Indiana, Wisconsin, and Georgia. In 1997, he worked for the Wisconsin Central, LTD as a construction laborer assigned to special capacity projects. In 2000, Mr. Bobby joined the Consoer Townsend Envirodyne (CTE) Engineers as a Civil Engineer in their rail group where he was involved in a variety of railroad project across the Midwest

Mr. Bobby joined STV Incorporated in mid-2004 as the Midwest Manager of Track, and recently was promoted to his current position as Associate and the Director of Railroad Engineering for the Midwest Region.

Mr. Bobby's resume is attached hereto.

Mr. Bobby is sponsoring Section III.F.2 of UP's Reply Evidence relating to roadbed preparation Mr. Bobby has signed a verification of the truth of the statements contained therein. A copy of that verification is attached hereto.

VERIFICATION

I declare under penalty of perjury that I have read the Reply Evidence in this proceeding that I have sponsored, as described in the foregoing Statement of Qualifications, and that the contents thereof are true and correct. Further, I certify that I am qualified and authorized to sponsor this testimony.

Paul E Bobby

Paul Bobby

Executed on April 8, 2013

Paul E. Bobby, P.E.

Project Manager

Mr. Bobby is a civil engineer and project manager with more than 10 years of experience in the design and construction of railroad and highway improvements, including FTA New Starts projects and rail clearance and grade separation programs He is adept at the design of roadway and track alignment, geometry, and right-of-way (ROW) and utility conflict identification Mr Bobby has experience with feasibility studies, cost estimating, and the development of construction staging plans to maintain traffic and operations He has also managed a variety of successful track capacity expansion and rail improvement project, for Metra, freight railroads, and as part of the Chicago Region Environmental and Transportation Efficiency Program (CREATE) program, which was established to identify key bottlenecks and conflicts within existing Chicagoland transportation infrastructure

Office Location
Chicago, IL

Date joined firm
8/23/04

Years with other firms
5

Education
Bachelor of Science, Civil Engineering, University of Wisconsin/Platteville (2000)

Professional Registrations
Professional Engineer, Georgia (2009/#PE-034469/exp 12/31/2012), Illinois (2005/Civil/Sanitary Engineering/#062-058268/exp. 11/30/13), Indiana (2007/#PE10708276/exp. 7/31/2012), and Wisconsin (2006/#38452-6/exp 7/31/14)

Memberships
American Railway Engineering and Maintenance-of-Way Association (AREMA)

Maintenance-of-Way Club of Chicago

Project Experience

IDOT IL 15 over ICG Railroad and IL 13 Reconstruction - Rail Coordinator

Providing railroad coordination services for the $14 4 million replacement of dual structures on IL 15 that span IL 13 and the Illinois Central Gulf (ICG) railroad ROW in St. Clair County, IL An Illinois Department of Transportation (IDOT) inspection found the dual bridges to be in poor condition The agency therefore recommended that both structures be replaced STV provided Phase I and Phase II design engineering services for the structural replacements Phase I services included the preparation of a crash analysis, geometric studies, environmental coordination, public involvement, and all other work necessary to prepare a Project Report for design approval. Phase II includes the complete design of the new structures Mr Bobby communicates closely with the various rail agencies to keep them informed of the project plans and mitigate potential impacts the project may have on their operations. (11/08 - Present)

CSX Bridge 45 - Rail Engineer

Responsible for the rail alignment design and construction staging plans for a new single-track railroad bridge over the Hudson River in Iona, NY. Mr. Bobby prepared staging plans to maintain rail operations during the bridge construction. The bridge was designed with environmental sensitivity to the Hudson River ecosystem (3/07 - 9/07)

WisDOT Wisconsin Central Railroad Bridge over US 41 - Project Manager

Managed the replacement of the Wisconsin Central Bridge US 41 in Fond du Lac, WI. Mr. Bobby prepared the project work plan, budget, amendments, and schedule; made staff assignments, quality assurance, and managed all coordination with the client. The project encompassed five alternative studies for the new structure, which replaced the existing single-track bridge. The Wisconsin Department of Transportation (WisDOT) and STV determined that two new bridges would best replace the single-track bridge over US 41 The design provided a new industrial spur railroad track off of the main line to the Fond du Lac Southwest Industrial Park The firm also assisted in executing public information meetings and utilities coordination. Mr Bobby's responsibilities included coordinating the evaluation of alternatives with WisDOT. (2002 - 2004)

CSX Curtis Bay Coal Terminal Reconfiguration - Project Manager
Managing the planning and design for the reconfiguration of CSX's Curtis Bay coal terminal in Baltimore The project will consolidate yard tracks from the existing coal inbound yard and merchandise yard to provide three 130-foot inbound tracks to store unit coal trains. The project will also reconfigure the inbound lead tracks to the west yard in order to separate switching operations and implement new crossover arrangements at the existing three coal dumpers The work is needed for CSX's planned expansion of ground storage at this facility. Mr. Bobby is overseeing the conceptual layouts and design for the yard reconfiguration The most challenging aspect is staging the sequence of construction for the maintenance of operations to minimize impacts to CSX service during construction He is also conducting onsite visits, communicating extensively with the client, and managing the project budget and schedule (11/11 - Present)

UP CREATE B-2 Project - Project Manager
Oversaw design engineering services for the reconstruction of the Metra's Union Pacific West Line's passenger stations in Berkeley and Bellwood, IL, as part of the CREATE B2 Project STV provided engineering and architectural design services to modify the stations to accommodate a third mainline track being constructed by Union Pacific Railroad (UP). The station upgrades consist of new center platforms, warming shelters, and pedestrian underpasses with retaining walls. Mr Bobby worked closely with the railroads to develop a phased implementation plan to coordinate with the third-track construction STV completed the design in July 2011, and the project has now moved into the construction phase. Mr. Bobby is overseeing STV's construction phase services. (3/11 - Present)

CSX/Chicago/Gary Regional Airport Authority CSX Fort Wayne Line and NS Gary Branch Consolidation - Project Manager
Overseeing track and civil plans for the consolidation of CSX's Fort Wayne Line and the Norfolk Southern Railway (NS) Gary Branch in Gary, IN The work is being performed to facilitate the Chicago/Gary Regional Airport Authority's airport runway extension and includes the addition of a new connection from CSX's Barr Subdivision to Canadian National (CN)'s reconfigured Elgin, Joliet & Eastern (EJ&E) Railway Line. A new industrial connection from the CSX Porter Subdivision to the Indiana Sugars manufacturing facility will also be required In addition, the project includes reconfiguring the Clarke Junction Interlocking between the Barr Subdivision,

adding a new connection to the NS Chicago Line, and removing the Pine Junction Interlocking on the Barr Subdivision to improve speeds from 40 mph to 60 mph Mr Bobby is coordinating closely with the client while developing the track design STV is acting as the owner's representative for the project, and Mr. Bobby is reviewing documentation from the airport to the client to assess impacts to CSX He is identifying potential hazards, such as drainage issues, to make sure the interests of CSX are maintained and their property is not affected during construction. Mr Bobby is also managing the project budget, schedule, and staff (2/11 - Present)

GEC Services for CSX CREATE Projects - Project Manager
Overseeing various projects under a general engineering consultant (GEC) contract with CSX. The aim of the Chicago Region Environmental and Transportation Efficiency (CREATE) program is to help CSX expedite freight rail transit through Chicago, the busiest rail freight gateway in the United States. The tasks under the contract involve interlocking, track, and signal modifications, which require civil and track engineering design and construction management services. (4/10 - Present)

CSX (4/10 - 8/11)

CHSRA Los Angeles-to-Anaheim Project EIR/EIS - QA/QC Review
Conducting a quality assurance/quality control (QA/QC) review, including track and alignments, of a 30-mile segment of high-speed rail line between Los Angeles and Anaheim, CA, for the California High-Speed Rail Authority (CHSRA) The proposed corridor runs adjacent to existing passenger and freight lines and will travel at speeds up to 220 miles per hour The segment requires the development of solutions for overlaying a new set of track infrastructure into a physically constrained rail corridor, which includes local and regional passenger service as well as local and transcontinental rail freight operating on a limited ROW in a dense urban environment. Mr. Bobby is providing a QA/QC review of the plan and profile drawings, as well as the inclusion of alternatives for at-grade, tunnel, and aerial portions during the evaluation process (12/09 - Present)

Sunoco Logistics Nederland Rail Facilities Upgrade - Rail Design Lead
Led the design of the rail component of the infrastructure upgrade at the large marine terminal in Nederland, TX, which provides oil loading and unloading facilities for extracting crude oil from rail cars The site has two short existing tracks with a small number of equipment spots for loading and unloading oil Mr Bobby directed the design of the track extension to accommodate multiple 30-car loading and unloading spots. His team's rail plan included typical sections, alignment plan, profiles, cross sections, and track details The track expansion was designed to be constructed under traffic to allow oil cars to still load and unload while the track extensions are constructed. (3/12 - 4/12)

NICTD Kensington Interlocking Improvements CM Services - Construction Manager

Directed construction management (CM) services for improvements at the Kensington Interlocking on Chicago's south side, including the addition of a second Northern Indiana Commuter Transportation District (NICTD) route across the Canadian National railroad to the Metra Electric Mains STV provided a precondition survey to identify existing conditions of the rail and ROW within the project limits, including the existing signal system, structures, and track appurtenances, and oversaw all aspects of the contractor's construction methods Mr Bobby was responsible for field inspections, contract administration, project controls, quality assurance, safety monitoring, and procurement assistance (12/08 - 12/11)

CSX CREATE WA-10 - Project Manager
Managed the final design of a rail interlocking to allow the interchange between the Canadian National and CSX railroads in Blue Island, IL. Expanding this interlocking between these two main lines will increase rail traffic capacity and improve train movement through Chicago. Mr. Bobby coordinated work between the signal designers and each railroad and their respective labor forces He also prepared plans, specifications, and estimate submittals to the Illinois Department of Transportation (6/08 - 3/11)

Metra Civil/Structural Blanket Engineering Services - Project Manager
Oversaw rail engineering services for STV's civil/structural blanket project for Metra, for which the firm provided systemwide services on an as-needed basis. STV's project scope varied by task order, and services included field verification of conditions, design of buildings and trackwork, rehabilitation of buildings and retaining walls, construction inspection and plan preparation, environmental assessments, traffic studies, roadway geometry, and property surveys. Mr. Bobby oversaw all 12 tasks associated with this contract, one of which involved conducting a thorough condition inspection, preparing a condition report, and developing the necessary rehabilitation activities for repair of the Rock Island District Turntable in Blue Island, IL (10/08 - 12/10)

NICTD West Lake Corridor New Starts Studies - Engineering Task Leader
Led Phase I engineering design of a commuter rail system for the Northern Indiana Commuter Transit District (NICTD) extending from Valparaiso to Lowell, IN, to Chicago. Mr. Bobby prepared travel-demand modeling, alternatives development, plan and profile development, and a public outreach campaign (7/05 - 9/10)

CTA Block 37 Station and Tunnel Connector - Project Engineer/Lead Rail Engineer
Designed the rail alignment for a mined tunnel in water-bearing soft clay that connects the Chicago Transit Authority (CTA) Blue and Red transit lines in Chicago. Located at Block 37 between State and Dearborn streets, this tunnel links the two subways to a new underground station Work for this project was performed on an extremely complex and tight schedule, and had to be completed with minimal disruptions to the subway service Mr. Bobby

prepared all special trackwork and details, and established the horizontal geometry for the trackwork and alignment for the entire project (8/04 - 6/07)

Publications and Presentations

Published and presented "Metra - Southwest Service Expansion" at the American Railway Engineering and Maintenance-of-Way Association (AREMA) International Conference in Chicago (2003)

Work History:

1. CTE Engineers, Project Engineer (1999 - 2004)
2. CTE Engineers, Engineering Intern (5/98 - 9/98, 5/99 - 9/99)
3. Wisconsin Central Ltd. (Canadian National Railway Company), Labor Trackman (5/96 - 9/96, 5/97 - 9/97)

RICHARD W. BROWN

Richard W. Brown is a Director at FTI Consulting, Inc., an economic and consulting firm with offices located at 1101 K Street, NW, Washington, DC 20005. With 30 years of experience in the railroad industry, Mr. Brown specializes in providing financial, economic and analytical consulting services to North America's largest railroads.

Mr. Brown received a BA in Economics from Syracuse University in 1963, and an MBA from Northwestern University in 1971. Prior to joining FTI, Mr. Brown spent 28 years with The Burlington Northern & Santa Fe Railway (BNSF), and its predecessor The Atchison, Topeka and Santa Fe Railway (ATSF). While at BNSF, Mr. Brown focused on strategic issues including the negotiation and implementation of the agreements between UP and BNSF that were effected to facilitate the UP-SP merger. Additionally, he took a lead role in the analysis of the potential impact of regulatory changes on railroad marketing strategy

Mr Brown held numerous positions in Strategic Planning and Marketing at ATSF. He was involved in merger analysis and planning and played a key role in the attempted merger between ATSF and Southern Pacific. Mr. Brown headed ATSF's Bulk Commodity Marketing which included Chemicals and Coal. In this role, he re-engineered a field sales organization with regional directors responsible for coaching and mentoring account managers. He also led ATSF's rail-truck retail efforts and negotiated several joint venture and business partnerships. While in this capacity, he developed a program for using rail truck transfer to increase car utilization. He implemented a joint venture with a major bulk truck line to bring intermodal rail service to dry bulk shippers.

Mr. Brown has provided expert testimony in merger proceedings before the Interstate Commerce Commission and The Surface Transportation Board.

Mr Brown is sponsoring portions of Sections III.D of defendants Reply Evidence. Mr. Brown has signed a verification of the truth of the statements contained therein. A copy of that verification is attached hereto.

VERIFICATION

I declare under penalty of perjury that I have read the Reply Evidence in this proceeding that I have sponsored, as described in the foregoing Statement of Qualifications, and that the contents thereof are true and correct. Further, I certify that I am qualified and authorized to sponsor this testimony.

Richard W. Brown

Executed on April ____, 2013

Richard Brown

Director – Economic Consulting

rick.brown@fticonsulting.com

FTI Consulting
1101 K Street NW
Suite B100
Washington, DC 20005
Tel. (202) 312-9100
Fax: (202) 312-9101

Education
MBA from Northwestern University Graduate School of Management

BS in Economics from Syracuse University

Richard Brown is a Director in FTI's Economic Consulting practice With 28 years of experience in the railroad industry, Mr. Brown specializes in providing financial, economic and analytical consulting services to North America's largest railroads Mr. Brown has provided expert testimony in merger proceedings before the Interstate Commerce Commission and The Surface Transportation Board Mr Brown is assigned to the DC office, however works from his home office at 100 Windwood Circle; Breckenridge, Colorado 80424.

Mr. Brown joined FTI Consulting in 1999 Much of the NIS group's work focuses on the economic and financial analysis of network industries, in particular different aspects of transportation While at FTI, he has been involved in the analysis of rates, costs, and service in the railroad industry. Mr Brown has worked extensively to develop expert testimony before the Surface Transportation Board ("STB") examining the reasonableness of railroad rates, railroads' applications for mergers and acquisitions He also supported railroad internal strategic planning needs with respect to mergers and acquisitions and the impact of potential regulatory changes

Prior to joining FTI, Mr Brown spent 28 years with The Burlington Northern & Santa Fe Railway (BNSF), and its predecessor The Atchison, Topeka and Santa Fe Railway (ATSF) While at BNSF, he focused on strategic issues including the negotiation and implementation of the agreements between UP and BNSF that were effected to facilitate the UP-SP merger Additionally, he took a lead role in the analysis of the potential impact of regulatory changes on railroad marketing strategy.

Mr Brown held numerous positions in Strategic Planning and Marketing at ATSF. He was involved in merger analysis and planning and played a key role in the attempted merger between ATSF and Southern Pacific. He headed ATSF's Bulk Commodity Marketing which included Chemicals and Coal In this role, Mr. Brown re-engineered a field sales organization with regional directors responsible for coaching and mentoring account managers, started a subsidiary company to handle tank containers as a retail intermodal options, and expanded on that with a joint venture with Bulkmatic, a major dry bulk truck line, to initiate a retail intermodal option for bulk containers

Mr Brown holds a Bachelors Degree in Economics from Syracuse University and an MBA degree from Northwestern University Graduate School of Management

TESTIMONY

Surface Transportation Board

September 20, 2002 Docket No 42070. Duke Energy Corporation v CSX Transportation, Inc , Written Reply Evidence and Argument of CSX Transportation, Inc

September 30, 2002 Docket No. 42069. Duke Energy Corporation v. Norfolk Southern Railway Company, Written Reply Evidence and Argument of Norfolk Southern Railway Company

October 11, 2002	Docket No 42072 Carolina Power & Light v Norfolk Southern Railway Company, Written Reply Evidence and Argument of Norfolk Southern Railway Company
January 19, 2010	Docket No 42110 Seminole Electric Cooperative, Inc v CSX Transportation, Inc. Written Reply Evidence of CSX Transportation, Inc.
February 5, 2010	CV No 3.08-CV-415-BR. -BNSF Railway Company v Albany and Eastern Railroad Company, et al
May 7, 2010	Docket No 42113 Arizona Electric Power Cooperative, Inc v. BNSF Railway Company and Union Pacific Railroad Company, Joint Reply Evidence of BNSF Railway Company and Union Pacific Railroad Company
November 10, 2011	Docket No 42127 Intermountain Power Agency v Union Pacific Railroad Company, Reply Evidence of Union Pacific Railroad Company
November 30, 2012	Docket No 42125 E.I. DuPont De Nemours & Company v Norfolk Southern Railway Company, Reply Evidence of Norfolk Southern Railway Company
January 7, 2013	Docket No 42130 SunBelt Chlor Alkali Parttnership v Norfolk Southern Railway Company, Reply Evidence of Norfolk Southern Railway Company
March 1, 2013	STB Ex Parte No. 711 Petition for Rulemaking to Adopt Revised Competitive Switching Rules, Opening Comments of the Association of American Railroads, Verified Statement of Michael R. Baranowski and Richard W Brown

PATRICK BRYANT

Patrick Bryant is a Civil Engineer at STV Incorporated, an Engineering Consulting Firm with offices located at 200 West Monroe Street, Suite 1650, Chicago, IL 60067. Since 1994, Mr Bryant has been involved in many aspects of design and construction for transportation facilities.

Mr. Bobby has a Bachelor of Science in Civil Engineering from the University of Illinois at Chicago, and holds a Professional Engineering License in the State of Illinois. In 1994, he worked for the Christian-Roge & Associates, as a Construction Engineer assigned to highway construction projects and as a Design Engineer on highway design projects. In 2005, Mr. Bobby joined Jacob & Hefner Associates as a Civil Engineer involved in a variety of site development projects. Mr Bryant joined STV Incorporated in mid-2008 as a Project Engineer on numerous Rail projects.

Mr Bryant's resume is attached hereto.

Mr. Bryant is sponsoring Section III F 2 of UP's Reply Evidence relating to roadbed preparation Mr. Bryant has signed a verification of the truth of the statements contained therein. A copy of that verification is attached hereto

VERIFICATION

I declare under penalty of perjury that I have read the Reply Evidence in this proceeding that I have sponsored, as described in the foregoing Statement of Qualifications, and that the contents thereof are true and correct. Further, I certify that I am qualified and authorized to sponsor this testimony

Patrick Bryant

Executed on April 9, 2013

Patrick J. Bryant, P.E.

Civil Engineer

Mr Bryant is a civil engineer with more than 18 years of experience in roadway, highway, bridge, and rail design and construction He has provided services as a project engineer, construction engineer, construction technician and quality assurance/quality control (QA/QC) specialist for numerous projects in Illinois, including for the Illinois Department of Transportation (IDOT) Elgin O'Hare West Bypass, for which he is providing conceptual track design for potential alignments and impacts to the Union Pacific Railroad, Canadian Pacific Railway, and Canadian National Railway Mr. Bryant's experience includes the design of roadway geometry, grading, drainage, and utilities He has been responsible for the design of roadway plans, including profiles, horizontal alignments, and cross sections, and is also experienced in track design for commuter rail agencies and freight railroads In addition, Mr. Bryant's work on residential and commercial development projects showcases his knowledge of site/civil and environmental engineering

Employee No.
04733

Department No.
34

Office Location
Chicago, IL

Date joined firm
7/21/08

Years with other firms
14

Education
Bachelor of Science, Civil Engineering, University of Illinois, Chicago (1994)

Professional Registrations
Professional Engineer: Illinois (2004/4062057106/ exp 11/30/13)

Training
Amtrak Contractor Safety (2009)

Computer Skills
AutoCAD, Civil3D MicroStation, GEOPAK, HydroFlow, TR20, Pavdin, Visual Basic, AutoLisp, Eaglepoint

Project Experience

BRIDGES

Illinois Tollway Jane Addams Memorial Tollway Lee Street to Kennedy Expressway Widening - Civil Engineer
Inspected the superstructure and substructure of the eastbound Jane Addams Memorial Tollway (I-90) bridge over Des Plaines River Road and the ramp bridge over Des Plaines River Road in Cook County, IL, as part of civil engineering services for the planned reconstruction and widening of 2.5 miles of the I-90 between Lee Street and Kennedy Expressway. Mr Bryant took field notes and photos, recorded damage, and coordinated with traffic control personnel. He also assisted with the preparation of Bridge Condition Reports for both structures (2/13 - 3/13)

CSX Manville Bridge Reconstruction - Track Engineer
Prepared track designs to address construction staging for CSX's reconstruction of a railroad bridge over a waterway in Manville, NJ The new structure increases CSX's capacity from one track to two tracks in the Reading subdivision. Mr Bryant designed track geometry, plan and profiles, and temporary shoofly alignments for the staging plans and final rail alignment. (7/09 - 8/09)

CDOT Montrose Harbor Bridges and Underpasses - Project Engineer
Provided engineering services for the reconstruction of four concrete arch bridges originally built in the 1930s in Chicago's Montrose Harbor Park. STV evaluated rehabilitation and reconstruction alternatives for each of the structures. Because the bridges are located in a historic park setting, STV coordinated with the project architect to develop a structural system that maintained the existing architectural features while meeting current highway bridge standards. Mr Bryant designed maintenance of traffic plans, which included assessing current traffic volume and developing a plan would have minimal impact to commuters during construction He also assisted with the drainage design plans for the Chicago Department of Transportation (CDOT) project. (4/08 - 1/09)

COMMERCIAL/RETAIL

Sharp Homes Commercial Development Projects - Project Engineer
Developed site plans for various commercial development projects in Joliet, IL Mr. Bryant oversaw spur track design, road design, grading design, geometric alignments, stormwater management design, easement coordination, and utility design and coordination for the new industrial park, three commercial lots, and a railroad distribution center at the Mound Road Commercial Park (5/05 - 5/08)

O&S Holdings Bridge Street Mall - Project Engineer

Responsible for site plans for a 320-acre mall development project in Joliet, IL. The proposed mall would contain numerous stores, restaurants, and medical and professional offices Mr Bryant was responsible for parking lot, road, and grading design, geometric alignments; easement coordination, storm water management system design; and utility design and coordination. (10/07 - 4/08)

Taking Care of Business Inc. Crete Marketplace - Project Engineer
Developed site plans for a 100-acre commercial development project in Crete. IL. This commercial development contains 2 major department stores, a fast-food restaurant, 2 gas stations, and 12 other useable lots. Mr. Bryant was responsible for parking lot, road, and grading designs; geometric alignments; easement coordination; stormwater management design; and utility design and coordination. (3/07 - 4/08)

Chovan Commercial Subdivision - Project Engineer
Developed site plans for a 20-acre commercial development project in Joliet, IL, consisting of medical and professional offices. Mr Bryant was responsible for parking lot, road, and grading design, geometric alignments, easement coordination; stormwater management design, and utility design and coordination (2/06 - 9/07)

HIGHWAYS/ROADWAYS

Kane County DOT Fabyan Parkway at Van Nortwick Avenue Phase II Intersection Improvements - QA/QC
Performed QA/QC for STV's Phase II engineering services for the Fabyan Parkway and Van Nortwick Avenue intersection in Batavia, IL, for the Kane County Department of Transportation (DOT). The scope of work included road widening and the addition of a left-turn lane, as well as data collection, geotechnical services, and drainage design The firm also extended lateral pipes in the widened area, replacing inlets along curb lines and a culvert to correct a drainage problem. STV prepared construction documents in accordance with the IDOT Bureau of Local Roads manual and Kane County design standards. Mr. Bryant performed QA/QC of the final Phase II engineering plans that STV submitted (6/09 - 2/10)

IDOT US 150 Phase I Study - Civil Engineer
Provided civil design for Phase I engineering for the preparation of a Categorical Exclusion Group II report for the widening of US 150 in Tazewell County, IL, to three lanes. Mr. Bryant was responsible for roadway design, including grading, geometric alignments, and easements. (7/08 - 8/08)

Kendall County Highway Department/Sharp Homes Hunter's Ridge Road Widening - Project Engineer
Designed roadway plans, including profiles, horizontal alignments, cross sections, and drainage systems, for the widening of a 2-lane rural road to a 4-

lane arterial with multiple intersections to support new residential developments in Joliet, IL. The project included widening a 1.5-mile stretch of roadway to accommodate the 130-acre Hunter's Ridge and 90-acre Jones Road subdivisions developed by Sharp Homes Mr Bryant was also responsible for developing site plans for the subdivision projects. (5/05 - 3/06)

Kendall County Highway Department/Lakewood Homes Ridge Road Widening - Project Engineer
Supervised the design of roadway plans, including profiles, horizontal alignments, cross sections, and drainage systems, for 2 miles of a major 4-lane arterial in Joliet, IL. Mr. Bryant was also responsible for developing roadway improvements funded by Lakewood Homes. All plans were submitted to the Kendall County Highway Department for review (10/04 - 3/05)

Illinois Tollway I-294 Reconstruction - Project Engineer
Managed the design of roadway plans, including profiles, horizontal alignments, cross sections, and drainage systems, for the reconstruction of 6 miles of I-294 in Cook County, IL Mr Bryant was also responsible for developing special provisions and preparing project cost estimates. (6/03 - 4/05)

CDOT Racine Avenue Improvements - Project Engineer
Facilitated the design of roadway plans, including profiles, horizontal alignments, cross sections, and drainage systems associated with the improvement of a 0 8-mile segment of Racine Avenue in Chicago Mr Bryant was also responsible for developing special provisions and preparing project cost estimates for this Chicago Department of Transportation (CDOT) project (7/03 - 1/04)

CDOT 37th Street Improvements - Project Engineer
Developed roadway plans, including profiles, horizontal alignments, cross sections, and drainage systems, for improvements for a 0.5-mile stretch of 37th Street in Chicago Mr Bryant also developed special provisions and prepared project cost estimates for the Chicago Department of Transportation (CDOT) project. (7/03 - 1/04)

IDOT Higgins Road Rehabilitation - Project Engineer
Responsible for the design of roadway plans, including profiles, horizontal alignments, cross sections, and drainage systems, for the rehabilitation of 4 miles of Higgins Road in Schaumburg, IL Mr. Bryant was also responsible for developing special provisions and preparing project cost estimates (12/00 - 1/03)

IDOT Golf Road Rehabilitation - Project Engineer
Designed roadway plans, including profiles, horizontal alignments, cross sections, and drainage systems, for the rehabilitation of 4 miles of Golf Road

in Schaumburg, IL. Mr. Bryant also developed special provisions and prepared project cost estimates. (10/00 - 1/03)

DuPage County Highway Department Road Improvement Projects - Construction Engineer
Inspected the resurfacing and repair of numerous county roads in DuPage County, IL, including Bloomingdale Road, Gary Avenue, Glen Ellyn Road, Naperville Road, 75th Street, and 63rd Street Mr Bryant also provided QA/QC of contractors' work on these road construction projects. (4/95 - 9/99)

Illinois Tollway I-90 Improvements - Project Engineer
Responsible for the design of roadway plans, including profiles, horizontal alignments, cross sections, and drainage systems, for improvements to I-90 in Illinois Mr Bryant was also responsible for developing special provisions and preparing project cost estimates. (11/97 - 4/98)

Cook County Highway Department Ashland Avenue - Construction Engineer
Inspected the construction of 1 5 miles of Ashland Avenue in Chicago. Mr Bryant also provided QA/QC of contractors' work on the highway and bridge construction. (4/97 - 11/97)

Illinois Tollway Randall Road/I-90 Interchange - Project Engineer
Designed roadway plans, including profiles, horizontal alignments, cross sections, and drainage systems, for the Randall Road/I-90 interchange in Elgin, IL Mr Bryant was also responsible for developing special provisions and preparing cost estimates. (10/96 - 4/97)

Cook County Highway Department Lehigh Avenue - Construction Engineer
Responsible for the construction of 1 5 miles of Lehigh Avenue in Morton Grove, IL. Mr. Bryant provided QA/QC of the contractors' work (3/96 - 12/96)

IDOT IL-59 - Project Engineer
Prepared roadway plans, including profiles, horizontal alignments, cross sections, and drainage systems, as part of the design of 5 miles of IL-59 in Naperville, IL Mr. Bryant was also responsible for developing special provisions and preparing cost estimates. (9/94 - 4/95)

Illinois Tollway I-294 Improvements - Construction Engineer
Responsible for construction inspection during the repair and resurfacing of 6 miles of I-294 in Rosemont, IL. Mr Bryant provided QA/QC of contractors' work on this Illinois Tollway project. (4/94 - 9/94)

INDUSTRIAL/MANUFACTURING

IDI Rock Run Industrial Park - Project Engineer
Provided road and grading designs, geometric alignments, easement coordination, and utility design and coordination for this 60-acre development in Joliet, IL (4/07 - 9/07)

RAIL

CSX Curtis Bay Coal Terminal Reconfiguration - Project Engineer
Planning and designing the reconfiguration of CSX's Curtis Bay coal terminal in Baltimore. The project will consolidate yard tracks from the existing coal inbound yard and merchandise yard to provide three 130-foot inbound tracks to store unit coal trains. The project will also reconfigure the inbound lead tracks to the west yard to separate switching operations and implement new crossover arrangements at the existing three coal dumpers. The work is needed for CSX's planned expansion of ground storage at this facility. Mr Bryant is overseeing the conceptual layouts and design for the yard reconfiguration The most challenging aspect is staging the sequence of construction for the maintenance of operations to minimize impacts to CSX service during construction (11/11 - Present)

IDOT Elgin O'Hare West Bypass - Track Engineer
Coordinating design plans with various railroads and transportation agencies and preparing staging plans as part of STV's freight rail coordination for the $3.6 billion Elgin O'Hare West Bypass in Cook and DuPage counties, IL Mr. Bryant developed conceptual track engineering plans and cost estimates for potential track alignments and impacts to the railroads during Phase I of this project. He also developed staging plans, cross sections, plan profiles, and drainage plans The project has now moved into Phase II, and STV is coordinating the approved plans among the Union Pacific, Canadian Pacific, and Canadian National freight railroads and the project team. The primary objective of the coordination is to keep the railroads informed of project progress and to resolve any potential conflicts at an early stage Mr Bryant is coordinating work with the planning team during the alternative design process and is advising them of potential rail impacts. He is also coordinating plans with signals and highway improvement work being performed simultaneously (10/08 - Present)

CSX/Chicago/Gary Regional Airport Authority CSX Fort Wayne Line and NS Gary Branch Relocation - Design Engineer
Prepared track and civil plans for the reconfiguration of CSX's Fort Wayne Line onto the Norfolk Southern Railway (NS) Gary Branch in Gary, IN. The work was performed as a component of the Chicago/Gary Regional Airport Authority's airport runway extension project and includes the addition of a new connection from CSX's Barr Subdivision to Canadian National's reconfigured Elgin, Joliet & Eastern Railway Line A new industrial connection from the CSX Porter Subdivision to the Indiana Sugars manufacturing facility was also added In addition, the scope of work included reconfiguring the Clarke Junction Interlocking between the Barr

Subdivision. adding a new connection to the NS Chicago Line, and removing the Pine Junction Interlocking on the Barr Subdivision and improving design speed from 40 mph to 60 mph Mr Bryant also coordinated the design plans with the various railroads and transportation agencies (11/10 - 7/12)

NICTD Kensington Interlocking Improvement CM Services - Track Engineer
Developed track engineering for construction management (CM) services for improvements at the Kensington Interlocking, including the addition of a second Northern Indiana Commuter Transportation District (NICTD) route across the connect to the Metra electric mains. Mr. Bryant made recommendations for alterations to the original track design that were incorporated into the final design and construction He also performed office engineering tasks as well as field inspections. STV oversaw all aspects of the contractor's construction methods and provided a precondition survey to identify existing conditions of the rail and right-of-way in the area of the Kensington Interlocking limits, including the existing signal system, structures, and track appurtenances (6/09 - 6/12)

UP vs. Intermountain Power Agency Rate Case Litigation Cost Assessments - Project Engineer
Assembled the planning, engineering, and construction costs to build a hypothetical contemporary operating railroad for the Union Pacific Railroad (UP) Services included a complete itemization, justification, and documentation of all transportation, material, and labor construction costs associated with a contemporary construction costing All submittals were entered as evidence to the Surface Transportation Board to justify contested rates for this coal rate case. The cost assessments Mr. Bryant worked on included major earthwork and culvert construction (8/11 - 12/11)

CSX CREATE B-12 Third Main Construction Oversight - Field Inspector
Performed field inspections for the construction of a third mainline along the Beltway Corridor from 123rd Street to CP San Francisco in Alsip and Blue Island, IL, which includes new track and upgrades to existing track Part of the Chicago Region Environmental and Transportation Efficiency (CREATE) program, this additional mainline increased freight rail capacity and decrease travel times within the area A new rail bridge over 127th Street was also constructed, including associated signal work. Mr. Bryant provided inspections to make sure the work was performed according to the project plans and specifications (9/10 - 7/11)

CSX CREATE WA-10 - Design Engineer
Preparing track and civil plans for the final design of the rail interlocking to allow the interchange between the Canadian National (CN) and CSX railroads in Blue Island, IL. As a component of the Chicago Region Environmental and Transportation Efficiency (CREATE) program. the project involved reconfiguring the CSX Vermont Street interlocking to provide a universal connection to the CN main line. Mr. Bryant also

coordinated the design plans with the various railroads and transportation agencies (2/10 - 6/11)

TTC Transit City LRT Program Project Management Services - Track Design QC

Provided QC for track and civil plans as part of the proposed 13 6-km (8.5-mile) Toronto Transit Commission (TTC) underground light rail transit (LRT) line and new Sheppard's Street station in Toronto, Ontario. Canada Mr Bryant verified that the project was designed according to the agency's design criteria and that it was constructible He checked clearances, materials, profile grades, and drainage design (4/10 - 2/11)

St. Louis Metro East Riverfront Interlocking - Track Engineer

Prepared track and civil plans for the design of a new interlocking between the East Riverfront MetroRail station and the historic Eads Bridge, which connects St. Louis with East St Louis, IL, over the Mississippi River. The Eads Bridge is a 2-level structure carrying two sets of tracks for the MetroRail light-rail transit system on its lower level and a 4-lane highway on the upper level. STV designed a new asymmetrical diamond crossover interlocking within the East Arcade located east of the bridge. To construct the new interlocking, approximately 206 feet of the roadway deck and superstructure was removed. The firm designed the new interlocking on a tight schedule and within a restricted area, making the design work challenging. The interlocking is 185 feet long and the crossover is confined within an 18-foot-wide area. Mr Bryant performed track calculations and geometry to develop multiple track alignment options The plans were then presented to the client, which chose an option most suitable to its needs. Mr. Bryant prepared track and civil design plans using AutoCAD. He also coordinated with other project disciplines to develop conduit plans for multiple systems, including electrical, communications, overhead catenary, and signals, all of which located within the restricted area. (11/09 - 6/10)

KCS Meridian Connection - Rail Engineer

Performed design for the rail alignment and related earthwork as part of the construction of a 4-mile realignment and connection of Norfolk Southern Railway (NS) and the Kansas City Southern (KCS) railway on the Meridian Speedway in Meridian, MS, as part of an on-call contract. The project required extensive coordination between the KCS and NS, resulting in an operational staging plan suitable for both parties (10/08 - 7/09)

NS/PennDOT SR 0028 Improvement - Track Engineer

Facilitated track design to address Norfolk Southern Railway (NS) capacity issues during the Pennsylvania Department of Transportation (PennDOT) improvement of SR 0028 in Pittsburgh. To allow for single-tracking during roadway improvements, NS Control Point (CP) Herr will be eliminated. For NS to have capacity for this interlocking removal and single-tracking, STV relocated two approaching interlockings one at CP Etna, and one at CP Sharp. Mr. Bryant designed track geometry, plan and profile for relocation of the interlockings as well as extension of the westward main track No. 2 and controlled siding The total project will increase block capacity by 2,700 feet. (1/08 - 5/09)

NS Lakeside Dam Rehabilitation - Rail Engineer
Responsible for the design of the rail alignment and related earthwork as part of the proposed construction of a 1 5-mile realignment of Norfolk Southern Railway (NS) in Macon, GA. The proposed alignment was partially over a 60-foot-high earthen dam The project, which required coordination among many stakeholders, was a complex intersection of the railroad, a major state route, and the dam (8/08 - 12/08)

RESIDENTIAL

KB Homes Streams of Plainfield Residential Subdivision - Project Engineer
Provided road design, grading design, geometric alignments, easement coordination, and utility design and coordination for this 80-acre residential subdivision in Plainfield, IL. (6/06 - 4/07)

Gallagher and Henry Parker Road Residential Subdivision - Project Engineer
Responsible for road and grading designs, geometric alignments, easement coordination, and utility design and coordination for this 120-acre residential subdivision in Homer Glen, IL. (2/06 - 1/07)

Sharp Homes Horton Farms Residential Subdivision - Project Engineer
Provided road and grading design, geometric alignments, easement coordination, stormwater management, and utility design and coordination for this 80-acre residential subdivision in Joliet, IL (1/06 - 8/06)

TRANSPORTATION FACILITIES

UP CREATE B-2 Project - Project Engineer
Delivered site design engineering services for the reconstruction of the Metra's Union Pacific West Line's passenger stations in Berkeley and Bellwood, IL, as part of the Chicago Region Environmental and Transportation Efficiency (CREATE) program STV provided engineering and architectural design services to modify the stations to accommodate a third mainline track being constructed by Union Pacific Railroad (UP). The station upgrades consisted of new center platforms, warming shelters, and pedestrian underpasses with retaining walls. Mr. Bryant provided site design, including grading, drainage, signage, and construction staging, and construction support services. (9/10 - 9/12)

City of Joliet Regional Multimodal Transportation Center - Track Engineer

Provided railroad coordination and designs for infrastructure improvements as part of the development of a multimodal transportation center in Joliet, IL. Several modes of transportation were relocated into a central facility that connects to the historic Joliet Union Station. This venture could eventually be a stop on the future high-speed passenger rail line, linking Chicago with St. Louis. The transportation center is located within the Joliet UD Interlocking, which includes Union Pacific Tailroad, BNSF Railway, Amtrak, and the Metra Rock Island District and Heritage Corridor rail lines. Mr. Bryant developed designs for the infrastructure improvements related to track realignments, platform configurations, interlocking modifications, bridge rehabilitations, and construction staging. (9/09 - 6/11)

WATER RESOURCES

CDWM Sewer Improvement Projects - Project Engineer
Responsible for the design of plans, including profiles, horizontal alignments, and grading plans, for numerous sewer improvements in Chicago. These Chicago Department of Water Management (CDWM) projects ranged from spot repair to total reconstruction of road and sewers. (6/01 - 3/05)

CDWM CHA Redevelopment Projects - Project Engineer
Designed sewer plans, including sewer profiles, sewer horizontal alignments, and grading plans associated with improvements to Chicago Housing Authority (CHA) public housing. Associated Chicago Department of Water Management (CDWM) projects included the Stateway Gardens, Henry Horner, Ida B Wells, and Lakeview Crescent developments. (2/02 - 6/04)

KAUSTUV CHAKRABARTI

Mr. Chakrabarti is a Senior Director at FTI Consulting, Inc., an economic and consulting firm with offices located at 1101 K Street, NW, Washington, DC 20005. Mr. Chakrabarti conducts economic and financial analysis primarily for the transportation, telecommunications, and energy industries.

Mr. Chakrabarti holds an M.A. is Applied Economics from the Johns Hopkins University and a Bachelor of Science, majoring in Chemistry and Economics, from the College of William and Mary, and is a CFA (Chartered Financial Analyst) charterholder Mr. Chakrabarti has developed analyses in the transportation industry to estimate and forecast operating expenses, investment costs, variable costs, and other income-related elements. He has constructed and utilized databases to analyze operational data and in support of strategic decision-making. He has applied the STB's URCS regulatory costing model and the above analyses in rate cases brought before the STB under the Full SAC, Simplified SAC, and Three-Benchmark standards.

Mr. Chakrabarti's curriculum vitae, which identifies representative engagements and cases in which he has sponsored expert testimony, is attached hereto

Mr. Chakrabarti is sponsoring portions of Section III.D of defendants' Reply Evidence. Mr. Chakrabarti has signed a verification of the truth of the statements contained therein. A copy of that verification is attached hereto.

VERIFICATION

I declare under penalty of perjury that I have read the Reply Evidence in this proceeding that I have sponsored, as described in the foregoing Statement of Qualifications, and that the contents thereof are true and correct. Further, I certify that I am qualified and authorized to sponsor this testimony.

Kaustuv Chakrabarti

Executed on April 10, 2013

Kaustuv Chakrabarti

Senior Director – Economic Consulting

Kaustuv.Chakrabarti@fticonsulting.com

FTI Consulting
1101 K Street NW
Suite B100
Washington DC 20005
Tel (202) 312-9100
Fax (202) 312-9101

Education
Master of Arts in Applied Economics from the Johns Hopkins University

Bachelor of Science in Chemistry and Economics from the College of William and Mary

Kaustuv Chakrabarti is a Senior Director at FTI Consulting in the Network Industries Strategies group within the Economic Consulting practice in the Washington, DC office Mr Chakrabarti conducts economic and financial analysis for primarily the transportation, telecommunications, and energy industries He holds an M A in Applied Economics from the Johns Hopkins University and a Bachelor of Science, majoring in Chemistry and Economics, from the College of William and Mary, and is a CFA (Chartered Financial Analyst) charterholder

Background

Mr Chakrabarti has developed analyses in the transportation industry to estimate and forecast operating expenses, investment costs, variable costs, and other income-related elements He has constructed and utilized databases to analyze operational data and in support of strategic decision-making. He has applied the STB's URCS regulatory costing model and the above analyses in rate cases brought before the STB under the Full SAC, Simplified SAC, and Three-Benchmark standards He has also conducted valuations of firms or business segments outside of the transportation industry For these valuations, he analyzed financial statements and other income data to develop various discount cash flow models

Mr. Chakrabarti has conducted numerous business case analyses for the federal government in voice telephony, information technology, and building construction In these efforts, he worked with clients to design potential investment solutions, compare the costs, benefits, and risks of each, and identify the optimal solution

TESTIMONY

Surface Transportation Board

November 30, 2012	Docket No 42125 E.I. DuPont De Nemours & Company v Norfolk Southern Railway Company, Reply Evidence of Norfolk Southern Railway Company
January 7, 2013	Docket No. 42130 SunBelt Chlor Alkali Parttnership v. Norfolk Southern Railway Company, Reply Evidence of Norfolk Southern Railway Company

BENTON V. FISHER

Mr. Fisher is a Senior Managing Director at FTI Consulting, Inc., an economic and consulting firm with offices located at 1101 K Street, NW, Washington, DC 20005. Since 1991, Mr. Fisher has been involved in various aspects of transportation consulting including economic studies involving costs and revenues, traffic and operating analyses, and work with performance measurement and financial reporting systems.

Mr. Fisher holds a Bachelor of Science degree in Engineering and Management Systems from Princeton University. In 1990, he served as the Deputy Controller for the Bill Bradley for U.S. Senate Campaign. In 1991, he joined Klick, Kent & Allen, Inc., which was acquired by FTI Consulting, Inc. in 1998. While with the firm Mr. Fisher has performed numerous analyses for and assisted in the preparation of expert testimony related to merger applications, rate reasonableness proceedings, contract disputes, and other regulatory costing issues before the Interstate Commerce Commission, Surface Transportation Board, Federal Energy Regulatory Commission, Postal Rate Commission, Federal Courts, and State Utility Commissions. He has previously sponsored evidence in numerous railroad rate reasonableness proceedings, including evidence regarding the topics identified above.

Mr. Fisher's curriculum vitae, which identifies representative engagements and cases in which he has sponsored expert testimony, is attached hereto.

Mr. Fisher is sponsoring portions of Sections III.C and III.D of defendants' Reply Evidence relating to calculation of equipment counts and operating costs other than MOW and G&A. Mr. Fisher has signed a verification of the truth of the statements contained therein. A copy of that verification is attached hereto.

VERIFICATION

I declare under penalty of perjury that I have read the Reply Evidence in this proceeding that I have sponsored, as described in the foregoing Statement of Qualifications, and that the contents thereof are true and correct. Further, I certify that I am qualified and authorized to sponsor this testimony

Benton V. Fisher

Benton V. Fisher

Executed on April 8, 2013

Benton V. Fisher

Senior Managing Director – Economic Consulting

benton.fisher@fticonsulting.com

FTI Consulting
1101 K Street, NW
Suite B100
Washington, DC 20005
Tel (202) 312-9100
Fax: (202) 312-9101

Education
B S In Engineering and Management Systems, Princeton University

Benton V. Fisher is a Senior Managing Director of FTI's Economic Consulting group, located in Washington, D.C Mr Fisher has more than 20 years of experience in providing financial, economic and analytical consulting services to corporate clients dealing with transportation, telecommunications, and postal subjects

North America's largest railroads have retained FTI both to assist them in making strategic and tactical decisions and to provide expert testimony in litigation FTI's ability to present a thorough understanding of myriad competitive and regulatory factors has given its clients the necessary tools to implement and advance their business Mr. Fisher has worked extensively to develop these clients' applications for mergers and acquisitions and expert testimony justifying the reasonableness of their rates before the Surface Transportation Board In addition to analyzing extensive financial and operating data, Mr. Fisher has worked closely with people within many departments at the railroad as well as outside counsel to ensure that the railroads' presentations are accurate and defensible Additionally, Mr Fisher reviews the expert testimony of the railroads' opponents in these proceedings, and advises counsel on the necessary course of action to respond

AT&T and MCI retained FTI to advance its efforts to implement the Telecommunications Act of 1996 in local exchange markets. Mr Fisher was primarily responsible for reviewing the incumbent local exchange carriers' (ILEC) cost studies, which significantly impacted the ability of FTI's clients to access local markets Mr Fisher analyzed the sensitivity of multiple economic components and incorporated this information into various models being relied upon by the parties and regulators to determine the pricing of services Mr Fisher was also responsible for preparing testimony that critiqued alternative presentations

Mr Fisher assisted in reviewing the U.S Postal Service's evidence and preparing expert testimony on behalf of interveners in Postal Rate and Fee Changes cases He has also been retained by a large international consulting firm to provide statistical and econometric support in their preparation of a long-range implementation plan for improving telecommunications infrastructure in a European country

Mr. Fisher has sponsored expert testimony in rate reasonableness proceedings before the Surface Transportation Board and in contract disputes in Federal Court and arbitration proceedings.

Mr Fisher holds a B.S in Engineering and Management Systems from Princeton University

TESTIMONY

Surface Transportation Board

January 15, 1999	Docket No 42022 FMC Corporation and FMC Wyoming Corporation v Union Pacific Railroad Company, Opening Verified Statement of Christopher D Kent and Benton V Fisher
March 31, 1999	Docket No 42022 FMC Corporation and FMC Wyoming Corporation v Union Pacific Railroad Company, Reply Verified Statement of Christopher D Kent and Benton V. Fisher
April 30, 1999	Docket No 42022 FMC Corporation and FMC Wyoming Corporation v Union Pacific Railroad Company, Rebuttal Verified Statement of Christopher D Kent and Benton V Fisher
July 15, 1999	Docket No 42038 Minnesota Power, Inc v. Duluth, Missabe and Iron Range Railway Company, Opening Verified Statement of Christopher D Kent and Benton V Fisher
August 30, 1999	Docket No. 42038 Minnesota Power, Inc v. Duluth, Missabe and Iron Range Railway Company, Reply Verified Statement of Christopher D. Kent and Benton V. Fisher
September 28, 1999	Docket No. 42038 Minnesota Power, Inc. v Duluth, Missabe and Iron Range Railway Company, Rebuttal Verified Statement of Christopher D. Kent and Benton V Fisher
June 15, 2000	Docket No 42051 Wisconsin Power and Light Company v Union Pacific Railroad Company, Opening Verified Statement of Christopher D. Kent and Benton V Fisher
August 14, 2000	Docket No. 42051 Wisconsin Power and Light Company v Union Pacific Railroad Company, Reply Verified Statement of Christopher D Kent and Benton V. Fisher
September 28, 2000	Docket No 42051 Wisconsin Power and Light Company v. Union Pacific Railroad Company, Rebuttal Verified Statement of Christopher D Kent and Benton V. Fisher
December 14, 2000	Docket No 42054 PPL Montana, LLC v The Burlington Northern Santa Fe Railway Company, Opening Verified Statement of Christopher D Kent and Benton V Fisher
March 13, 2001	Docket No. 42054 PPL Montana, LLC v The Burlington Northern Santa Fe Railway Company, Reply Verified Statement of Christopher D. Kent and Benton V Fisher
May 7, 2001	Docket No. 42054 PPL Montana, LLC v The Burlington Northern Santa Fe Railway Company, Rebuttal Verified Statement of Christopher D Kent and Benton V. Fisher

October 15, 2001	Docket No 42056 Texas Municipal Power Agency v The Burlington Northern Santa Fe Railway Company, Opening Verified Statement of Benton V Fisher
January 15, 2002	Docket No 42056 Texas Municipal Power Agency v The Burlington Northern Santa Fe Railway Company, Reply Verified Statement of Benton V Fisher
February 25, 2002	Docket No 42056 Texas Municipal Power Agency v The Burlington Northern Santa Fe Railway Company, Rebuttal Verified Statement of Benton V. Fisher
May 24, 2002	Docket No 42069 Duke Energy Corporation v Norfolk Southern Railway Company, Opening Evidence and Argument of Norfolk Southern Railway Company
June 10, 2002	Docket No 42072 Carolina Power & Light Company v Norfolk Southern Railway Company, Opening Evidence and Argument of Norfolk Southern Railway Company
July 19, 2002	Northern States Power Company Minnesota v Union Pacific Railroad Company, Union Pacific's Opening Evidence
September 30, 2002	Docket No 42069 Duke Energy Corporation v Norfolk Southern Railway Company, Reply Evidence and Argument of Norfolk Southern Railway Company
October 4, 2002	Northern States Power Company Minnesota v Union Pacific Railroad Company, Union Pacific's Reply Evidence
October 11, 2002	Docket No 42072 Carolina Power & Light Company v. Norfolk Southern Railway Company, Reply Evidence and Argument of Norfolk Southern Railway Company
November 1, 2002	Northern States Power Company Minnesota v Union Pacific Railroad Company, Union Pacific's Rebuttal Evidence
November 19, 2002	Docket No 42069 Duke Energy Corporation v Norfolk Southern Railway Company, Rebuttal Evidence and Argument of Norfolk Southern Railway Company
November 27, 2002	Docket No 42072 Carolina Power & Light Company v Norfolk Southern Railway Company, Rebuttal Evidence and Argument of Norfolk Southern Railway Company
January 10, 2003	Docket No 42057 Public Service Company of Colorado D/B/A Xcel Energy v. The Burlington Northern and Santa Fe Railway Company, Opening Evidence and Argument of The Burlington Northern and Santa Fe Railway Company
February 7, 2003	Docket No. 42058 Arizona Electric Power Cooperative, Inc. v. The Burlington Northern and Santa Fe Railway Company and Union Pacific Railroad, Opening Evidence of The Burlington Northern and Santa Fe Railway Company and Union Pacific Railroad

April 4, 2003	Docket No. 42057 Public Service Company of Colorado D/B/A Xcel Energy v The Burlington Northern and Santa Fe Railway Company, Reply Evidence and Argument of The Burlington Northern and Santa Fe Railway Company
May 19, 2003	Docket No. 42057 Public Service Company of Colorado D/B/A Xcel Energy v The Burlington Northern and Santa Fe Railway Company, Rebuttal Evidence and Argument of The Burlington Northern and Santa Fe Railway Company
May 27, 2003	Docket No 42058 Arizona Electric Power Cooperative, Inc v The Burlington Northern and Santa Fe Railway Company and Union Pacific Railroad, Joint Variable Cost Reply Evidence of The Burlington Northern and Santa Fe Railway Company and Union Pacific Railroad
May 27, 2003	Docket No 42058 Arizona Electric Power Cooperative, Inc v The Burlington Northern and Santa Fe Railway Company and Union Pacific Railroad, Reply Evidence of The Burlington Northern and Santa Fe Railway Company
June 13, 2003	Docket No 42071 Otter Tail Power Company v. The Burlington Northern and Santa Fe Railway Company, Opening Evidence of The Burlington Northern and Santa Fe Railway Company
July 3, 2003	Docket No 42058 Arizona Electric Power Cooperative, Inc. v The Burlington Northern and Santa Fe Railway Company and Union Pacific Railroad, Joint Variable Cost Rebuttal Evidence of The Burlington Northern and Santa Fe Railway Company and Union Pacific Railroad
October 8, 2003	Docket No 42071 Otter Tail Power Company v The Burlington Northern and Santa Fe Railway Company, Reply Evidence of The Burlington Northern and Santa Fe Railway Company
October 24, 2003	Docket No 42069 Duke Energy Corporation v Norfolk Southern Railway Company Supplemental Evidence of Norfolk Southern Railway Company
October 31, 2003	STB Docket No 42069 Duke Energy Corporation v Norfolk Southern Railway Company, Reply of Norfolk Southern Railway Company to Duke Energy Company's Supplemental Evidence
November 24, 2003	STB Docket No 42072 Carolina Power & Light Company v. Norfolk Southern Railway Company, Supplemental Evidence of Norfolk Southern Railway Company
December 2, 2003	STB Docket No 42072 Carolina Power & Light Company v Norfolk Southern Railway Company, Reply of Norfolk Southern Railway Company to Carolina Power & Light Company's Supplemental Evidence
January 26, 2004	STB Docket No 42058 Arizona Electric Power Cooperative, Inc v The Burlington Northern and Santa Fe Railway Company and Union Pacific Railroad Company, Joint Supplemental Reply Evidence and Argument of The Burlington Northern and Santa Fe Railway Company and Union Pacific Railroad Company

March 1, 2004	STB Docket No. 41191 (Sub-No 1) AEP Texas North Company v The Burlington Northern and Santa Fe Railway Company, Opening Evidence and Argument of The Burlington Northern and Santa Fe Railway Company
March 22, 2004	STB Docket No. 42071 Otter Tail Power Company v The Burlington Northern and Santa Fe Railway Company, Supplemental Reply Evidence of *The Burlington Northern and Santa Fe Railway Company*
April 29, 2004	STB Docket No. 42071 Otter Tail Power Company v The Burlington Northern and Santa Fe Railway Company, Rebuttal Evidence of The Burlington Northern and Santa Fe Railway Company
May 24, 2004	STB Docket No 41191 (Sub-No 1) AEP Texas North Company v The Burlington Northern and Santa Fe Railway Company, Reply Evidence of The Burlington Northern and Santa Fe Railway Company
March 1, 2005	Docket No. 42071 Otter Tail Power Company v BNSF Railway Company, Supplemental Evidence of BNSF Railway Company
April 4, 2005	Docket No 42071 Otter Tail Power Company v BNSF Railway Company, Reply of BNSF Railway Company to Supplemental Evidence
April 19, 2005	Docket No 42088 Western Fuels Association, Inc and Basin Electric Power Cooperative, Inc v BNSF Railway Company, Opening Evidence of BNSF Railway Company
July 20, 2005	Docket No 42088 Western Fuels Association, Inc and Basin Electric Power Cooperative, Inc. v. BNSF Railway Company, Reply Evidence of BNSF Railway Company
July 27, 2004	STB Docket No 41191 (Sub-No 1) AEP Texas North Company v The Burlington Northern and Santa Fe Railway Company, Rebuttal Evidence of The Burlington Northern and Santa Fe Railway Company
September 30, 2005	Docket No. 42088 Western Fuels Association, Inc and Basin Electric Power Cooperative, Inc v. BNSF Railway Company, Rebuttal Evidence of BNSF Railway Company
October 20, 2005	Docket No 42088 Western Fuels Association, Inc and Basin Electric Power Cooperative, Inc v BNSF Railway Company, Surrebuttal Evidence of BNSF Railway Company
June 15, 2006	Docket No 42088 Western Fuels Association, Inc. and Basin Electric Power Cooperative, Inc v BNSF Railway Company, Reply Supplemental Evidence of BNSF Railway Company
June 15, 2006	Docket No 41191 (Sub-No 1) AEP Texas North Company v BNSF Railway Company, Reply Supplemental Evidence of BNSF Railway Company
March 19, 2007	Docket No 41191 (Sub-No. 1) AEP Texas North Company v BNSF Railway Company, Reply Third Supplemental Evidence of BNSF Railway Company

March 26, 2007	Docket No. 42088 Western Fuels Association, Inc and Basin Electric Power Cooperative, Inc v BNSF Railway Company, Reply Second Supplemental Evidence of BNSF Railway Company
July 30, 2007	Docket No. 42095 Kansas City Power & Light v. Union Pacific Railroad Company, Union Pacific's Opening Evidence
August 20, 2007	Docket No. 42095 Kansas City Power & Light v Union Pacific Railroad Company, Union Pacific's Reply Evidence
February 4, 2008	Docket No 42099 E I. DuPont De Nemours and Company v CSX Transportation, Inc., Opening Evidence of CSXT
February 4, 2008	Docket No 42100 E I DuPont De Nemours and Company v CSX Transportation, Inc , Opening Evidence of CSXT
February 4, 2008	Docket No. 42101 E.I DuPont De Nemours and Company v. CSX Transportation, Inc , Opening Evidence of CSXT
March 5, 2008	Docket No 42099 E.I. DuPont De Nemours and Company v CSX Transportation, Inc , Reply Evidence of CSXT
March 5, 2008	Docket No 42100 E.I. DuPont De Nemours and Company v CSX Transportation, Inc , Reply Evidence of CSXT
March 5, 2008	Docket No. 42101 E I. DuPont De Nemours and Company v CSX Transportation, Inc , Reply Evidence of CSXT
April 4, 2008	Docket No 42099 E I DuPont De Nemours and Company v CSX Transportation, Inc , Rebuttal Evidence of CSXT
April 4, 2008	Docket No 42100 E I DuPont De Nemours and Company v. CSX Transportation, Inc , Rebuttal Evidence of CSXT
April 4, 2008	Docket No 42101 E I DuPont De Nemours and Company v. CSX Transportation, Inc , Rebuttal Evidence of CSXT
July 14, 2008	Docket No 42088 Western Fuels Association, Inc. and Basin Electric Power Cooperative, Inc v BNSF Railway Company, Third Supplemental Reply Evidence of BNSF Railway Company
August 8, 2008	Docket No 41191 (Sub-No 1) AEP Texas North Company v. BNSF Railway Company, Fourth Supplemental Evidence of BNSF Railway Company
September 5, 2008	Docket No. 41191 (Sub-No 1) AEP Texas North Company v BNSF Railway Company, Fourth Supplemental Reply Evidence of BNSF Railway Company
October 17, 2008	Docket No 42110 Seminole Electric Cooperative, Inc v. CSX Transportation, Inc , CSX Transportation, Inc 's Reply to Petition for Injunctive Relief, Verified Statement of Benton V. Fisher
August 24, 2009	Docket No 42114 US Magnesium, L L C v. Union Pacific Railroad Company, Opening Evidence of Union Pacific Railroad Company

September 22, 2009	Docket No. 42114 US Magnesium, L L C v. Union Pacific Railroad Company, Reply Evidence of Union Pacific Railroad Company
October 22, 2009	Docket No 42114 US Magnesium, L L.C v. Union Pacific Railroad Company, Rebuttal Evidence of Union Pacific Railroad Company
January 19, 2010	Docket No 42110 Seminole Electric Cooperative, Inc v CSX Transportation, Inc , Reply Evidence of CSX Transportation, Inc
May 7, 2010	Docket No. 42113 Arizona Electric Power Cooperative, Inc v. BNSF Railway Company and Union Pacific Railroad Company, Joint Reply Evidence of BNSF Railway Company and Union Pacific Railroad Company
October 1, 2010	Docket No 42121 Total Petrochemicals USA, Inc v CSX Transportation, Inc , Motion for Expedited Determination of Jurisdiction Over Challenged Rates, Verified Statement of Benton V. Fisher
November 22, 2010	Docket No 42088 Western Fuels Association, Inc. and Basin Electric Power Cooperative, Inc v. BNSF Railway Company, Comments of BNSF Railway Company on Remand, Joint Verified Statement of Michael R Baranowski and Benton V Fisher
January 6, 2011	Docket No 42056 Texas Municipal Power Agency v. BNSF Railway Company, BNSF Reply to TMPA Petition for Enforcement of Decision, Joint Verified Statement of Michael R. Baranowski and Benton V Fisher
July 5, 2011	Docket No 42123 M&G Polymers USA, LLC v CSX Transportation, Inc., Reply Market Dominance Evidence of CSX Transportation, Inc
August 1, 2011	Docket No 42125 E I. DuPont De Nemours and Company v Norfolk Southern Railway Company, Norfolk Southern Railway's Reply to Second Motion to Compel, Joint Verified Statement of Benton V Fisher and Michael Matelis
August 5, 2011	Docket No. 42121 Total Petrochemicals USA, Inc v CSX Transportation, Inc , Reply Market Dominance Evidence of CSX Transportation, Inc
August 15, 2011	Docket No. 42124 State of Montana v BNSF Railway Company, BNSF Railway Company's Reply Evidence and Argument, Verified Statement of Benton V. Fisher
October 24, 2011	Docket No 42120 Cargill, Inc. v BNSF Railway Company, BNSF Railway Company's Reply Evidence and Argument, Verified Statement of Benton V Fisher
October 28, 2011	Docket No FD 35506 Western Coal Traffic League - Petition for Declaratory Order, Opening Evidence of BNSF Railway Company, Joint Verified Statement of Michael R Baranowski and Benton V Fisher
November 10, 2011	Docket No 42127 Intermountain Power Agency v. Union Pacific Railroad Company, Reply Evidence of Union Pacific Railroad Company
November 28, 2011	Docket No FD 35506 Western Coal Traffic League - Petition for Declaratory Order, Reply Evidence of BNSF Railway Company, Joint Reply Verified Statement of Michael R Baranowski and Benton V. Fisher

December 14, 2011	Docket No 42132 Canexus Chemicals Canada L P. v. BNSF Railway Company, BNSF Motion to Permit Consideration of 2011 TIH Movements from BNSF Traffic Data in Selecting Comparison Group, Verified Statement of Benton V Fisher
February 13, 2012	Docket No 42132 Canexus Chemicals Canada L.P. v. BNSF Railway Company, Opening Evidence of BNSF Railway Company, Verified Statement of Benton V Fisher
March 13, 2012	Docket No 42132 Canexus Chemicals Canada L P v BNSF Railway Company, Reply Evidence of BNSF Railway Company
April 12, 2012	Docket No. 42132 Canexus Chemicals Canada L P v BNSF Railway Company, Rebuttal Evidence of BNSF Railway Company
May 10, 2012	Docket No 42056 Texas Municipal Power Agency v BNSF Railway Company, BNSF Reply to TMPA Petition to Reopen and Modify Rate Prescription, Joint Verified Statement of Michael R Baranowski and Benton V Fisher
November 30, 2012	Docket No. 42125 E I DuPont De Nemours & Company v Norfolk Southern Railway Company, Reply Evidence of Norfolk Southern Railway Company
January 7, 2013	Docket No. 42130 SunBelt Chlor Alkali Parttnership v Norfolk Southern Railway Company, Reply Evidence of Norfolk Southern Railway Company

U.S District Court for the Eastern District of North Carolina

March 17, 2006	Civil Action No. 4.05-CV-55-D, PCS Phosphate Company v. Norfolk Southern Corporation and Norfolk Southern Railway Company, Report by Benton V. Fisher

U S. District Court for the Eastern District of California

January 18, 2010	E.D Cal Case No 08-CV-1086-AWI, BNSF Railway Company v San Joaquin Valley Railroad Co , et al

Arbitrations and Mediations

July 10, 2009	JAMS Ref # 1220039135, In the Matter of the Arbitration Between Pacer International, Inc , d/b/a/ Pacer Stacktrain (f/k/a/ APL Land Transport Services, Inc), American President Lines, Ltd. And APL Co Pte Ltd And Union Pacific Railroad Company, Rebuttal Expert Report of Benton V. Fisher

ROBERT FISHER

Rob Fisher is a Senior Director in the Network Industries Strategies group of the FTI Economic Consulting practice and is based in Washington, D.C. Mr. Fisher provides financial and economic consulting services to the transportation, energy and telecommunications industries.

Mr. Fisher holds an M.B.A. (with distinction) from the University of Michigan and a B.S. from the School of Foreign Service at Georgetown University. Prior to joining FTI, Mr. Fisher worked for two technology companies, most recently as Vice President of Strategic Marketing, where he held P&L responsibility for the company's largest product. Before that, he spent 10 years as a strategy consultant, working with dozens of telecom clients on financial analysis, marketing strategy and operational improvement.

Mr. Fisher has developed expert testimony for railroad clients in litigation disputes involving the delivery of large coal shipments to energy customers. He has directed financial analysis to demonstrate the reasonableness of railroad rates before the Surface Transportation Board, including leading the analysis of traffic and revenues in prior stand alone cases.

Mr. Fisher's curriculum vitae, which identifies representative engagements and cases in which he has sponsored expert testimony, is attached hereto.

Mr. Fisher is sponsoring portions of Sections III.A, III.G and III.H. Mr. Fisher has signed a verification of the truth of the statements contained therein. A copy of that verification is attached hereto.

VERIFICATION

I declare under penalty of perjury that I have read the Reply Evidence in this proceeding that I have sponsored, as described in the foregoing Statement of Qualifications, and that the contents thereof are true and correct. Further, I certify that I am qualified and authorized to sponsor this testimony.

Robert Fisher

Robert Fisher

Executed on April 9, 2013

Rob Fisher

Senior Director – Economic Consulting

Robert.Fisher@fticonsulting.com

FTI Consulting
1101 K Street NW
Suite B100
Washington DC 20005
Tel. (202) 312-9100
Fax (202) 312-9101

Education
MBA (with distinction) from University of Michigan

BS from School of Foreign Service at Georgetown University

Rob Fisher is a senior director in the Network Industries Strategies group of the FTI Economic Consulting practice and is based in Washington, D C. Mr. Fisher provides financial and economic consulting services to the transportation, energy and telecommunications industries

Mr Fisher has developed expert testimony for railroad clients in litigation disputes involving the delivery of large coal shipments to energy customers He also has directed financial analysis to demonstrate the reasonableness of railroad rates before the Surface Transportation Board, including leading the analysis for the first small-shipper case before the Board.

In addition, Mr. Fisher has supported a consortium of manufacturers to gain anti-leakage provisions in the pending greenhouse gas legislation. His report, which measured the energy and trade intensity and the emissions of each industry, has been entered into Congressional testimony

Prior to joining FTI, Mr. Fisher worked for two technology companies, most recently as Vice President of Strategic Marketing, where he held P&L responsibility for the company's largest product. Before that, he spent 10 years as a strategy consultant, working with dozens of telecom clients on financial analysis, marketing strategy and operational improvement

Mr Fisher holds an M B A (with distinction) from the University of Michigan and a B S from the School of Foreign Service at Georgetown University

TESTIMONY

Surface Transportation Board

May 7, 2010	Docket No 42113 Arizona Electric Power Cooperative, Inc v BNSF Railway Company and Union Pacific Railroad Company, Joint Reply Evidence of BNSF Railway Company and Union Pacific Railroad Company
November 10, 2011	Docket No 42127 Intermountain Power Agency v. Union Pacific Railroad Company, Reply Evidence of Union Pacific Railroad Company
September 24, 2012	Docket No. 42130 SunBelt Chlor Alkali Partnership v Norfolk Southern Railway Company, Norfolk Southern Railway Company's Motion to Hold Case in Abeyance Pending Completion of Rulemaking, Verified Statement of Robert O. Fisher
November 30, 2012	Docket No 42125 E I DuPont De Nemours & Company v Norfolk Southern Railway Company, Reply Evidence of Norfolk Southern Railway Company
January 7, 2013	Docket No 42130 SunBelt Chlor Alkali Partnership v Norfolk Southern Railway Company, Reply Evidence of Norfolk Southern Railway Company

RANDALL G. FREDERICK

Randall G. Frederick the office manager for STV's office at 5200 Belfort Road, Suite 400 Jacksonville, FL 32256, has more than 30 years of experience as a project manager providing construction engineering and inspection (CE&I) services for highway and railway bridges and tunnels.

As a former CSX Principal Engineer, he was responsible for management and administration of publicly funded projects in Ohio, Pennsylvania, West Virginia, Virginia, Maryland, and Washington, DC Mr. Frederick functioned as the primary representative in the mediation of legal proceedings, public safety issues, and other politically-sensitive railroad-related matters. He managed the system and network of the company's Computer Aided Dispatching System (CADS), Rail-Highway Grade Crossing Warning Systems, and Incremental Train Control Signaling (ITCS). Mr. Frederick has a Bachelor of Arts degree in Business Administration from Cedarville University.

Mr Frederick's resume is attached hereto.

Mr Frederick is sponsoring Section III.F.8 of UP's Reply Evidence relating to public improvements. Mr. Frederick has signed a verification of the truth of the statements contained therein. A copy of that verification is attached hereto.

VERIFICATION

I declare under penalty of perjury that I have read the Reply Evidence in this proceeding that I have sponsored, as described in the foregoing Statement of Qualifications, and that the contents thereof are true and correct. Further, I certify that I am qualified and authorized to sponsor this testimony

Randall G. Frederick

Executed on April 5, 2013

Randall G. Frederick

Project Manager/Senior Engineer
Associate

Mr Frederick, the office manager for STV's office in Jacksonville, FL, has more than 35 years of experience as a project manager providing construction engineering and inspection (CE&I) services for highway and railway bridges and tunnels As a former CSX Principal Engineer, he was responsible for management and administration of publicly funded projects in Ohio, Pennsylvania, West Virginia, Virginia, Maryland, and Washington, D C Mr. Frederick functioned as the primary representative in the mediation of legal proceedings, public safety issues, and other politically-sensitive railroad-related matters He managed the system and network of the company's Computer Aided Dispatching System (CADS), and provided guidance for Rail-Highway Grade Crossing Warning System designs and other publicly funded projects.

Office Location
Jacksonville, FL

Date joined firm
9/12/05

Years with other firms
30

Education
Bachelor of Arts Business Administration, Cedarville University (1987)

Training
FRA Roadway Worker

Environmental and Industrial Safety Course

AREMA Highway Crossing Interconnection

Memberships
NCUTCD Railroad & Light Rail Transit Highway Grade Crossings Technical Committee

Computer Skills
MS PowerPoint, MS Project, MS Access

Project Experience

CSX I-370 Bridge Widenings - Construction Manager
Managing CE&I services for the widening of dual highway bridges on I-370 over the CSX right-of-way in Derwood, MD Mr Frederick is preparing estimates, coordinating with CSX personnel, and managing the budget. (2006 - Present)

CSX Public Projects GEC Management – Project Manager
Supervising the engineering review, administrative and contract handling, and estimate preparation for third-party overhead bridge and at-grade crossing projects Mr. Frederick is responsible for ensuring strict compliance with CSX criteria, specifications, and standards. His responsibilities include reviewing CSX operating requirements, railroad force account development, contract management, construction management, and project budget oversight. (2005 – Present)

CSX Wireline and Pipeline Installations - Construction Manager
Managing multiple underground wireline and pipeline utility installations across CSX property in 23 states, some of which go under and others parallel to the CSX right-of-way Mr Frederick is preparing estimates, coordinating with CSX personnel, and managing the project budgets (2005 - Present)

CSX Railroad Bridge over Asbury Road Rehabilitation - Project Manager
Managing preliminary engineering reviews and development of railroad force account estimates and contract management for the rehabilitation of a single-span railroad bridge over Asbury Road at Erie International Airport in

Erie, PA Mr. Frederick coordinated with CSX personnel and managed the budget until the project was cancelled (2006 - 2012)

CSX Montgomery Sanitary Sewer Installation - Project Manager
Managed CE&I services for the micro-tunneling and installation of a 96-foot sanitary sewer beneath the CSX main line tracks in Montgomery, AL. Mr Frederick prepared estimates, coordinated with CSX personnel, and managed the budget (2007 – 2008)

Republic of China Ministry of Rail ITCS Signal System - Designer
Served as a member of the design management team for a state-of-the-art, GPS-based, ITCS system on 1,400 km of rail line between Beijing and Tibet for the Republic of China's Ministry of Rail. Mr. Frederick led a team of engineers and CAD designers in the application engineering department of GE Transportation Systems in Jacksonville, FL, to ensure on-time project completion within pre-established budgetary constraints (2004 - 2005)
Performed while employed by GE Transportation Systems

GE Transportation Systems - Signal Engineer
Directed oversight and management of the grade crossing warning system and as-in-service train control projects This position required solid knowledge and experience in railroad signal design, inspection and installation; Federal Railroad Administration, Federal Highway Administration, and Manual on Uniform Traffic Control Devices standards; as well as a thorough understanding of the federal (ISTEA/TEA-21/SAFETEA-LU) funding programs. (2000 - 2005)

CSX Public Projects - Former Principal Engineer, Public Projects
Oversaw project management and administration of publicly funded projects. within a 11-state area including Ohio, Michigan, Indiana, Illinois, Pennsylvania, Kentucky, Tennessee, West Virginia, Virginia, Maryland, Washington, D C., and Ontario, Canada Mr Frederick monitored, scheduled, and coordinated key project milestones necessary for successful implementation. His responsibilities necessitated close interaction, communication, and negotiation with state and local government authorities for review and execution of contractual agreements. The position required detailed knowledge and application of state and federal laws and regulations, as they relate to railroad operations, permitting, and associated issues. He periodically appeared as the railroad's expert witness for grade crossing accident and Public Utility Commission hearings and litigation Mr. Frederick also functioned as the railroad's primary representative in the mediation of legal proceedings, public safety issues, and other politically-sensitive railroad-related matters. (1994 - 2000)

CSX Technology - Former Software Engineer
Managed the system and network of the company's CADS in Jacksonville, FL His duties included system monitoring, performance tuning, supervision, implementation and management of software/hardware upgrades, and

disaster recovery planning within a high-volume, mission-critical operation. (1992 - 1994)

CSX Technology - Former Electronic Signal Technician
Coordinated and implemented new software to update CADS in Jacksonville, FL. His duties included managing and directing field personnel in the identification, analysis, and resolution of signal code system problems (1988 - 1992)

CSX Technology - Former Division Signal Maintainer
Performed signal design, installation, maintenance, and electronic trouble shooting of automatic signal and grade crossing warning systems in Newark, OH (1974 - 1988)

WORK HISTORY

GE Transportation Systems Global Signaling - Former Signal Engineer (2000 - 2005)

CSX Transportation, Inc - Principal Engineer-Public Projects (1994 - 2000)

CSX Technology - Software Engineer (1992 - 1994)

CSX Technology - Electronic Signal Technician (1988 - 1992)

CSX Technology - Division Signal Maintainer (1974 - 1988)

VERIFICATION

I, Robert D. Fredericks, Senior Director of Property Taxes for Union Pacific Railroad Company's Finance Department, sponsor evidence in Section III.D relating to the State of Utah's ad valorem tax methodology and Union Pacific's assessed fair market value under such methodology. I declare under penalty of perjury that I have read the Reply Evidence in this proceeding that I have sponsored and that the contents thereof are true and correct. Further, I certify that I am qualified and authorized to sponsor this testimony.

Robert D. Fredericks

Executed on April 11, 2013

DAVID J. HUGHES

David J Hughes has over 30 years of experience as a professional engineer, including railroad engineering, railroad operations, and maintenance supervision. He has substantial experience with small regional freight railroads, as well as larger railroads, and is especially well qualified to assess the MOW workload and resource requirements of IRR.

Mr. Hughes has experience with a broad range of railroads. From 1967 to 1975, he held numerous positions in the Engineering Department of Southern Pacific Railroad, including as a General Track Foreman in Utah In this position, he inspected track for defects and either personally made repairs or scheduled the repairs by a maintenance gang. He also supervised the work of section gangs, smoothing gangs, and welders In addition, Mr. Hughes served as Bridge and Building Supervisor in Houston, Texas In that position, he was personally responsible for performing annual bridge inspections and prioritizing bridge maintenance. He was also responsible for equipment maintenance facilities and other railroad facilities in the Houston Terminal. Both of these positions provided Mr. Hughes with hands on knowledge of what is required to maintain track and structures in the field.

From 1975 through 1980, Mr. Hughes was Vice President of Engineering for the Boston and Maine ("B&M") Railroad, where he was responsible for all track structures and signal systems maintenance, and for planning the reconfiguration and reconstruction of 155 route miles of mainline B&M's size and traffic density were similar to those of IRR.[1] As B&M was in bankruptcy reorganization when Mr. Hughes was chief engineer, he gained valuable experience in effectively maintaining track and structures at the lowest possible cost

[1] B&M was sold to Guilford Transportation Industries in 1981.

From 1980 through 1985, Mr. Hughes was President of Pandrol, Inc. (a manufacturer of track fastening systems) and Speno Rail Services (a railroad track maintenance contractor), where he assisted railroads in developing high-performance track components and mechanized rail and ballast maintenance practices In those positions, he spent extensive time in the field observing maintenance problems first hand and devising solutions to those problems

From 1985 through 1991, Mr. Hughes was President of the Bangor & Aroostook Railroad, a 430-mile regional railroad in the northeastern United States. From 2001 to 2005, he was Chief Engineer for the National Railway Passenger Corporation ("Amtrak"), where he was responsible for maintenance and construction of track, structures, signal and electrical systems on one of the most complex railroad infrastructures in the Americas. This position gave him a deep understanding of the most sophisticated railroad track, signal, and electrical technologies. From 2005 through 2006, Mr Hughes was Acting President and Chief Executive Officer of Amtrak.

As co-founder and first chairman of Regional Railroads of America, Mr. Hughes testified before Congress on several occasions about the capital and maintenance requirements of small railroads. He has had frequent discussions with leaders of the small railroad industry about their techniques for operating railroads profitably Furthermore, as a consultant, Mr Hughes has performed due diligence reviews of dozens of MOW plans for lines being spun off by Class I railroads or of lines being bought or sold by private parties. These due diligence studies generally involved hi-rail inspection trips over lines and interviews with MOW officials regarding their MOW maintenance organizations and plans for maintaining the lines Through the due diligence reviews, Mr Hughes gained extensive familiarity with the MOW practices of non-union railroads These reviews, performed for financial institutions and borrowers, are an ongoing part of his practice, allowing him to keep up to date with the most recent MOW practices. Mr. Hughes' consulting work has allowed him to understand how MOW practices have evolved over the past 30 years and has placed him in an excellent position to contrast the MOW practices of different railroads.

Mr. Hughes has a long history of participation in professional engineering organizations and keeps those contacts current He has been a director and member of the board of governors of the American Railway Engineering and Maintenance Association, a director of the Engineering Division of the Association of American Railroads ("AAR"), and president of the Transportation Research Forum of New England. He has served on the AAR committee prioritizing new research investments and has attended several annual meetings of the International Heavy Haul Association. He has been a frequent visitor to the Facility for Accelerated Service Testing in Pueblo, Colorado, where he followed the performance of various track components under heavy haul conditions.

During his career, Mr. Hughes has worked with more than 35 railroads in 25 countries – including short line railroads in the United States – to improve operating efficiency, evaluate operations and maintenance costs, and optimize capital spending. His knowledge of MOW practices is fresh, broad, and deep, and he is well-acquainted with maintenance activities on lines with size and traffic density similar to what IPA proposes for IRR. Thus, Mr Hughes is well-positioned and highly qualified to evaluate IPA's MOW evidence and the maintenance requirements for the IRR lines His testimony addresses the reasonableness of IPA's MOW assumptions and the need to consider real-world evidence in evaluating IPA's MOW plan.

Mr. Hughes sponsors evidence relating to MOW costs set forth in Section III D 4. Mr. Hughes has signed a verification of the truth of the statements contained herein A copy of that verification is attached hereto.

VERIFICATION

I declare under penalty of perjury that I have read the Reply Evidence in this proceeding that I have sponsored, as described in the foregoing Statement of Qualifications, and that the contents thereof are true and correct Further, I certify that I am qualified and authorized to sponsor this testimony.

David J. Hughes

Executed on April 8, 2013

DAVID A. MAGISTRO, P.E.

David A. Magistro is a Senior Engineer/Project Manager for STV Incorporated at 6405 Metcalf, Suite 516, Overland Park, KS 66202. He has more than ten years of experience focused on movable bridge construction and rehabilitation for numerous private railroad and public transportation agency clients. He is knowledgeable about all components of railroad bridges, including superstructure design, substructure design and bridge construction.

Mr. Magistro was the bridge design team leader for BNSF's double tracking project through Abo Canyon in New Mexico, which included design for 9 major bridges, T-Wall retaining walls and several culverts He has also provided strategic planning on more long-term projects, such as the delicate conversion of a historic swing-span bridge in Swanton, VT, from manual to mechanical operation. Mr. Magistro's project team successfully incorporated an electric-powered system for New England Central Railroad without altering the appearance or function of the bridge.

Mr. Magistro has a Bachelor of Science degree in Civil Engineering from Kansas State University.

Mr. Magistro's resume is attached hereto.

Mr. Magistro is sponsoring Section III.F.5 of UP's Reply Evidence relating to bridges. Mr. Magistro has signed a verification of the truth of the statements contained therein. A copy of that verification is attached hereto.

VERIFICATION

I declare under penalty of perjury that I have read the Reply Evidence in this proceeding that I have sponsored, as described in the foregoing Statement of Qualifications, and that the contents thereof are true and correct. Further, I certify that I am qualified and authorized to sponsor this testimony.

David A. Magistro

Executed on April 5th, 2013

David A. Magistro, P.E.

Senior Engineer/Project Manager

[movable bridge focus]
Mr Magistro has more than 10 years of experience focused on movable bridge construction and rehabilitation for numerous private railroad and public transportation agency clients. Regarded as a versatile and responsive professional, he is knowledgeable about all components of movable bridges, including the structural steel, drive systems, motors, shafts, and bearings Mr Magistro's design of emergency repairs to the structural and mechanical systems on the 3,750-foot, double swing-span Coleman Bridge between Yorktown and Gloucester Point, VA, helped the Virginia Department of Transportation (VDOT) quickly restore service to this important toll crossing after a tug boat collision. He has also provided strategic planning on more long-term projects, such as the delicate conversion of a historic swing-span bridge in Swanton, VT, from manual to mechanical operation Mr Magistro's project team successfully incorporated an electric-powered system for New England Central Railroad without altering the appearance or function of the bridge

Office Location
Overland Park, KS

Date joined firm
3/30/09

Years with other firms
11

Education
Bachelor of Science, Civil Engineering, Kansas State University (1998)

Professional Registrations
Professional Engineer
Missouri (2003/ #2003001061/exp 12/31/13)
Kansas (2009/#20754/exp. 4/30/13)
Oklahoma (2009/#21155/exp. 8/31/14)

Memberships
American Railway Engineering and Maintenance-of-Way Association (AREMA) (2005 - Present)
Chairman, AREMA Committee 15 Subcommittee 6 (2012 – Present)
Heavy Movable Structures (HMS) Registrar (2001 - 2010), Treasurer (2010-Present)

Project Experience

ODOT Robinson Street Grade Crossing - Project Manager
Managing the construction of a detour for rail and vehicular traffic that will be used during construction of a permanent Burlington Northern Santa Fe (BNSF) Railroad grade separation at Robinson Street in Norman, OK This railroad corridor receives heavy freight traffic and is also an Amtrak corridor. STV's shoofly design will permit rail and roadway traffic to continue during construction In addition, the firm is assisting the contractor with the design of shoring for the permanent bridge structure. (3/10 - Present)

UPRR Oklahoma City I-40 - Project Engineer
Reviewed project plans for the realignment of train tracks along this highway corridor in Oklahoma City Mr Magistro reviewed the overhead structures and foundation configuration at each grade separation to determine if the arrangements, clearances, and structural designs met American Railway Engineering and Maintenance-of-Way Association (AREMA) and Union Pacific Railroad (UPRR) requirements He provided reviews through the duration of the project and interacted with UPRR, the Oklahoma Department of Transportation, utility owners, and construction contractors. (6/09 - 9/10)

New England Central Railroad Bridge 15.21 Modification - Project Engineer
Provided mechanical and structural design services for the conversion of a swing-span bridge from manual to mechanical operation in Swanton, VT. The bridge, which had been operated manually using a capstan, is protected as a state historic resource The project team successfully incorporated the

electric-powered system without altering the appearance or function of the bridge (5/09 - 10/10)

VDOT Coleman Bridge Cable Replacement - Project Engineer
Designed emergency repairs to the structural and mechanical systems on this 3,750-foot, double swing-span bridge that crosses the York River between Yorktown and Gloucester Point, VA. A tug boat struck the bridge and damaged several cables Mr Magistro's work enabled VDOT to restore service to this important toll crossing, which carries the 4-lane U.S. 117 and connects the Peninsula and Middle Peninsula areas of Virginia's Tidewater region. (10/09 - 6/10)

South Central Florida Express Moore Haven Bridge Rehabilitation - Project Engineer
Prepared design plans for new mechanical equipment on this swing-span railroad bridge in Moore Haven, FL, which remained in operation during construction. Engineers completed the transition between the old and new system in a week without causing interruptions to train service (5/10 - 9/10)

BNSF Bridge 231.4 Structural Inspection, Load Rating, and Structural Repairs - Project Manager/Field Inspector/Design Engineer
Responsible for the comprehensive structural inspection and load rating of the floor system for the roadway portions of this double-deck structure over the Mississippi River in Fort Madison, IA, for the Burlington Northern Santa Fe (BNSF) Railroad. The inspection and load rating was followed by a phase of structural repairs. Mr Magistro was responsible for the design and construction sequencing of the structural steel repairs for an approach span through plate girders and floor system components, including stringers and floor beams. (6/08 - 3/09)

Norfolk Southern Bridge 6.66 Rehabilitation - Design Engineer
Managed the structural design for the replacement of curved segments on the rolling girders of this double-track rolling bascule span over the South Branch Elizabeth River in Gilmerton, VA. The project included structural design and detailing, plan production, construction specifications, construction sequencing and contractor coordination. (5/07 - 1/09)

BNSF Bridges 5.8, 6.2, and 6.7 Structural Inspection, Load Rating and Structural Repairs - Project Manager/Field Inspector
Directed the comprehensive inspection and load rating analysis of these three structures over north Willamette Boulevard, north Lombard Street, and north Fessenden Street in Portland, OR All three structures consist of a combination of deck plate girder spans and deck truss spans resting on either structural steel towers or concrete piers. Mr. Magistro also managed the follow-up project to design structural retrofits to increase the load capacity of these structures (1/08 - 12/08)

BNSF Bridge 117.35 Electrical/Mechanical Rehabilitation - Project Manager

Responsible for the replacement of the drive system on this span drive vertical lift bridge over the Illinois River in Beardstown, IL. The project included replacing the existing central reducer, drive motors, auxiliary drive system, shafts, bearings, and couplings. (9/07 - 11/08)

Canadian Pacific Rail Bridge 283.27 Bearing Repair and Truss Jacking - Project Manager/Design Engineer
Responsible for design and detailing of jacking frames used to longitudinally jack two approach spans through trusses adjacent to this 360-foot swing span over the Mississippi River in La Crosse, WI The project included construction sequencing and field assistance during construction (5/07 - 12/07)

VDOT I-264 Berkley Bridge Rehabilitation - Design Engineer
Participated in the rehabilitation of a 4-leaf bascule bridge over the New Elizabeth River in Norfolk, VA, for VDOT The project consisted of design and integration of a new drive system and machinery on top of an existing system of equipment and machinery The design includes two complete designs to accommodate the original 2-leaf bascule built in 1950 and the second bascule pair built in 1992 Mr Magistro's responsibilities included design of the new mechanical equipment, as well as structural retrofits required for installation of the new equipment. (6/06 - 9/07)

BNSF Abo Canyon Double Track Capacity Design Project - Lead Bridge Engineer
Responsible for bridge layouts, design, quantity calculations and cost estimates for nine bridge structures along a 5-mile stretch of second mainline track for the Burlington Northern Santa Fe (BNSF) Railroad through Abo Canyon, NM. (10/04 - 3/06)

BNSF Bridge 0.80 Emergency Stringer Replacement - Project Manager/Design Engineer
Supervised the emergency replacement of eight stringers in the movable span floor system of this 450-foot swing span over the Missouri River in Kansas City, MO The scope of the project also included shop inspection during fabrication of the fracture critical stringers. (8/04 - 10/04)

Canadian Pacific Rail Bridge 283.27 Span Alignment Lock Design - Project Manager
Led the design and detailing of a new span alignment and span locking device for this 360-foot swing span over the Mississippi River in La Crosse, WI The project included structural modifications to the approach span where the new device was located (12/03 - 10/04)

BNSF Bridge 37.0 Fender Replacement - Project Manager/Design Engineer
Oversaw design and detailing of a new fender system for the 260-foot swing span over the Snohomish River in Everett, WA. (5/03 - 4/04)

Work Experience.

HDR Engineering Kansas City, MO - Design Engineer / Project Manager (5/00 - 3/09) Project Manager responsible for all facets of project execution: tracking and marketing project opportunities, proposals, project initiation in the accounting system, staffing of project work, managing deliverables, tracking financial and business aspects, invoicing, coordination with subcontractors, construction staging and project close-out Movable Bridge/Rail Bridge team member assisting with staffing and work load planning for all project work within the section Rail engineer: Structural inspection, bridge layout, structural steel design, foundation design, retrofits and repairs design Movable Bridge Engineer Structural and mechanical inspection, operational troubleshooting Structural design of equipment frames, reinforcing existing members and modifications to existing structure Mechanical design of shafts, bearings, gears, pinions, couplings, brakes and gearboxes Construction assistance QA/QC Committee member Office Safety Coordinator for HDR Kansas City. Project manager planning & monitoring training, career skills development training, leadership training, people styles training and Dale Carnegie training - effective communications and human relations

Black & Veatch Corp Kansas City, MO - Steel & Foundation Engineer
(6/98 - 5/00) Steel designer for a combined cycle power plant, including 1200-ton structural steel pipe rack. Mechanical and Electrical Departments to resolve interference issues with pipe rack Foundation designer for pipe rack, combustion turbines and heat recovery steam generators Directed technicians for plan production of structural steel and reinforced concrete foundations

STEVEN R. McMULLEN, P.E., L.E.G

Steven R. McMullen is a geotechnical engineer at Shannon & Wilson, Inc. with 22 years of experience of which the last 16 years have been related to railroad projects. As an engineer with a geological engineering background, Steve recognizes geologic issues that can have major impacts on the design, construction, and maintenance of a railroad. He has directed geotechnical and geological reconnaissance efforts for railroad condition assessments and new track construction projects varying in length from 2 to 880 miles. Steve's railroad projects have included tunnel improvements, track substructure design, river bank stabilization, soil nail shoring, bridge foundations, and retaining walls. However, the majority of his railroad projects have involved the stabilization of soft subgrade, embankment slopes, and landslides that impact railroad operations. Steve specializes in designing low-cost stabilization methods that can be constructed with minimal impact on railroad operations. He has employed a variety of slope stabilization methods at over 300 sites, including trench drains, horizontal drains, toe buttresses, lightweight fills, shear keys, and pile reinforcements. Mr. McMullen has a Master of Science Degree in Civil Engineering from Virginia Polytechnic Institute and State University.

Mr. McMullen's resume is attached hereto.

Mr. McMullen is sponsoring Section III.F.4 of UP's Reply Evidence relating to geotechnical issues and GIS mapping. Mr. McMullen has signed a verification of the truth of the statements contained therein. A copy of that verification is attached hereto

VERIFICATION

I declare under penalty of perjury that I have read the Reply Evidence in this proceeding that I have sponsored, as described in the foregoing Statement of Qualifications, and that the contents thereof are true and correct. Further, I certify that I am qualified and authorized to sponsor this testimony.

Steven R McMullen

Steven R McMullen

Executed on April 5, 2013

Steven R. McMullen, PE, LEG | Associate

EDUCATION

MS, Civil Engineering (Geotechnical), Virginia Polytechnic Institute and State University, 1989
BS, Geological Engineering, Washington State University, 1988

REGISTRATION

Registered Professional Civil Engineer WA, 33223, 1996
Registered Professional Civil Engineer SD, 7938, 2003
Registered Professional Civil Engineer, MT, 16316, 2004
Registered Professional Civil Engineer: ND, PE-4991, 2003
Licensed Engineering Geologist WA, 1240, 2002

Steve McMullen is an Associate in the Railroad Services group of Shannon & Wilson, Inc. Steve has been practicing geotechnical and geological engineering for over 22 years with the last 16 devoted almost exclusively to railroad geotechnology projects As an engineer with a geological engineering background, he recognizes geologic issues that can have major impacts on the design, construction, and maintenance of a railroad He has directed geotechnical and geological reconnaissance efforts for railroad condition assessments and new track construction projects varying in length from 2 to 880 miles. His railroad projects have included tunnel improvements, track substructure design, river bank stabilization, soil nail shoring, bridge foundations, and retaining walls. However, the majority of his railroad projects have involved the stabilization of soft subgrade, embankment slopes, and landslides that impact railroad operations. Steve specializes in designing low-cost stabilization methods that can be constructed with minimal impact on railroad operations. He has employed a variety of slope stabilization methods at over 300 sites, including trench drains, horizontal drains, toe buttresses, lightweight fills, shear keys, and pile reinforcements

RELEVANT EXPERIENCE

Dakota, Minnesota & Eastern Railroad (DM&E) – Powder River Basin Expansion Project, Powder River Basin Consortium (Design-Build Team), MN, SD, WY. Lead Geotechnical Engineer for the proposed DM&E project that will include the rehabilitation of 600 miles of existing railroad through Minnesota and South Dakota, and the construction of 280 miles of new railroad to access coal mines in Wyoming During a conceptual engineering phase from 1998 to 2000, Steve planned and directed geologic reconnaissance, subsurface explorations, and laboratory testing programs He performed extensive computer slope stability studies to determine design slope angles for fill embankments and excavation cut slopes for a variety of geologic conditions including the landslide-prone Pierre Shale. Steve also analyzed the stability of existing embankments and landslides and developed preliminary stabilization recommendations During the preliminary engineering phase in 2006-2008, Steve was project manager for the PRC portion of the project: a 107-mile segment of existing track reconstruction between Pierre and Wall, South Dakota. The PRC Segment is known for its difficult soil conditions and track subgrade instability. Steve developed and managed the exploration program that included 148 borings and 38 test pits. His engineering evaluations included track subgrade stabilization using lime, asphalt, and geosynthetics, embankment stability analyses, cut slope design, culvert design, ballast and subballast design, and erosion control. He also provided deep foundation recommendations for 69 bridges

UPRR Crusher Siding, Allamoore, TX. As Project Manager for geotechnical design of a new railroad siding, Steve developed subsurface exploration and laboratory testing programs, performed analyses for embankment and cut slope design, ballast/subballast design, settlement, and rock excavation methods. At UPRR's request, he also provided review and comment on UPRR's standard specification for rock blasting.

Burlington Northern Santa Fe Railway (BNSF) – Subgrade Maintenance Training Course, BNSF System-wide. Course development and instructor. Steve and other Shannon & Wilson engineers developed a training course and manual for BNSF Maintenance-of-Way, Engineering, and Structures personnel. The course was designed to increase railway workers' awareness of the importance of drainage. It described how common railroad maintenance practices such as undercutting, ditching, shoulder grading, etc., can affect the subgrade and embankment stability, and outlined the proper methods of performing such activities. Steve presented the course to over 350 BNSF employees in 20 cities.

North Coast Railroad Authority – Restoration of the Northwestern Pacific (NWP) Railroad, Northern CA. Project Manager. The NWP Railroad extends from Arcata, California, southward approximately 300 miles to San Pablo Bay. It repeatedly suffered damage from severe storms and flooding in the 1990s and has been closed since 1998. The State of California intends to restore rail service to all or part of the line. Steve performed geotechnical field reconnaissance along portions of the line in 1999, 2002, 2005, and 2007-2008. He obtained permission from adjacent property owners to access to the railroad right-of-way, provided recommendations for repairs and stability improvements, estimated material quantities, and developed construction costs for nearly 290 locations with damage from rockfalls, landslides, and erosion. He also performed condition assessments of all 30 tunnels on the alignment, and working with other Shannon & Wilson engineers, developed tunnel rehabilitation recommendations, including repair of three collapsed tunnels.

Union Pacific Railroad Coast Line - Landslides near Santa Barbara, CA. Emergency response and lead geotechnical engineer. Steve participated in storm damage assessment surveys after severe El Niño storms of 1998 and 2005 triggered or reactivated major landslides, debris torrents, and high fill embankment failures along coastal bluffs in southern California. Steve developed aerial mapping, ground survey, and subsurface exploration programs. Based on the survey and exploration data, Steve performed stability analyses to evaluate various stabilization alternatives including subsurface drains, retaining structures, toe buttresses, and micropiles. Steve has performed similar storm and flood damage assessment surveys for the BNSF between Everett and Vancouver, Washington, the Union Pacific Railroad in Portland, Oregon, and the Columbia River gorge and the Port of Tillamook Bay Railroad in Oregon. On the UPRR Coast Line, Steve has also provided underground utility design review for landslide crossings and provided design recommendations for an aerial insert to suspend fiber optic lines across a landslide.

UPRR Second Main Line Construction, Cochise to Raso, AZ. Lead Geotechnical Engineer responsible for subsurface characterization and geotechnical analyses for 15.6 miles of proposed second main line embankment construction. Steve planned the subsurface exploration program consisting of 17 drill rig borings and 89 test pits, and developed the laboratory testing program. He performed analyses to estimate settlements and to determine stable embankment slopes. He provided recommendations for new embankment design and construction, including practical, low-cost measures to mitigate the effects of three to four feet of consolidation settlement resulting from embankment construction on soft clay soil.

BNSF Railway Company, Yellowstone River Bank Stabilization, Eastern MT. Project Manager. The BNSF railroad follows the Yellowstone River as it flows northwest from Billings to Glendive, Montana Steve has provided geotechnical engineering services to BNSF on landslide and riverbank erosion projects along the Yellowstone since 1994. During high flows in July 2008, bank erosion caused the track to become undermined and a train derailed into the river near Forsyth, Montana. Steve provided emergency response, designed bank stabilization measures, directed the permitting effort, and provided construction observation services. He participated in aerial and ground reconnaissance along the entire rail alignment and developed an inventory of potential bank stabilization sites Design of bank stability improvements, construction cost estimating, and permitting for these sites are ongoing Steve's designs have incorporated combinations of soft bioengineering methods, such as live willow staking, root wads, biodegradeable erosion control blankets, and revegetation, and hard engineering methods such as rock riprap revetments and slope armor

Caliente Rail Corridor, Bechtel SAIC Company, NV, Lead Geotechnical Engineer. The Caliente Rail Corridor is the preferred route for rail transport of radioactive waste and spent nuclear fuel to the proposed Yucca Mountain Repository in Nevada The project would involve construction of a new 300-mile rail line. Steve coordinated field reconnaissance efforts to support alignment optimization and preliminary engineering. He personally performed geotechnical and geological reconnaissance of over 400 miles of primary alignment and alternates He implemented real-time GPS navigation and terrain mapping to access the alignment in remote areas of the Nevada high desert, including the Nevada Test Site He also managed several geotechnical exploration and potential quarry site reconnaissance teams. His attention to detail and strict adherence to safety protocols resulted in no safety incidents or rules violations during several months of field work Using the field data, Steve provided preliminary engineering recommendations to support final route selection, EIS preparation, and civil design studies

Burlington Northern and Santa Fe Railroad, Commuter Rail Track Improvements, Tacoma – Seattle, WA. Geotechnical Engineer. Steve participated on the design team retained by the Burlington Northern and Santa Fe Railroad to design track improvements necessary to establish commuter rail service between Tacoma and Seattle, Washington. Shannon & Wilson completed field explorations, laboratory testing, and design studies to support the construction of two new bridges supported on deep foundations and the construction of several miles of retaining walls, and major utility relocations Steve's primary responsibilities included soil nail wall design, exploration management, and construction observation of anchored walls

PROFESSIONAL ASSOCIATIONS

American Society of Civil Engineers
Association of Engineering Geologists
American Railway Engineering and Maintenance-of-Way Association

THOMAS MURPHY

Thomas Murphy is a rail transportation consultant with 46 years of experience in rail industry operations. He began his career with the Milwaukee Railroad in 1967 In 1975, he was promoted to trainmaster. In 1979, Mr. Murphy joined the Chicago & North Western Railway Company ("CNW"), where he held various positions, including General Manager of the Transportation Center in Chicago. In that position, he was responsible for the safe and efficient dispatching of trains, locomotives, and crews for the CNW system, served as the point of contact for all interchange railroads on the system, and directed activities on CNW's line into the Powder River Basin.

Following the 1996 merger of CNW with UP, Mr. Murphy worked with the merger team to combine the CNW dispatching center into the Harriman Dispatch Center in Omaha, Nebraska. In 1996, he became General Superintendent of UP's Central Region, with responsibility for safety, transportation, and budget for the UP territories from St Louis, Missouri, to Texarkana, Texas, and Kansas City, Missouri, to Yuma, California. In 1998, Mr. Murphy was promoted to General Manager of the Harriman Dispatch Center. In addition to managing the Harriman Center, his responsibilities in this position included the acquisition of locomotives, short-term lease of locomotives, and balancing of horsepower hours between UP and other Class I railroads

In 1999, Mr. Murphy was promoted to Assistant Vice President of Operations for UP's Western Region, with responsibility for safety, transportation, dispatching, and budget for the region. The Western Region covered nine states, from Kansas to California, and to Idaho and Nevada. Mr. Murphy retired from UP in 2009.

Based on his experience described above, Mr. Murphy is familiar with the operating characteristics of the UP lines replicated for purposes of IPA's SARR, as well as with rail operations more generally. Mr. Murphy sponsors evidence relating to rail operations set forth in

Sections III.B and III C of the Reply Evidence above, as well as portions of Section III.D relating to IRR Operating Department personnel Mr Murphy has signed a verification of the truth of the statements contained herein A copy of that verification is attached hereto

VERIFICATION

I declare under penalty of perjury that I have read the Reply Evidence in this proceeding that I have sponsored, as described in the foregoing Statement of Qualifications, and that the contents thereof are true and correct. Further, I certify that I am qualified and authorized to sponsor this testimony.

Thomas Murphy

Executed on April 8, 2013

MARK PETERSON

Mark Peterson is a Vice President with STV Incorporated at 1055 West Seventh Street, Suite 3150, Los Angeles, CA 90017. He brings over 25 years of extensive experience in the design and construction management of transportation architecture. He brings a high degree of knowledge and experience in the resolution of challenging design and construction processes within operational facilities and structures. Most recently Mr. Peterson has functioned as the project architect on numerous highly technical projects for light rail, commuter rail, and passenger rail as well as Class I railroads. Mr. Peterson is sensitive to the specific needs of his clients, working closely with them to set appropriate project direction in order to achieve design goals. Mr. Peterson has a Bachelor of Arts Degree in Architecture from Washington University.

Mr. Peterson's resume is attached

Mr. Peterson is sponsoring Section III.F.7 of UP's Reply Evidence relating to buildings and facilities. Mr Peterson has signed a verification of the truth of the statements contained therein. A copy of that verification is attached hereto.

VERIFICATION

I declare under penalty of perjury that I have read the Reply Evidence in this proceeding that I have sponsored, as described in the foregoing Statement of Qualifications, and that the contents thereof are true and correct. Further, I certify that I am qualified and authorized to sponsor this testimony.

Mark Peterson

Executed on April 5, 2013

Mark A. Peterson, AIA

Architect
Vice President

Mr. Peterson is an architect and project manager with more than 25 years of experience in the design and oversight of new and renovated transportation, healthcare, and laboratory facilities. His transportation work has included master planning, programming, and design for vehicle maintenance, service and inspection, parking, operations and administrative, and communications facilities for state and regional transit agencies and railroads. Mr. Peterson also has particular expertise providing design for healthcare facilities, as well as for life safety systems and ADA compliance upgrades. He brings a high degree of knowledge and experience in the resolution of challenging construction projects within operating facilities.

Office Location
Los Angeles, CA

Date joined firm
12/3/07

Years with other firms
23

Education
Bachelor of Arts, Architecture, Washington University (1984)

Professional Registrations
Licensed Architect: California (1994/#C25229/ exp. 5/31/13)

Memberships
American Institute of Architects (AIA), Los Angeles Chapter

Project Experience

BNSF Intermodal and Automotive Facility Expansions - Project Manager/Project Architect
Led design for numerous rail and building projects in Los Angeles associated with a $150 million expansion of the world's largest intermodal facility. One project was the complete redesign of secure parking facilities, which included security systems; gate reconfiguration; and supporting administrative, repair, and mechanical structures. Mr. Peterson helped develop a complete master plan corresponding to the rolling 5-year goals of the BNSF Railway Company. He was responsible for the programming and design of a new 30,000-sf operations and administrative command center serving the nearly 500 employees and contractors at the Los Angeles facility, as well as a new, secure communications hub built to emergency services standards in Stockton, CA, to provide connectivity between operations centers in Los Angeles; Fort Worth, TX, and Northern California. Mr. Peterson assumed a similar design role for the Memphis Intermodal Yard Expansion, which was one of the first in the nation to employ European wide-span crane technology. (1995 - 2007)

POLA/BNSF Southern California International Gateway - Task Manager/Project Architect
Worked with the Port of Los Angeles (POLA) and BNSF Railway Company to plan a new intermodal facility, the Southern California International Gateway (SCIG), on a sustainable design basis on a 153-acre site in the San Pedro neighborhood of Los Angeles. The $500 million SCIG will provide much-needed near-dock capacity with direct access to the Alameda Corridor, a 20-mile-long, grade-separated rail line between the ports and downtown Los Angeles. The design, which progressed to the Environmental Impact Report process and is presently awaiting approval, is based on minimizing the environmental footprint and employs highly efficient wide-span cranes

capable of serving up to eight intermodal tracks. The cranes are electric and use cogeneration of power in their operation All hostling equipment will utilize either compressed natural gas or liquefied natural gas to reduce emissions Yard lighting is designed to virtually eliminate light trespass and utilizes highly efficient lamps Yard operations are designed to provide the utmost in efficiency and further reduce hostling operations and third-party truck dwell time. This efficiency also reduces the overall area of impact for stormwater management (2005) [Project approval is still pending as of 11/12]

SANDAG South Bay Bus Operations and Maintenance Facility Expansion - Project Manager

Overseeing architectural design and structural, mechanical, electrical, and industrial engineering for the design-build expansion of the San Diego Metropolitan Transit System's South Bay Bus Operations and Maintenance Facility in Chula Vista, CA The $60 million San Diego Association of Governments (SANDAG) project includes alterations to the existing maintenance building; a new 2-story, 12,000-sf operations and administrative Building, a new 2-bay bus wash building; and miscellaneous site structures, including trash and equipment enclosures and bollards The new operations and administrative building will house 10 open service bays for 40-foot buses, 5 service bays for longer articulated buses, a chassis wash bay, parts storage and distribution, fluid storage, workshops and tool storage, administrative and managerial offices, staff support areas, and mechanical and electrical rooms (1/13 - Present)

WMATA Greenbelt Test Track and Commissioning Facility - Lead Designer

Preparing 90% architectural design for 2-story, 65,000-sf building in Greenbelt, MD The first floor will house shop and storage areas, mechanical and electrical rooms will be located on the mezzanine level, and the top floor will house Washington Metropolitan Area Transit Authority (WMATA) office areas The facility will be used to commission new Kawasaki 7000 series cars and 8000 series cars that will be procured in the future for use on the Silver Line and the replacement of the 2000 series and 3000 series cars. Features will include two tracks with commissioning/repair spots for two married pairs of vehicles, allowing the facility to commission up to eight cars at a time (9/12 - Present)

NS Coal Rate Case Litigation Cost Assessments - Lead Evidence Sponsor

Preparing the response to plaintiffs' claims for Norfolk Southern Railway (NS) for submittal to the Surface Transportation Board (STB) to justify contested tariff rates for the shipping of DuPont products. The assessment includes planning, engineering, and construction costs to build a hypothetical contemporary operating railroad. STV's services include a complete itemization, justification, and documentation of all transportation, material, and labor construction costs (4/12 - Present)

City of Ottawa Light Rail Transit Project Tunney's Pasture to Blair Station - Vehicle Maintenance Facility Design Lead

Leading a team of engineers and architects in the development of the bridging documents for the vehicle maintenance and operations center for a groundbreaking, $2 1 billion light rail transit (LRT) line for the City of Ottawa, Ontario — the first conversion of an exclusive, fully built-out bus rapid transit system to an LRT network in North America STV is providing analysis, preliminary engineering, and specifications for the 7 8-mile line, which features 13 stations, 4 of which in a 1 5-mile tunnel under downtown Ottawa, and a new vehicle maintenance and storage facility with a 172,000-sf maintenance shop, a 21,000-sf car cleaner/transportation/maintenance-of-way facility, a 258,000-sf covered storage building, and a traction power substation (1/12 - Present)

WRTA Bus Maintenance, Operations, and Storage Facility - Lead Designer

Overseeing architectural design for the construction of a new $40 million vehicle maintenance, operations, and storage facility in Worcester, MA, for the Worcester Regional Transit Authority (WRTA). The 2-story, 150,000-sf facility will have a capacity for 125 vehicles and space for 155 employees. It will include bus lifts, wash and fueling bays, a body shop and paint booth, fluid dispensing systems, general parts and tire storage operations and retrieval, operations and maintenance personnel welfare areas, bus and van dispatch space, and office and administration spaces. (10/11 - Present)

OCTA On-Call A/E Design and Construction Support Services for Facility Modification Projects - Project Manager

Responsible for architectural and engineering (A/E) design and construction support services for facility modification projects under a 2-year task-order contract with the Orange County Transportation Authority (OCTA) Tasks to date include a 192-space surface parking lot adjacent to the Golden West Transportation Center in Huntington Beach, CA, upgrades to the methane gas detection systems at the Anaheim and Garden Grove bus bases; and reconstruction of an exterior curtain wall assembly damaged by water intrusion at a bus fueling facility in Anaheim. (7/11 - Present)

Omnitrans East Valley Vehicle Maintenance Facility Modifications - Project Manager

Leading architectural and engineering services for project development — including preliminary engineering and final design, engineering support services during construction, and development of plans and procedures for start-up, commissioning, operations, and maintenance — of the Omnitrans East Valley Vehicle Maintenance Facility in San Bernardino, CA The facility needs $ million in modifications to accommodate the introduction of up to 23 sixty-foot-long articulated buses associated with the sbX bus rapid transit project. All maintenance services must remain operational throughout the construction period. (1/11- Present)

CHSRA Los Angeles-to-Anaheim Project EIR/EIS - Facilities Programming and Design Manager

Leading the team for preliminary design of three stations and a rolling stock vehicle maintenance facility for a 30-mile high-speed train corridor between Los Angeles and Anaheim, CA, for the California High Speed Rail Authority (CHSRA). The maintenance facility will provide Class 1-3 vehicle maintenance services for 28 trainsets daily The contextual nature of the proposed facilities is seen as critical in terms of aesthetic, scale, massing, and traffic impact. Early on, Mr Peterson led the team's effort to generate projections for vehicle design, operations, ridership numbers, and demographics parameters that CHSRA had not yet defined. These projections distilled down into sensible design solutions. Despite significant changes to the project due to immense political pressures, Mr Peterson's leadership enabled the team to complete deliverables on time Currently, design is progressing toward a 30% design deliverable in support of the Environmental Impact Statement/Environmental Impact Report (EIS/EIR) for the design-build procurement package Mr. Peterson is meeting and coordinating with numerous agencies and cities along the corridor. He is also addressing the complex integration with the proposed Anaheim Regional Transit Intermodal Center (6/09 - Present)

POLA Pacific Harbor Line Maintenance Facility - Project Manager

Managing the design of an 8,200-sf maintenance facility and a 5,000-sf prefabricated office building at the Port of Los Angeles (POLA) in Wilmington, CA, to accommodate the Pacific Harbor Line The maintenance facility will provide two covered inspection pits, a fueling track, sanding facility, and an oil/water separator In addition to the service areas, the building will house a storage area, machine shop, tool corral, break room, office area, locker room, and restrooms. The office building will house administrative offices, a dispatching center, support spaces, a conference room, and employee welfare spaces. The design for the $90 million project features a broad range of sustainable strategies and project-specific innovations to comply with the California Green Building Code. Due to uncertainty in the economy, the project has been put on-hold several times, after which Mr Peterson has successfully regrouped the project team and gotten them back up to speed As a result, STV's team has met all submittal deadlines in a timely and material fashion (7/08 - Present)

Caltrans Rainbow Truck Inspection Facility Improvements - Project Manager

Oversaw architectural and engineering services for the renovation of a California Department of Transportation (Caltrans) truck inspection facility on I-15 in Temecula, CA The design includes the removal and replacement of the office building associated with the truck inspection facility, augmentation to and replacement of the facility's CCTV system, and renovations to the on-site sanitary sewer system (8/12 - 10/12)

Amtrak High-Speed Rail Maintenance Facility Expansion Feasibility Study and Conceptual Design - Lead Designer

Responsible for the development of conceptual designs for a study on the proposed expansion of Amtrak's Acela maintenance facilities at Ivy City Yard, in Washington, D.C., Sunnyside Yard, in Queens, NY, and Southampton Yard, in Boston. The scope of work involved conceptual designs and cost estimates for expanded 2-track and 4-track service and inspection shops and associated track realignments at each yard to accommodate longer 8-coach trains and a new storage yard in Readville, MA, to house trains displaced from Southampton Yard (1/12 - 10/12)

City of Los Angeles LADOT CNG Fueling and Bus Maintenance Facility Feasibility Study - Project Manager
Led a feasibility study of three locations for a proposed new Los Angeles Department of Transportation (LADOT) fueling and maintenance facility for its 60-vehicle compressed natural gas (CNG) Downtown Area Short Hop bus fleet, with layover area for up to 64 Commuter Express buses The facility will include vehicle storage, CNG fueling stations, maintenance bays, office space, parking for employees and non-revenue vehicles, welfare facilities, and a dispatch center. In addition to determining minimum site size and configuration, the conceptual feasibility evaluation included environmental and accessibility requirements, capacity for future expansion, general floor plans, rendered elevations, and cost estimates Issues Mr Peterson and his team addressed included the maneuvering and parking needs of the 30-foot-long and 40-foot-long vehicles, traffic patterns and impacts in and around the sites, and the availability of adequate quality natural gas, as well as integration with and support for planned future high-speed rail service in the region (8/11 - 9/12)

NCTD On-Call Projects - Project Manager
Oversaw design for several on-call engineering, planning, and design projects for the North County Transit District (NCTD) in San Diego County Projects included development and site adaptation of a bus shelter prototype design, facility and site modifications at the Oceanside Transit Center, and design for the installation of a new standby electrical generator and automatic transfer switch at the Solana Beach Station. (12/07 -6/12)

Work History

1. Wilson & Company/Hanson-Wilson Inc. (2000 - 2006)
2. SWA Architects (1990 - 2000)

ROBERT C. PHILLIPS, P.E.

Robert C. Phillips serves as Vice President of the Rail Division at STV Incorporated, an Engineering Consulting Firm with offices located at 1000 West Morehead, Suite 200, Charlotte, NC 28208. He is responsible for overseeing and directing STV's commuter and freight rail planning and engineering projects He has more than 30 years of experience with track design and maintenance, grade crossings, bridge construction, signal and communication systems, maintenance and protection of traffic, and the installation of fiber-optic cable within railroad rights-of-way. Mr Phillips worked for Norfolk Southern Railway in various capacities for 12 years, during which he gained operating experience in engineering, track maintenance, and train operations His responsibilities included supervising and training train crews, ensuring operating rules compliance, and investigating accidents and injuries

Mr Phillips led a team of project managers, senior engineers, and other railroad consultants in assembling the planning, engineering, and construction costs to build a hypothetical contemporary operating railroad in Charlotte, NC, as part of a cost assessment for a several coal rate cases. Cost assessments included major earthwork, bridge and culvert construction, track, communications and signalization, engineering design, construction management, material costs and logistics, mobilization, and contingencies. Cases included *Duke/CSXT*, *CP&L*, *Seminole v CSXT*, *AEPCO*, *Otter Tail*, and *AEP Texas North*

Mr. Phillips holds a Master of Business Administration from Averett College and a Bachelor of Science degree in civil engineering from Virginia Polytechnic Institute. He joined STV in 1994.

Mr. Phillips' resume is attached hereto.

Mr. Phillips is sponsoring Section III.F.2 through III.F.12 of UP's Reply Evidence. Mr

Phillips has signed a verification of the truth of the statements contained therein. A copy of that verification is attached hereto.

VERIFICATION

I declare under penalty of perjury that I have read the Reply Evidence in this proceeding that I have sponsored, as described in the foregoing Statement of Qualifications, and that the contents thereof are true and correct. Further, I certify that I am qualified and authorized to sponsor this testimony.

Robert C. Phillips

Executed on April 5th, 2013

Robert C. Phillips, P.E.

Vice President/Project Manager

Mr. Phillips, Vice President of the Rail Division, is responsible for overseeing and directing STV's freight rail planning and engineering projects. He has more than 35 years of experience with track design and maintenance, grade crossings, bridge construction, construction management of rail projects, maintenance and protection of traffic, and the installation of fiber-optic cable within railroad rights-of-way. Mr Phillips worked for Norfolk Southern Railway (NS) in various capacities for 12 years, during which he gained operating experience in engineering, track maintenance, and train operations. His responsibilities included managing track maintenance, supervising and training train crews, ensuring operating rules compliance, and investigating accidents and injuries.

Office Location
Charlotte, NC

Date joined firm
6/2/94

Years with other firms
19

Education
Master of Business Administration, Averett College (1992)

Bachelor of Science, Civil Engineering, Virginia Polytechnic Institute (1975)

Professional Registration
Professional Engineer, Pennsylvania (2000/#PE056524-E/exp. 9/30/13) and Virginia (1997/#030702/exp 2/28/15)

Project Experience

NCDOT NS over U.S. 220 Bridge Replacement - Field Engineer
Provided construction field coordination between NS and the North Carolina Department of Transportation (NCDOT) for the replacement of a Norfolk Southern single-track, single-span railroad bridge with a double-track, 4-span railway bridge over U.S. 220 in Price, NC (1996 - 1997)

NCDOT NS over U.S. 401 Bridge Replacement - Field Engineer
Handled the construction field coordination between NS and the North Carolina Department of Transportation (NCDOT) for replacement of the Norfolk Southern Bridge over U.S. 401 in Fuquay-Varina, NC (1995 - 1996)

City of Greensboro Merritt Drive Improvements - Field Engineer
Performed construction observation for a detour bridge and replacement of the Norfolk Southern railroad bridge on Merritt Drive in Greensboro, NC. (1995 - 1996)

VDOT Norfolk Southern over U.S. 250 Bridge Replacement - Project Manager
Provided construction field coordination between NS and the Virginia Department of Transportation (VDOT) for the construction of a temporary detour bridge and a new through-plate girder replacement railroad bridge in Waynesboro, VA. (1994 - 1995)

NS Construction Management for Rickenbacker, Birmingham, and Charlotte Airport Intermodal Yards - Senior Project Manager
Assembling and administering construction management (CM) teams for three new NS regional intermodal facilities to handle increases in rail container traffic and to accommodate the classification of double-stack container trains. Each team is managing the construction of $100 million

projects at new site locations Construction includes grading and drainage, classification tracks, storage tracks, new sidings, concrete loading and unloading pads, acres of roller compact concrete for storage, truck gates, yard offices, and crew facilities. CM services include plan review, progress reports, inspection reports, maintenance of contractor's schedule, monthly pay estimates, and project closeout verifications and documentation (5/09 - Present)

Union Pacific Railroad Miscellaneous Engineering Services – Principal-in-Charge
Managing on-call contract services for an ongoing list of 40 current structural projects from Utah to Chicago for Union Pacific Railroad Mr Phillips is overseeing several types of engineering projects, including bridge deck replacements and repair, new track construction, construction and design reviews, and construction oversight. The projects include work on approximately 25 rail bridges. (2006 – Present)

NS On-Call Services Contract - Principal-in-Charge
Responsible for plan review and construction engineering on an on-call, as-needed basis for more than 50 projects involving proposed roadway, bridge, and retaining wall construction affecting railway facilities Projects to date have included overseeing construction of overhead bridges, underpasses, floodwalls, utility crossings, parallel construction of utilities, roadways, bikeways, and grade crossings (2/04 - Present)

CSX Transportation General Engineering Consultant Services Contract - Principal-in-Charge
Serving as the point of contact for administration of contract services and appointment of project managers. Mr. Phillips is overseeing track and bridge design and construction, plan review, construction management, and inspection services on an on-call basis for several projects involving proposed roadway, bridge, and retaining wall construction affecting railway facilities throughout the 23-state CSXT system. His contributions so far include the design and construction of bridges, tracks, yards, and capacity-related projects Public projects includes bridge, track, floodwalls, utility crossings, parallel construction of utilities, roadways, bikeways, and grade crossings (2/04 - Present)

STB Railroad Coal Rate Case Litigation Cost Assessments - Project Manager
Leading a team assembling the planning, engineering, and construction costs to build a hypothetical contemporary operating railroad. Services include a complete itemization, justification, and documentation of all transportation, material, and labor construction costs associated with a contemporary construction costing All submittals were entered as evidence to the Surface Transportation Board (STB) to justify contested rates for several coal rate cases Cost assessments included major earthwork, bridge and culvert construction, track, communications and signalization, engineering design, construction management, facilities, material costs and logistics,

mobilization, and contingencies. Cases included Norfolk Southern (NS) vs Duke Energy, NS vs. CP&L, CSXT vs. Duke Energy, AEPCO vs. Burlington Northern Santa Fe (BNSF) and Union Pacific, Otter Tail vs BNSF, AEP Texas North vs. BNSF, Seminole vs. CSXT, IPA vs UP, DuPont vs NS, TPI vs. CSXT, M&G vs CSXT (2002 – Present)

NS Heartland Corridor Clearance Improvements CM - Senior Project Manager
Oversaw this $191 million project to provide clearance improvements to 28 railroad tunnels and seven bridges on the 530-mile-long Heartland Corridor, which extends from Norfolk, VA, to Columbus, OH Mr. Phillips' services included creating overhead bridge jacking plans to obtain vertical clearances, modifying slide fences, providing utility coordination, creating Stormwater Pollution Prevention Plans for tunnel portals, creating railroad-bridge lowering plans, and reviewing track designs His construction management (CM) responsibilities also included conducting preconstruction meetings with contractors as well as weekly progress meetings, reviewing construction schedules, monitoring and documenting contractor work, reviewing monthly contractor pay estimates, and coordinating between the contractor and railroad forces. The project constituted an innovative public-private partnership venture between NS, various participating states, and the Federal Highway Administration. (4/07 - 12/10)

CSX Post-Hurricane Katrina/Rita Emergency Rail Reconstruction Project - Principal-in-Charge
Oversaw design and construction inspection for this $100 million emergency rail reconstruction project. Mr. Phillips was in charge of assessing damage to six major rail bridges ranging to more than 10,000 feet in length, developing repair or replacement plans, providing project management and construction management, and providing on-site inspection during the reconstruction period In total, more than 75 miles of track was severely damaged and in need of emergency repair (8/05 - 9/07)

NS Fiber-Optic Cable Installation - Project Manager
Responsible for the construction management of the installation of the fiber backbone along NS right-of-way along several routes: Cleveland, OH, to Boyce, VA, via Pittsburgh and Harrisburg, PA, Kalamazoo to Dearborn, MI; Dearborn, MI, to Toledo, OH; Toledo to Cleveland, OH; Cleveland, OH, to Buffalo, NY; and Cleveland, OH, to Pittsburgh, PA Mr. Phillips oversaw staffing, permitting, inspection, safety operations, and final route approval More than 100 managers and inspectors were involved in this major trunk line installation. Mr. Phillips also provided safety training, led NS operations meetings, attended weekly scheduling meetings, coordinated work trains and flagmen, and provided engineering reviews, change orders, and construction administration. (1999 - 2002)

NS Fiber-Optic Cable Installation in North and South Carolina - Project Manager
Coordinated with NS personnel and monitored the installation of fiber-optic cables belonging to Qwest Communications along several hundred miles of

NS right-of-way in North Carolina and South Carolina All phases of installation were involved, including plow train operations, long directional bores, and bridge attachments Mr. Phillips provided periodic progress reports to NS and authorized minor changes from the approved construction plans to meet local conditions. He was also responsible for monitoring the railroad safety aspects of the installations. (1998 - 1999)

CSX System-Wide Grade Crossing Sign Project - Team Leader
Led one of seven teams for this project which required the installation of standard identification signs at every roadway grade crossing on the CSX Transportation system During this process, STV completely updated the CSX grade crossing inventory list. (1997 - 1998)

CSX Systemwide Grade Crossing Inventory - Project Manager
Managed multiple teams to perform a grade crossing inventory encompassing more than 35,000 grade crossings on the CSX Transportation system in 21 states to meet a Federal Railroad Administration deadline. The project included deployment of multiple teams to inventory crossings, installing standard identification signs at every crossing to enhance safety and reporting, and updating CSX's inventory, including digital imagery of each crossing All work was performed under a tight deadline of 180 days and completed a month ahead of schedule. (10/97 - 6/98)

NS Automobile Mixing Facility - Field Engineer
Oversaw shop inspection of structural steel at the fabrication plant in Colfax, NC, to be utilized in construction of this new automobile mixing facility in Shelbyville, KY Mr. Phillips managed preliminary and final hydraulic/hydrologic design as well as railway, roadway, highway bridge, and railway bridge design (1996)

Norfolk Southern - Trainmaster
Supervised train crews and yard personnel, ensured operating rules compliance, investigated all accidents and injuries, scheduled local train and yard engine operations, and trained employees on Federal Railroad Administration and NS operating rules through annual operating rule classes for track and transportation employees in Manassas and Danville, VA (1981 - 1987)

Norfolk Southern - Track Supervisor
Supervised track maintenance crews and production gangs, responsible for track inspection program, and ensured Federal Railroad Administration (FRA) Track Safety Standards for Class of track were in compliance Mr. Phillips maintained the NS Safety Program over assigned territory and investigated all accidents and injuries, scheduled track maintenance operations, and trained employees on FRA Track Safety Standards and NS track maintenance policy. (1975 - 1980)

Work History

1. APAC, Project Engineer (1987 - 1992)
2. Norfolk Southern, Trainmaster (1981 - 1987)
3. Norfolk Southern, Track Supervisor (1975 - 1980)

RICHARD H. RAY

Richard H. Ray is Director of Projects for RR Rail Highway Crossing Consultants, Inc., a consulting company with expertise in rail/highway crossings design and requirements, train signal systems and communications, with an office at 506 Fontaine Road, Mableton, GA 30126. Mr. Ray is recently retired from Norfolk Southern Corporation ("NS").

Since 1972, Mr. Ray has been involved in the various aspects of the rail industry primarily in the Signals and Communications Department, which included maintenance, construction, and engineering while employed by NS.

After graduation from High School Mr. Ray joined the Naval Air Reserve and served as an Avionic Technician, operating and repairing aircraft electronic equipment at various locations throughout the world including a tour of duty in Vietnam. Upon an honorable discharge from the Navy and employment by NS, Mr. Ray attended West Georgia College for two years while working in the engineering section of NS.

In 1972, Mr. Ray began his employment with NS on the Central of Georgia Railroad as an Assistant Signalman in a construction gang installing crossing signals and signal equipment Later he was assigned to an Assistant Signal Maintainer position in East Point, Georgia with responsibilities of supporting the Signal Maintainer in his duties to maintain and troubleshoot signal systems and crossing signals. Later in 1972, Mr. Ray was promoted to Signal Maintainer in Dalton, Georgia, on the Southern Railway System with the responsibilities of maintaining, troubleshooting, testing and reporting pursuant to FRA regulations on signal systems and crossing signal equipment. At the end of 1972 Mr. Ray was transferred to Bolton, (Atlanta) Georgia as a Signal Maintainer with the same responsibilities as the Dalton, Georgia position.

Mr. Ray was promoted to C&S Supervisor, Southern Railway in 1974 His duties included supervision of five mainline signal maintainers, one communications maintainer, one electrician and one floating signalman Responsibilities included troubleshooting, ordering equipment and material, scheduling of jobs for signal and communications personnel, maintenance of two hot box detectors, and ensuring compliance with FRA regulations and railroad operating rules and procedures.

In 1978. Mr Ray was promoted into the Signal Engineering Section of the Southern Railway as an Applications Engineer with responsibilities of design for signal systems, with an area of concentration centered on design of highway grade crossing warning devices Duties included design of signal equipment, ordering of materials and detailed estimates for grade crossing signal projects. He was instrumental in the transition to computer aided drafting by designing the typicals used to engineer crossing signal equipment and computerizing grade crossing signal programs. This position required interaction with State DOT officials and serving on Committee D of the AAR.

After several years as an Applications Engineer, Mr. Ray accepted a position in 1988 as a Signal Engineer in the Engineering Section of NS. Duties for this position involved design of train signal systems and job estimation for installation and removal of track structures and signal systems. This position required interaction with the various railway departments.

While still in the Engineering Section, Mr. Ray was promoted in 1993 to Senior Systems Engineer, responsible for review and coordination with other departments concerning capital improvement projects and providing estimates and extent of Communication and Signal involvement. His duties in this position also involved State, local and private industry projects.

In 1995, Mr. Ray was promoted to his last position with NS as their Administrator Highway Grade. He was responsible for administering the railroad's portion of the federal highway grade crossing safety program and other grade crossing safety requests This was accomplished by directing control systems activities, working closely with the signal design engineers to provide engineering and estimates, and coordinating activities between the railroads, state and other departments concerning projects for installation, up-grade or modification of grade crossing warning devices It was essential in his duties to maintain a close working relationship and contact with the necessary local, state and federal agencies and authorities to ensure the success of all programs and projects. His duties required working closely with Norfolk Southern Safety, Claims and Legal personnel which included giving deposition testimony and testimony at hearings concerning all aspects of the grade crossing program.

Mr. Ray's resume is attached hereto.

Mr. Ray is sponsoring Section III.F 6 of UP's Reply Evidence relating to signals and communications. Mr Ray has signed a verification of the truth of the statements contained therein. A copy of that verification is attached hereto.

VERIFICATION

I declare under penalty of perjury that I have read the Reply Evidence in this proceeding that I have sponsored, as described in the foregoing Statement of Qualifications, and that the contents thereof are true and correct. Further, I certify that I am qualified and authorized to sponsor this testimony

Rick Ray

Executed on April 05, 2013

Richard H. Ray

506 Fontaine Road
Mableton, GA 30126
Residence Phone 678-945-5442
Business Phone 404-529-1234

EDUCATION

1965-1969 Graduated Pebblebrook High School
1978-1980 West Georgia, College - Business Administration Curriculum
1985 Southern Technical Institute – Computer Science Curriculum

MILITARY SERVICE

1969-1971 United States Naval Air
Primary training in aviation electronics and operation of electronic countermeasures
Honorable Discharge, Combat Veteran

EMPLOYMENT

1972 Assistant Signal Maintainer, Central of Georgia Railroad
Assisted Signal Maintainer in maintenance and troubleshooting of signal systems and highway grade crossing warning devices.

1972 Signal Maintainer, Southern Railway
Provided maintenance and troubleshooting of signal systems and highway grade crossing warning devices. Responsibilities included testing and reports pursuant to FRA regulations.

1974-1978 C&S Supervisor, Southern Railway
Supervision of five mainline signal maintainers, one communications maintainer, one electrician and one floating signalman. Responsibilities included troubleshooting, ordering equipment, scheduling of jobs and maintenance of two hot box detectors Ensure compliance with FRA regulations and railroad operating procedures.

1978-1988 Applications Engineer, Norfolk Southern Railway
Design of signal systems, area of concentration centered on design of highway grade crossing warning devices. Including ordering of materials and estimates for grade crossing signal projects Instrumental in transition to computer aided drafting design and computerizing grade crossing signal program. Required interaction with state DOT officials within fourteen state territory Served on Committee D of the AAR

1988-1993 Signal Engineer, Norfolk Southern Railway
Primarily involved in design of train signal systems and job estimation for installation and removal of track structures. Required interaction with various railway departments.

EMPLOYMENT - CONTINUED

1993-1995 <u>Senior Systems Engineer</u>, Norfolk Southern Railway
Primary responsibilities included review and coordination with other departments of capital improvement projects providing estimates and extent of C&S involvement Also involved with state and private industry projects

1995 - 2011 <u>Administrator Highway Grade Crossing</u>, Norfolk Southern Railway
Administer the railroad's portion of the federal highway grade crossing safety program and other grade crossing safety requests This is accomplished by directing control systems activities and coordinating activities between the railroad, state and other departments concerning projects for installation, up-grade or modification of grade crossing warning devices Maintain close working relationship and contacts with necessary local, state and federal agencies and authorities to ensure success of programs and projects. Work closely with company claims and legal personnel including giving deposition testimony and testimony at hearings concerning all aspects of the grade crossing program

2011 - Retired from Norfolk Southern after 39 years

2011 - Incorporated RR Rail Hwy Crossing Consultants, Inc., a Georgia Corporation to provide consulting services to States and Railroads concerning Rail/Highway crossings

2011 - Joined STV as a contract consultant to provide consulting services to the Rail Industry, Rail Customers and State and Local Road Authorities. Responsibilities include site and plan review and estimate for proposed rail/highway grade crossing projects to ensure compliance with Federal, State and Rail Industry standards, regulations and guidelines, provide detailed estimate to assist in determining cost benefit analysis of proposed rail/highway crossing projects and project review and estimate for signal systems and crossing signal requirements for rail construction projects involving private or public entities. Also, provide management or assistance with installation of rail/highway grade projects, which includes meeting with necessary road authorities and/or railroad personnel, project engineering, acquisition of material and scheduling of construction forces

DAVID R. WHEELER

David R. Wheeler is the founder and President of Rail Network Analytics. His business address is 9222 Nottingham Way, Mason, OH 45040. Mr. Wheeler received a Bachelor of Science degree in engineering and computer science from Merrimack College in 1985 He also received a Masters of Business Administration degree in finance and operations management from Miami University in 1992.

Throughout his career, Mr. Wheeler has focused on advanced analytical techniques for operational improvement and strategic planning. He has more than fifteen years experience in areas including rail operations analysis, capacity analysis, simulation, stand-alone rate case litigation, structured problem solving and mergers & acquisitions Mr. Wheeler has experience not only in the simulation and analysis of railroads, but also in other high technology industries including cockpit simulation work on the F-16 and F-22 fighter aircraft.

Mr. Wheeler held a number of leadership positions within the Union Pacific Railroad Company (UP). During his tenure with UP, Mr Wheeler led teams within Finance, Capacity Planning, Network & Capital Planning and Network Design & Integration. He has submitted testimony in previous stand-alone cost cases and presented research in a variety of forums. As General Director, Capacity Planning & Analysis, Mr Wheeler was responsible for and led the capital planning function for UP's annual capital development and implementation. In this capacity, Mr. Wheeler analyzed and directed spending of more than $300 million for Powder River Basin coal traffic. Mr. Wheeler uses simulation tools on a regular basis and has conducted a number of simulation benchmarking studies to determine and lead vendors toward simulation improvements

Mr. Wheeler has worked on a variety of projects in the railroad industry. Mr Wheeler developed UP's Colorado/Utah coal capacity plan and guided the Intermodal growth capacity initiative from Chicago to Los Angeles across UP's Sunset and Tucumcari routes. He has led multiple projects for the BNSF, NS, CSX, CP and CN, as well as the many short lines that connect with the UP. Mr. Wheeler has also led teams working on proposals for new passenger service for Amtrak, various commuter agencies, and UP's Joint Facilities, Finance, Operations and Engineering groups. Mr. Wheeler has extensive experience with use of the Rail Traffic Controller ("RTC") model, both in connection with submission of evidence in Board rate complaint proceedings and in conducting analysis related to railroad decision making on capacity and operations issues.

Mr. Wheeler is sponsoring evidence relating to the SARR capacity requirements and cycle times. His evidence is contained in Sections III A, III.B and III.C of defendants' Reply Evidence. Mr. Wheeler has signed a verification of the truth of the statements contained therein. A copy of that verification is attached hereto.

VERIFICATION

I declare under penalty of perjury that I have read the Reply Evidence in this proceeding that I have sponsored, as described in the foregoing Statement of Qualifications, and that the contents thereof are true and correct. Further, I certify that I am qualified and authorized to sponsor this testimony

David Wheeler

Executed on April 8, 2013

GEORGE T. ZIMMERMAN

George T. Zimmerman is a railway engineer and project manager for STV Incorporated at 3505 Koger Boulevard, Suite 205, Duluth, GA 30096 He has more than 30 years of experience on roadway and bridge projects and particular expertise in freight planning, design, and construction management. His resident engineering and inspection experience includes grade crossings and roadway, railway, and highway bridges. Mr Zimmerman manages STV's relationship with Norfolk Southern ("NS"), working with the railroad on a regular basis and assisting in the preparation of proposals and contracts In addition, he provides structural designs and plan reviews for railway and bridge projects

Mr. Zimmerman manages plan review and construction engineering and inspection services on an on-call, as-needed basis for more than 750 proposed roadway, bridge, and retaining wall construction projects affecting railway facilities throughout the 22-state NS system Mr. Zimmerman has overseen construction of overhead bridges, underpasses, floodwalls, and utility crossings, and parallel construction of utilities, roadways, bikeways, and grade crossings since 1992 Mr. Zimmerman has a Bachelor of Science degree in civil engineering from West Virginia University.

Mr. Zimmerman's resume with additional project experience is attached hereto.

Mr. Zimmerman is sponsoring Section III.F.4 of UP's Reply Evidence relating to track construction Mr. Zimmerman has signed a verification of the truth of the statements contained therein. A copy of that verification is attached hereto.

VERIFICATION

I declare under penalty of perjury that I have read the Reply Evidence in this proceeding that I have sponsored, as described in the foregoing Statement of Qualifications, and that the contents thereof are true and correct. Further, I certify that I am qualified and authorized to sponsor this testimony.

George T. Zimmerman

Executed on April 5, 2013

George T. Zimmerman, P.E.

Project Manager/Senior Engineer

Mr. Zimmerman is a railway engineer and project manager with more than 30 years of experience on roadway and bridge projects and particular expertise in freight planning, design, and construction management. His resident engineering and inspection experience includes grade crossings and roadway, railway, and highway bridges. Mr. Zimmerman manages STV's relationship with Norfolk Southern, working with the railroad on a regular basis and assisting in the preparation of proposals and contracts. In addition, he provides structural designs and plan reviews for railway and bridge projects

Project Experience

Norfolk Southern Jeffersonville Road Widening - Project Manager
Managed the preliminary layout and design of a 4-span, 93.5-meter-long steel deck plate girder railroad bridge in Macon, GA. The single-track bridge will carry Norfolk Southern over Jeffersonville Road, which was widened from two to five lanes. The project included track realignment to allow off-line construction (2002 - 2007)

GDOT Railroad Bridges over Butler Street and Piedmont Avenue - Senior Engineer
Provided bridge design for the widening of two CSX Railroad bridges over Butler Street and Piedmont Avenue in Fulton County, GA, and two retaining walls for the Georgia Department of Transportation (GDOT) (2002 - 2006)

Central Midlands Council of Governments Camden to Columbia Corridor Alternatives Analysis – Senior Rail Engineer
Contributed to the alternatives analysis for potential mass transit technologies and corridors between Camden, SC, and Columbia, SC Mr. Zimmerman assisted the planning team by providing rail information, traffic potential, and operational layouts in Columbia where rail lines intersect He also identified areas of structural conflict requiring further study and analysis. (6/09 - 6/11)

FTA PMO Denver RTD/CDOT Capital Program - Senior Engineer
Identified locations along proposed alignments where changes would be made to the Burlington Northern Santa Fe and Union Pacific Railroad tracks as part of project management oversight (PMO) services to the Federal Transit Administration (FTA) for the Denver Regional Transportation District (RTD)/Colorado Department of Transportation (CDOT) commuter rail system in Denver. Mr. Zimmerman also determined if the work could be considered a required railroad change or betterment for the railroad involved To determine this, the trackwork and civil improvements to the rail system

Office Location
Duluth, GA

Date joined firm
5/16/79

Years with other firms
0

Education
Bachelor of Science, Civil Engineering; West Virginia University (1979)

Professional Registrations
Professional Engineer: Georgia (1992/#019811/exp. 12/31/14), Kansas (2002/ #17069/exp. 4/30/13), Missouri (2003/ #2003000042/exp. 12/31/13), Ohio (2001/#65833/exp 12/31/13), South Carolina (1989/#12625/exp 6/30/14)

Memberships
Roadway and Ballast Committee Member, American Railway Engineering and Maintenence of Way Association (AREMA)

American Society of Civil Engineers (ASCE) and track roadbed were evaluated as individual projects, but with a larger area view if there were track changes or replacements involved. (8/10 - 1/11)

CSX Ronald Reagan Parkway - Project Manager/Resident Engineer
Managed the construction engineering inspection of the CSX Railroad bridge over Ronald Reagan Parkway near Lawrenceville in Gwinnett County, GA. (2/92 - 12/93)

Norfolk Southern I-64 over Norfolk Southern - Resident Engineer
Observed construction field activities and represented the Norfolk Southern Railroad for two bridges over the railway, one at milepost 4.43 VB, and one at milepost 5 04 NS in Norfolk, VA (1/90 - 2/92)

City of Virginia Beach Pungo Ferry Bridge - Resident Engineer
Provided construction management and inspection services and represented the City of Virginia Beach for the construction of the replacement of this obsolete swing span with a 3,400-foot-long highway bridge over the Intracoastal Waterway in Virginia Beach, VA. The project included roadway approaches and the placement of a geosynthetic stabilized embankment over adjacent wetlands (1989 - 1992)

Norfolk Southern over Harris Boulevard - Resident Engineer
Provided construction management for a double-track Norfolk Southern underpass built using a temporary detour alignment in Newell, NC (7/88 - 6/89)

City of Charlotte Tyvola Road Extension - Resident Structural Inspector
Inspected this 3.6-mile, 5-lane roadway extension in Charlotte, NC, including a new interchange with a 7-lane bridge over Billy Graham Parkway, eight reinforced concrete box culverts, and a 6-lane bridge over Sugar Creek. (6/87 - 6/89)

Sandersville Railroad Alternate Route Study - Senior Engineer
Providing location, evaluation, and cost estimates for a 12-mile industrial lead in Washington County, GA (10/11 - Present)

Cambridge Systematics CSXT Intermodal Location Feasibility Assistance - Lead Railroad Engineer
Collaborating with the Maryland Department of Transportation (MDOT) in the review and evaluation of preliminary plans for alternate sites for CSXT intermodal transfer facilities in the Baltimore, MD, area. Mr. Zimmerman is assisting MDOT in interpreting CSXT plans and figures, explaining CSXT requirements, and verifiying that provided information is consistent with current CSXT and railroad industry standards of practice (8/11 - Present)

R. J. Corman Railroad On-Call Services Contract - Project Manager
Managing plan review and construction engineering and inspection services on an on-call, as-needed basis for proposed roadway, bridge, and miscellaneous projects affecting railway facilities throughout various R J Corman Railroad lines in the eastern United States. Mr Zimmerman has

overseen construction of overhead bridges, underpasses, utility crossings, parallel construction of utilities, roadways, and grade crossings since 2007. (2007 - Present)

Norfolk Southern On-Call Services Contract - Project Manager
Managing plan review and construction engineering and inspection services on an on-call, as-needed basis for more than 1000 proposed roadway, bridge, and retaining wall construction projects affecting railway facilities throughout the 22-state Norfolk Southern system. Mr. Zimmerman has overseen construction of overhead bridges, underpasses, floodwalls, and utility crossings, and parallel construction of utilities, roadways, bikeways, and grade crossings since 1992. (1992 - Present)

Norfolk Southern Heartland Corridor Clearance Improvements CM - Project Manager
Coordinated various teams providing construction management (CM) services for portions of the Heartland Corridor Clearance Project, an award-winning, $191 million initiative to improve 28 tunnels and seven through-truss bridges and remove 24 overhead obstacles to provide a direct double-stacked container train route from the ports of Virginia through West Virginia and eastern Kentucky into central Ohio Mr. Zimmerman oversaw the raising of a bridge at Harding Street in Bluefield, WV, stormwater and erosion control plans at various tunnel sites, and numerous bridge lowering and slide fence clearance tasks. (1/07 - 8/10)

LAMTPO Rail Relocation and Intermodal Facility Feasibility Study - Senior Engineer
Provided design engineering services for the proposed relocation of the Norfolk Southern Railroad mainline through Morristown, White Pine, and Jefferson City, TN, as part of a study for the Lakeway Area Metropolitan Transportation Planning Organization (LAMTPO) to determine the feasibility of relocating the Norfolk Southern A Line and installing an intermodal facility in Morristown Mr. Zimmerman assisted in gathering information and determining railroad design and operation requirements. The A Line, which runs through downtown Morristown, will be eliminated and either a new line will be built or an existing line will be improved in the county. The intermodal facility will facilitate connections between freight lines along Interstate 81 and the Norfolk Southern Crescent (3/08 - 4/09)

Rochester & Southern Railroad Silver Springs Connection Track - Project Manager
Reviewed rail design for a Rochester & Southern Railroad connection track in Silver Springs, NY The connecting track will allow unit coal train movement from Norfolk Southern Railroad to the Rochester & Southern Railroad. Mr Zimmerman's responsibilities included coordination with Norfolk Southern (2007 - 2009)

Vulcan Materials Company Skippers Quarry Loop Track - Project Manager

Provided project administration and coordinated staff in multiple offices for the preliminary and final design of a 0.75-mile loop track, including a 100-foot-long open deck railroad trestle, for Vulcan Materials Company at Skippers Quarry in Skippers, VA The track is used for loading unit rail trains with railroad ballast and other crushed aggregate materials. (1/07 - 1/09)

STB Railroad Coal Rate Case Litigation Cost Assessments - Project Manager

Determined values for track work items and construction staging of the work plan for this Surface Transportation Board (STB) project, which included assembling the planning, engineering, and construction costs to build a hypothetical contemporary operating railroad in North Carolina, as part of a cost assessment for a several coal rate cases Cost assessments included major earthwork, bridge and culvert construction, track, communications and signalization, engineering design, construction management, material costs and logistics, mobilization, and contingencies Cases included Norfolk Southern versus Duke Energy, Norfolk Southern versus Carolina Power & Light, CSX versus Duke Energy, Burlington Northern Santa Fe (BNSF) and Union Pacific versus AEC, BNSF versus Otter Tail, and AEP Texas North versus BNSF. (2000)

Norfolk Southern Automobile Mixing Facility - Project Manager

Provided preliminary and final hydraulic/hydrologic, railway, roadway, highway, and railway bridge design for this Ford automobile mixing facility in Shelbyville, KY The project included 2.5 million cubic yards of earthwork, 18 miles of track installation, a 45-acre paved vehicle storage yard, 3 bridges, and 2 access roads. (8/96 - 12/97)

CSX Double-Track Program - Project Manager

Designed 7 miles of track parallel to the CSX Railroad main line in Marietta, GA The project included a study of several grade-crossing eliminations and retaining wall structures (1995)

Norfolk Southern Third Mainline Track - Project Manager

Managed engineering services for the design and construction of a 2.9-mile third main track from adjacent to CSX's Queensgate Yard to Mitchell Avenue in Cincinnati. Mr. Zimmerman provided project management as well as the design of all earthwork, track work, and retaining structures. (6/94 - 7/95)

CATS LYNX Blue Line Extension Light Rail Project - Senior Engineer

Responsible for the coordination and resolution of issues generated by the preliminary design in areas along the corridor that involve Norfolk Southern, North Carolina and the Aberdeen, Carolina, and Western Railroads as part of the a new 9 3-mile light rail transit line extension in Charlotte, NC Mr. Zimmerman is working with the Charlotte Area Transit System (CATS) to successfully integrate transit and land use, and to solve challenges associated with crossing and running along existing freight railroad right-of-way. The plans must satisfy the requirements of four different railroads so the city can secure necessary agreements. (2008 - Present)

Teaching Experience

Instructor, Introduction to Construction Inspection, Module 13· General Structural Steel Inspection; North Carolina American Public Works Association (1999 - Present)

Instructor, STV/RWA Railroad Inspector's Workshops on various subjects including safety, project management, project reporting, and the development of a Field Inspectors Handbook for third-party projects on railroad property (1995 - Present)

APWA NC Chapter Annual Meeting and SCDOT Consultant Workshop – Presentation on working on public projects involving Railroad crossings, overhead bridges, underpasses, or utilities.
(2010- Present)

REDACTED – TO BE PLACED ON PUBLIC FILE

BEFORE THE
SURFACE TRANSPORTATION BOARD

INTERMOUNTAIN POWER AGENCY,	)	
Complainant,	)	Docket No. 42136
v.	)	
UNION PACIFIC RAILROAD COMPANY,	)	
Defendant.	)	

REPLY EVIDENCE AND ARGUMENT OF DEFENDANT UNION PACIFIC RAILROAD COMPANY

EXHIBITS

GAYLA L. THAL
LOUISE A. RINN
DANIELLE E. BODE
Union Pacific Railroad Company
1400 Douglas Street, Stop 1580
Omaha, NE 68179
(402) 544-3309

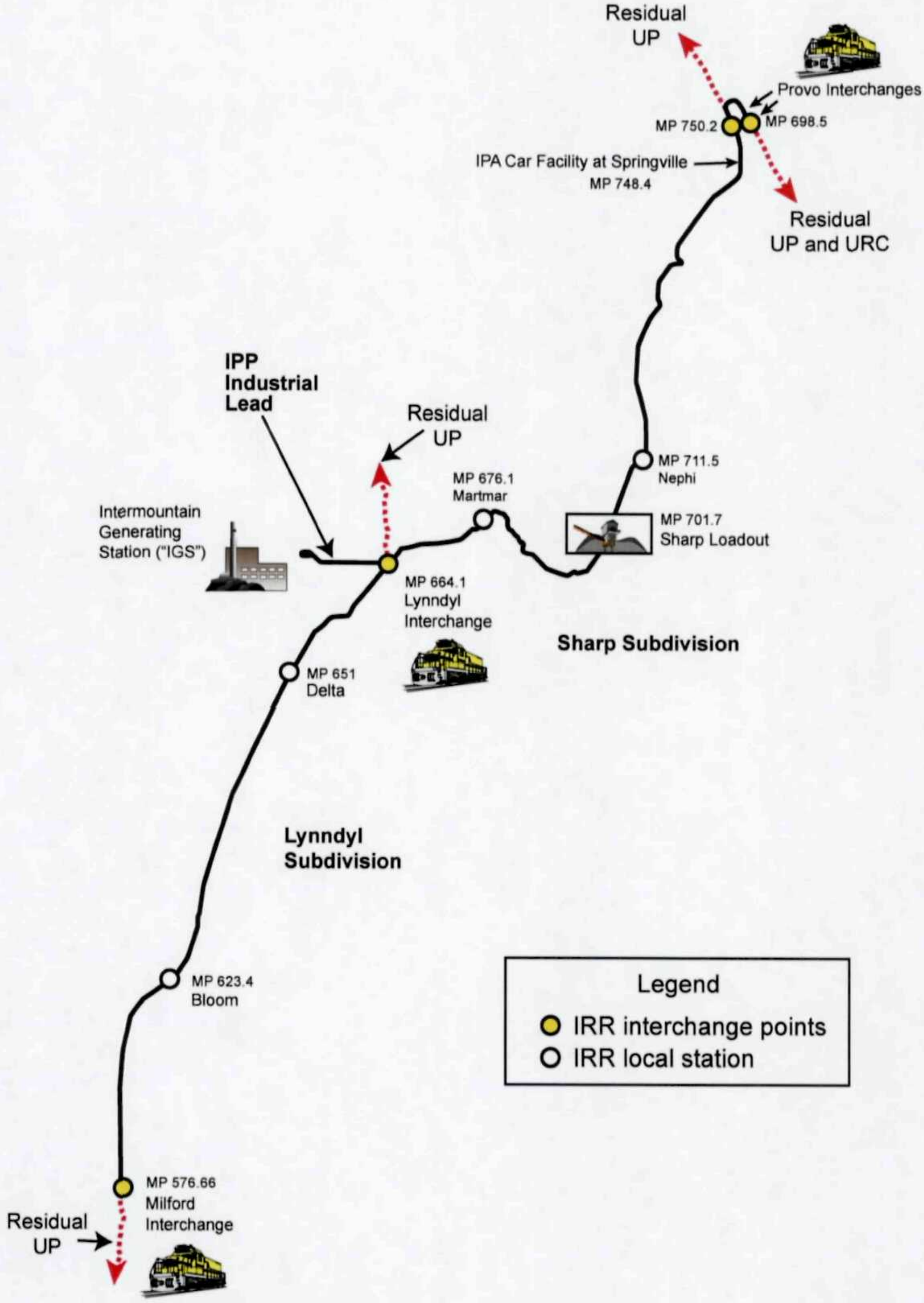
MICHAEL L. ROSENTHAL
CAROLYN F. CORWIN
EDWARD H. RIPPEY
MAUREEN M. JAPHA
MATTHEW J. CONNOLLY
SPENCER F. WALTERS
Covington & Burling LLP
1201 Pennsylvania Avenue, N.W.
Washington, DC 20004
(202) 662-6000

Attorneys for Union Pacific Railroad Company

April 12, 2013

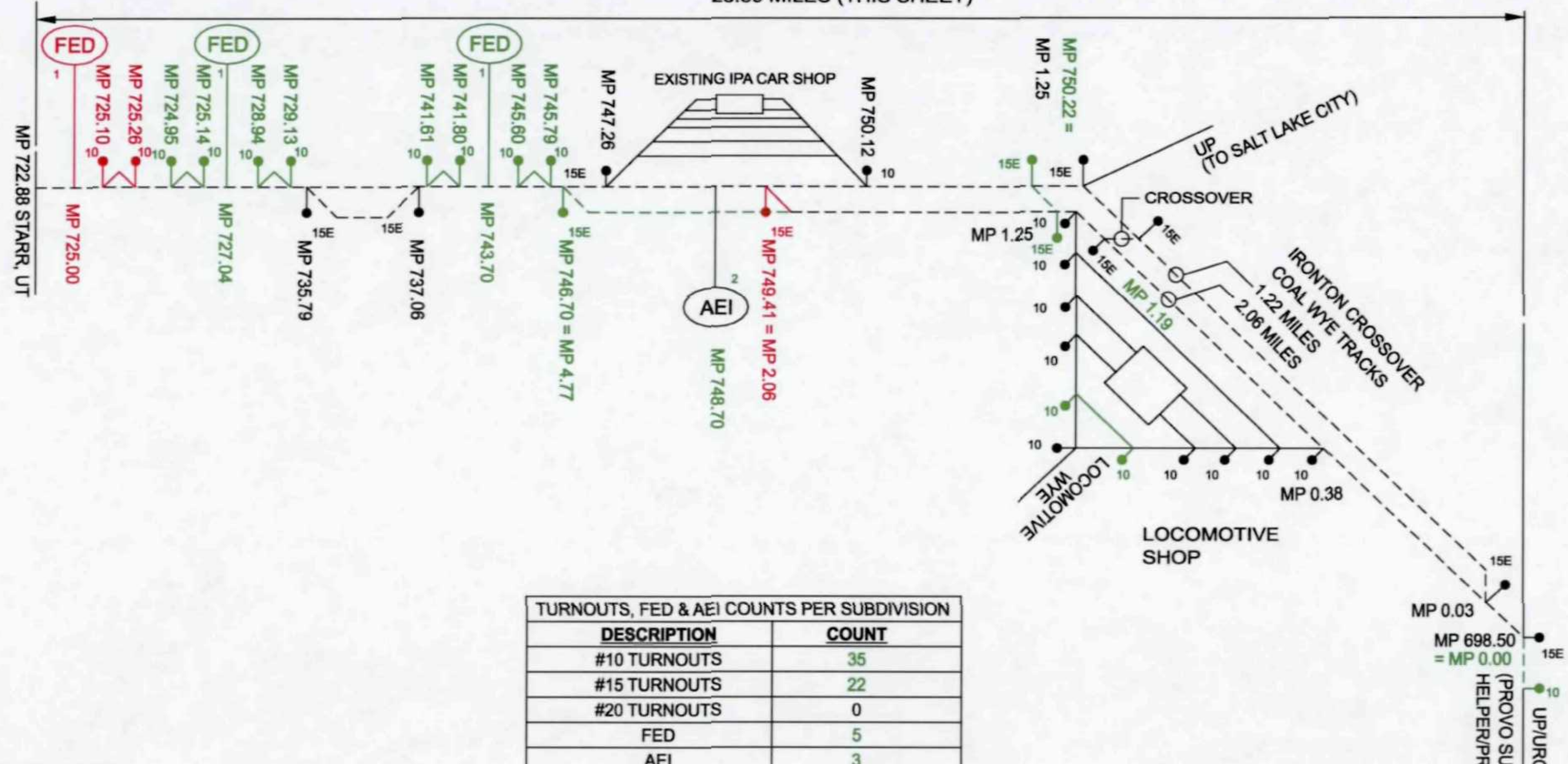
Contains Color Images

Intermountain Stand-Alone Railroad ("IRR")



85.77 IRR ROUTE MILES (CONTINUES ON SHEET 2 OF 4)

28.59 MILES (THIS SHEET)



TURNOUTS, FED & AEI COUNTS PER SUBDIVISION	
DESCRIPTION	**COUNT**
#10 TURNOUTS	35
#15 TURNOUTS	22
#20 TURNOUTS	0
FED	5
AEI	3

IRR

PAGE: 1 OF 4

LEGEND:

- - - - 136# STANDARD CWR
——— 115# CWR CLASS 1 RELAY

TURNOUT TYPE*

* TURNOUT TYPES
20 - #20 ELECTRIC
15E - #15 ELECTRIC
15 - #15 HAND-THROWN
105 - #10 SPRING
10 - #10 HAND-THROWN
10E - #10 ELECTRIC

FED — FAILED EQUIPMENT DETECTOR WITH NUMBER OF TRACKS COVERED

HB - HOT BEARING DETECTOR
DE OR DED - DRAGGING EQUIPMENT DETECTOR
HW - HOT WHEEL DETECTOR

AEI — AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

RED = REMOVE
GREEN = ADD

SUBDIVISION: **SHARP**

FROM: STARR
MP 722.88

TO: IRONTON
MP 750.22

DATE: 04/02/13

NOT TO SCALE

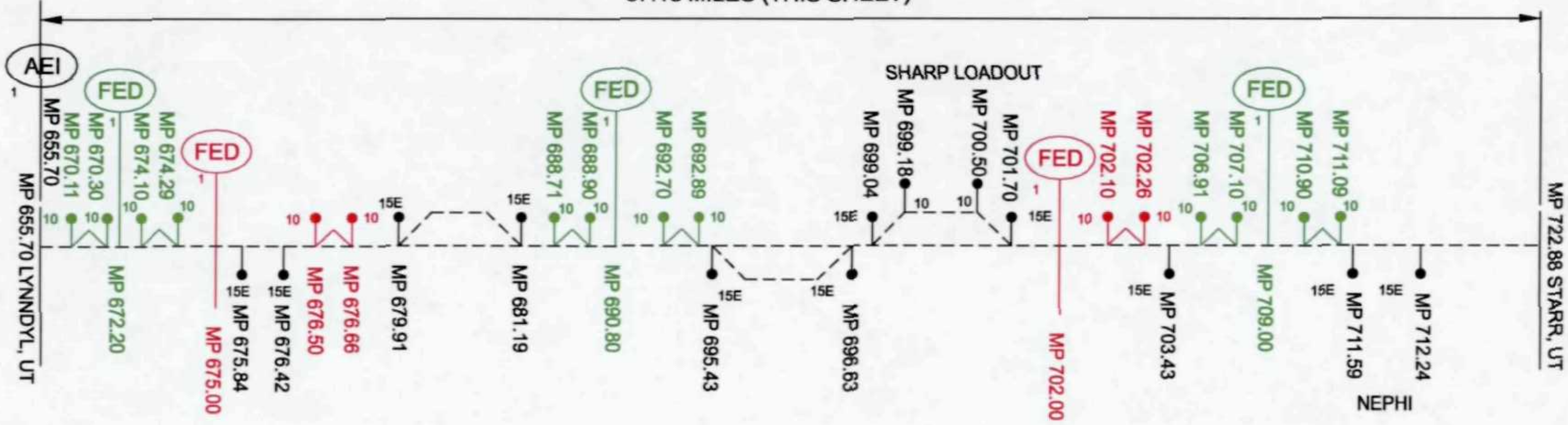
PREPARED BY:
STV/RALPH WHITEHEAD ASSOCIATES

UP REPLY EXHIBIT:

III-B-1

85.77 IRR ROUTE MILES (CONTINUES ON SHEET 1 OF 4)

57.18 MILES (THIS SHEET)



TURNOUTS, FED & AEI COUNTS PER SUBDIVISION	
DESCRIPTION	**COUNT**
#10 TURNOUTS	35
#15 TURNOUTS	22
#20 TURNOUTS	0
FED	5
AEI	3

IRR

PAGE: 2 OF 4

SUBDIVISION: **SHARP**

FROM: LYNNDYL
MP 665.70

TO: STARR
MP 722.88

DATE: 04/02/13

NOT TO SCALE

LEGEND:

- 136# STANDARD CWR
- 115# CWR CLASS 1 RELAY
- TURNOUT TYPE*

* TURNOUT TYPES
- 20 - #20 ELECTRIC
- 15E - #15 ELECTRIC
- 15 - #15 HAND-THROWN
- 10S - #10 SPRING
- 10 - #10 HAND-THROWN
- 10E - #10 ELECTRIC

FED 1 — FAILED EQUIPMENT DETECTOR WITH NUMBER OF TRACKS COVERED

HB - HOT BEARING DETECTOR
DE OR DED - DRAGGING EQUIPMENT DETECTOR
HW - HOT WHEEL DETECTOR

AEI 1 — AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

RED = REMOVE
GREEN = ADD

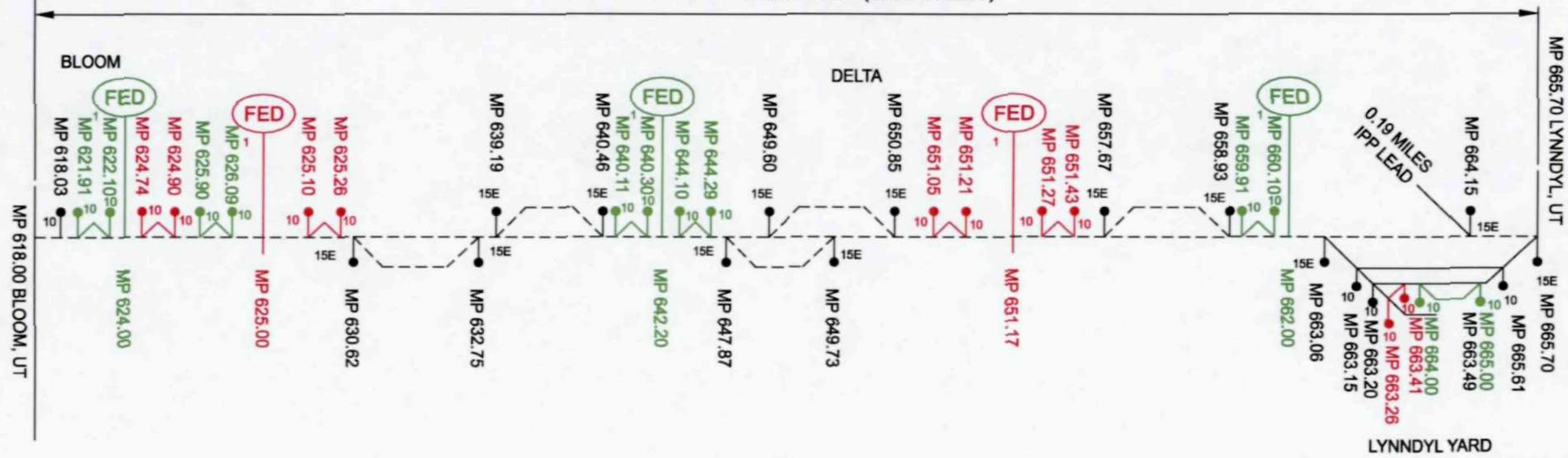
PREPARED BY:
STV/RALPH WHITEHEAD ASSOCIATES

UP REPLY EXHIBIT:

III-B-1

89.0 IRR ROUTE MILES (CONTINUES ON SHEET 4 OF 4)

47.70 MILES (THIS SHEET)



TURNOUTS, FED & AEI COUNTS PER SUBDIVISION	
DESCRIPTION	**COUNT**
#10 TURNOUTS	28
#15 TURNOUTS	26
#20 TURNOUTS	0
FED	5
AEI	1

IRR

PAGE: 3 OF 4

LEGEND:

- - - - 136# STANDARD CWR
—— 115# CWR CLASS 1 RELAY

TURNOUT TYPE*

* TURNOUT TYPES
20 - #20 ELECTRIC
15E - #15 ELECTRIC
15 - #15 HAND-THROWN
10S - #10 SPRING
10 - #10 HAND-THROWN
10E - #10 ELECTRIC

FED 1 — FAILED EQUIPMENT DETECTOR WITH NUMBER OF TRACKS COVERED

HB - HOT BEARING DETECTOR
DE OR DED - DRAGGING EQUIPMENT DETECTOR
HW - HOT WHEEL DETECTOR

AEI 1 — AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

RED = REMOVE
GREEN = ADD

SUBDIVISION: **LYNNDYL**

FROM: BLOOM
MP 618.00
TO: LYNNDYL
MP 665.70

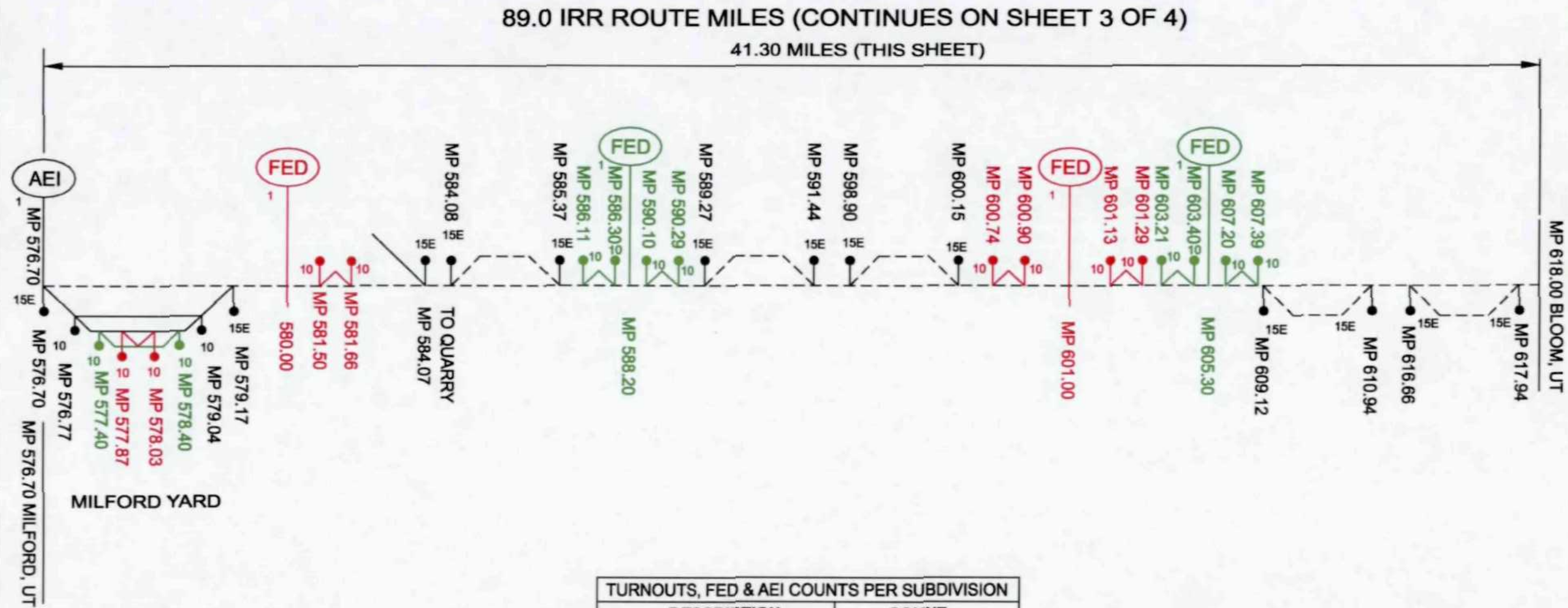
DATE: 04/02/13

NOT TO SCALE

PREPARED BY:
STV/RALPH WHITEHEAD ASSOCIATES

UP REPLY EXHIBIT:

III-B-1



TURNOUTS, FED & AEI COUNTS PER SUBDIVISION	
DESCRIPTION	**COUNT**
#10 TURNOUTS	28
#15 TURNOUTS	26
#20 TURNOUTS	0
FED	5
AEI	1

IRR

PAGE: 4 OF 4

SUBDIVISION: LYNNDYL

FROM: MILFORD
MP 576.70
TO: BLOOM
MP 618.00

DATE: 04/02/13

NOT TO SCALE

LEGEND:

136# STANDARD CWR
115# CWR CLASS 1 RELAY

TURNOUT TYPE*

* TURNOUT TYPES
20 - #20 ELECTRIC
15E - #15 ELECTRIC
15 - #15 HAND-THROWN
105 - #10 SPRING
10 - #10 HAND-THROWN
10E - #10 ELECTRIC

FED: FAILED EQUIPMENT DETECTOR WITH NUMBER OF TRACKS COVERED

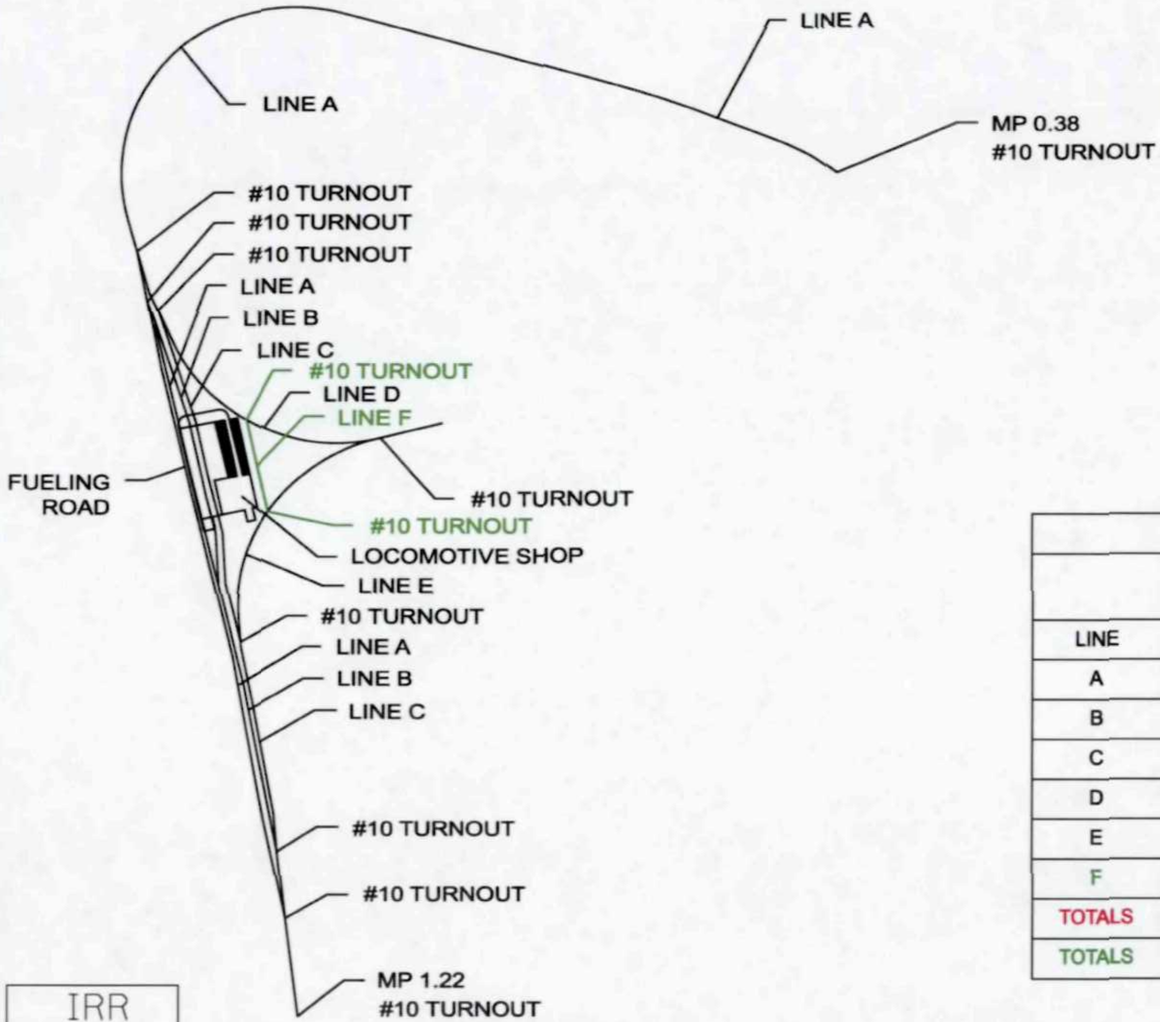
HB - HOT BEARING DETECTOR
DE OR DED - DRAGGING EQUIPMENT DETECTOR
HW - HOT WHEEL DETECTOR

AEI: AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

RED = REMOVE
GREEN = ADD

PREPARED BY:
STV/RALPH WHITEHEAD ASSOCIATES

UP REPLY EXHIBIT:
III-B-1



LOCOMOTIVE SHOP				
	LENGTH AFTER 13' TRACK CLEARANCE AREA		LENGTH FROM TURNOUT TO TURNOUT	
LINE	L.F.	MILES	L.F.	MILES
A	5,255	0.995	5,572	1.046
B	1,805	0.342	2,066	0.391
C	1,812	0.343	2,073	0.393
D	706	0.134	920	0.174
E	825	0.156	1,112	0.211
F	1,500	0.284	1,761	0.334
TOTALS	10,403	1.970	11,743	2.215
TOTALS	11,903	2.254	13,504	2.549

IRR

SUBDIVISION: SHARP

LOCOMOTIVE SHOP

DATE: 04/02/13

SCALE: 1"=600"

LEGEND:

- - - - 136# STANDARD CWR
—— 115# CWR CLASS 1 RELAY

20° TURNOUT TYPE*

FED 1 FAILED EQUIPMENT DETECTOR WITH NUMBER OF TRACKS COVERED

HB - HOT BEARING DETECTOR
DE OR DED - DRAGGING EQUIPMENT DETECTOR
HW - HOT WHEEL DETECTOR

AEI 1 AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

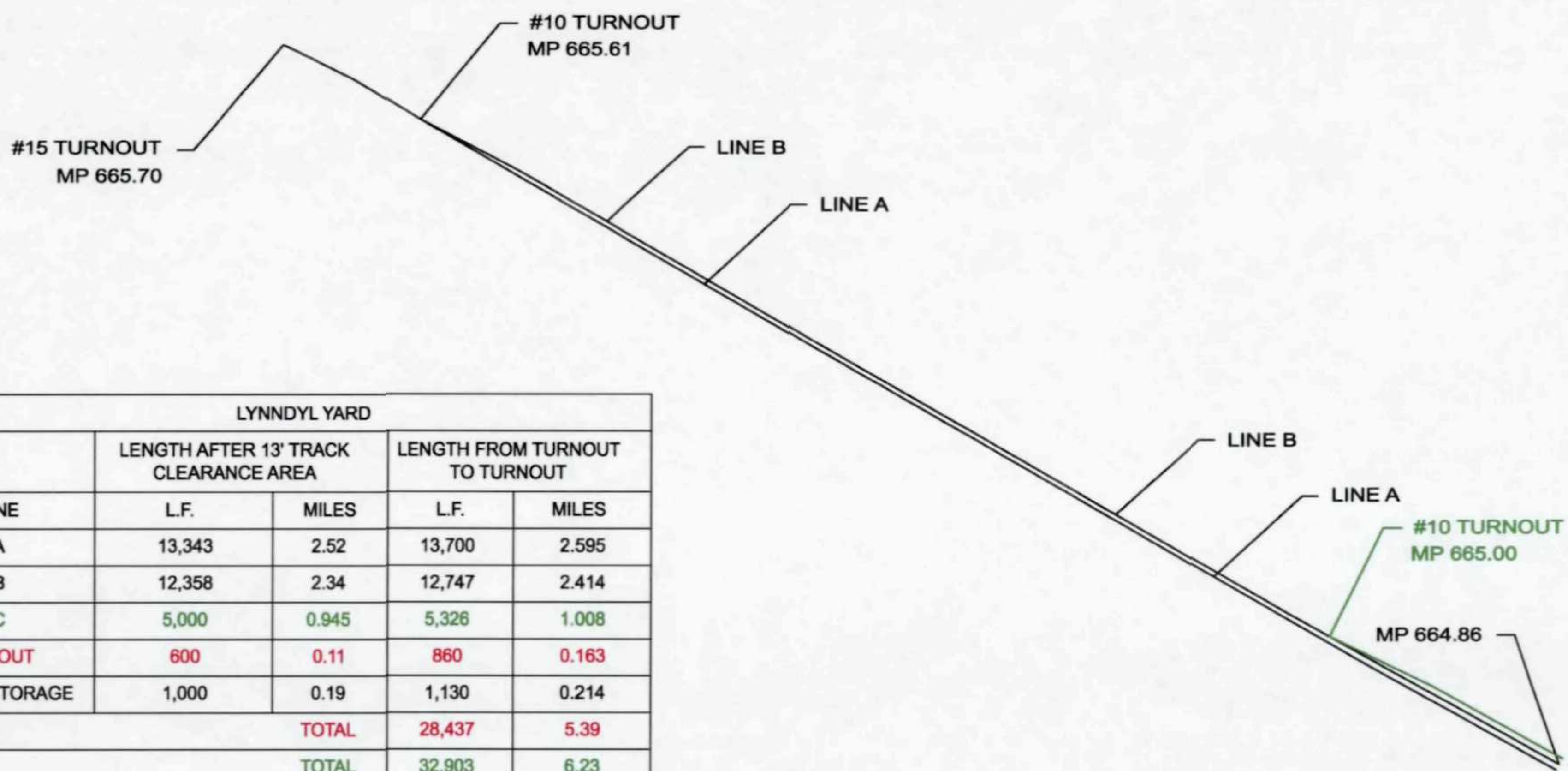
* TURNOUT TYPES
20 - #20 ELECTRIC
15E - #15 ELECTRIC
15 - #15 HAND-THROWN
105 - #10 SPRING
10 - #10 HAND-THROWN
10E - #10 ELECTRIC

RED = REMOVE
GREEN = ADD

PREPARED BY:
STV/RALPH WHITEHEAD ASSOCIATES

UP REPLY EXHIBIT:

III-B-2



LYNNDYL YARD				
	LENGTH AFTER 13' TRACK CLEARANCE AREA		LENGTH FROM TURNOUT TO TURNOUT	
LINE	L.F.	MILES	L.F.	MILES
A	13,343	2.52	13,700	2.595
B	12,358	2.34	12,747	2.414
C	5,000	0.945	5,326	1.008
SETOUT	600	0.11	860	0.163
M.O.W. STORAGE	1,000	0.19	1,130	0.214
		TOTAL	28,437	5.39
		TOTAL	32,903	6.23

IRR

PAGE: 2 OF 7

SUBDIVISION: LYNNDYL

LYNNDYL YARD

MP 665.70 TO 664.86

DATE: 04/02/13

SCALE: 1"=500"

LEGEND:

136# STANDARD CWR
115# CWR CLASS 1 RELAY

20° TURNOUT TYPE*

FED 1 FAILED EQUIPMENT DETECTOR WITH NUMBER OF TRACKS COVERED

HB - HOT BEARING DETECTOR
DE OR DED - DRAGGING EQUIPMENT DETECTOR
HW - HOT WHEEL DETECTOR

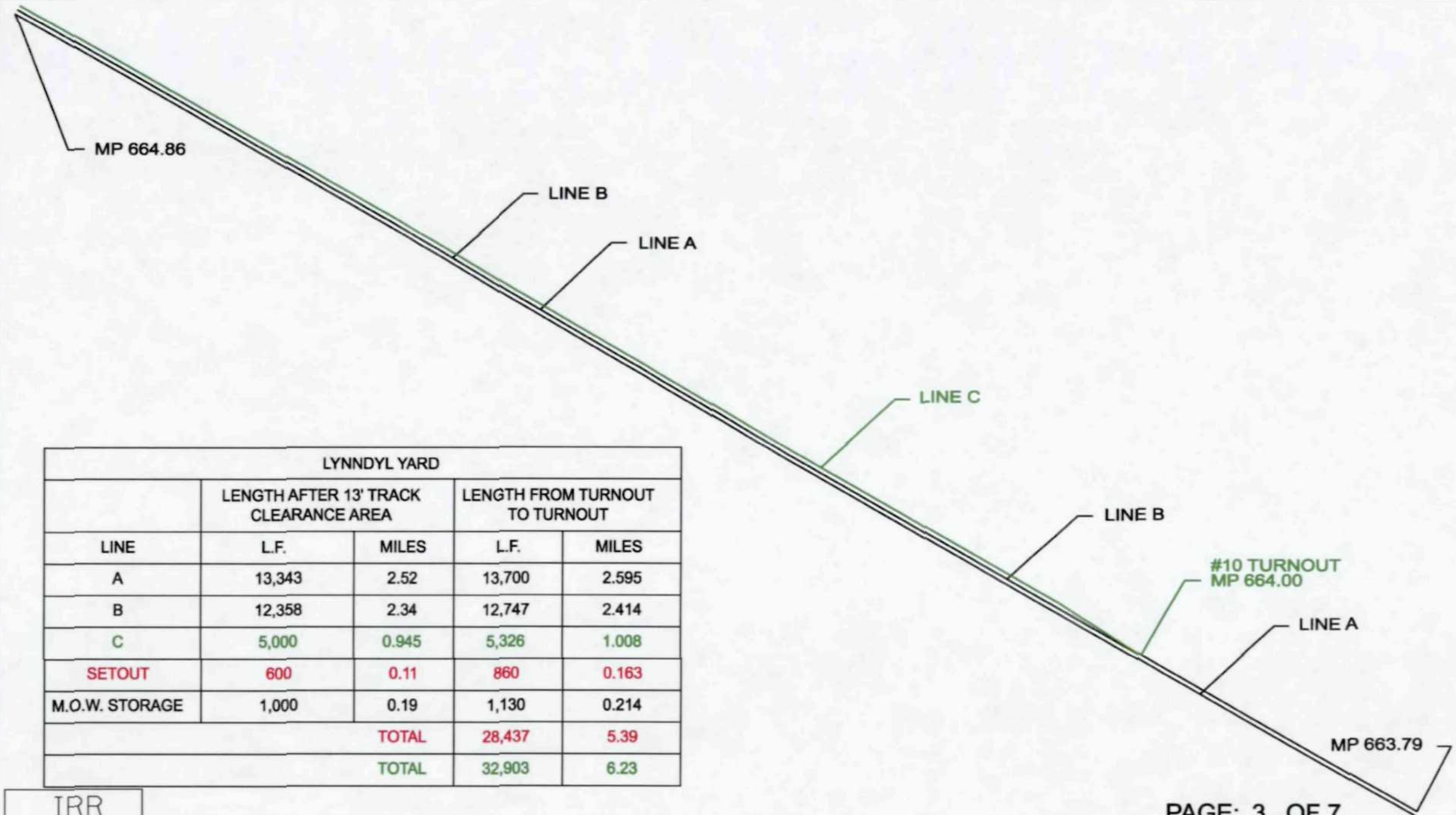
AEI 1 AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

* TURNOUT TYPES
20 - #20 ELECTRIC
15E - #15 ELECTRIC
15 - #15 HAND-THROWN
10S - #10 SPRING
10 - #10 HAND-THROWN
10E - #10 ELECTRIC

RED = REMOVE
GREEN = ADD

PREPARED BY:
STV/RALPH WHITEHEAD ASSOCIATES

UP REPLY EXHIBIT:
III-B-2



LYNNDYL YARD				
	LENGTH AFTER 13' TRACK CLEARANCE AREA		LENGTH FROM TURNOUT TO TURNOUT	
LINE	L.F.	MILES	L.F.	MILES
A	13,343	2.52	13,700	2.595
B	12,358	2.34	12,747	2.414
C	5,000	0.945	5,326	1.008
SETOUT	600	0.11	860	0.163
M.O.W. STORAGE	1,000	0.19	1,130	0.214
		TOTAL	28,437	5.39
		TOTAL	32,903	6.23

IRR

PAGE: 3 OF 7

SUBDIVISION: LYNNDYL

LYNNDYL YARD

MP 664.86 TO 663.79

DATE: 04/02/13

SCALE: 1"=500"

LEGEND:

- - - - 136# STANDARD CWR
——— 115# CWR CLASS 1 RELAY

20* TURNOUT TYPE*

(FED) 1 FAILED EQUIPMENT DETECTOR WITH NUMBER OF TRACKS COVERED

HB - HOT BEARING DETECTOR
DE OR DED - DRAGGING EQUIPMENT DETECTOR
HW - HOT WHEEL DETECTOR

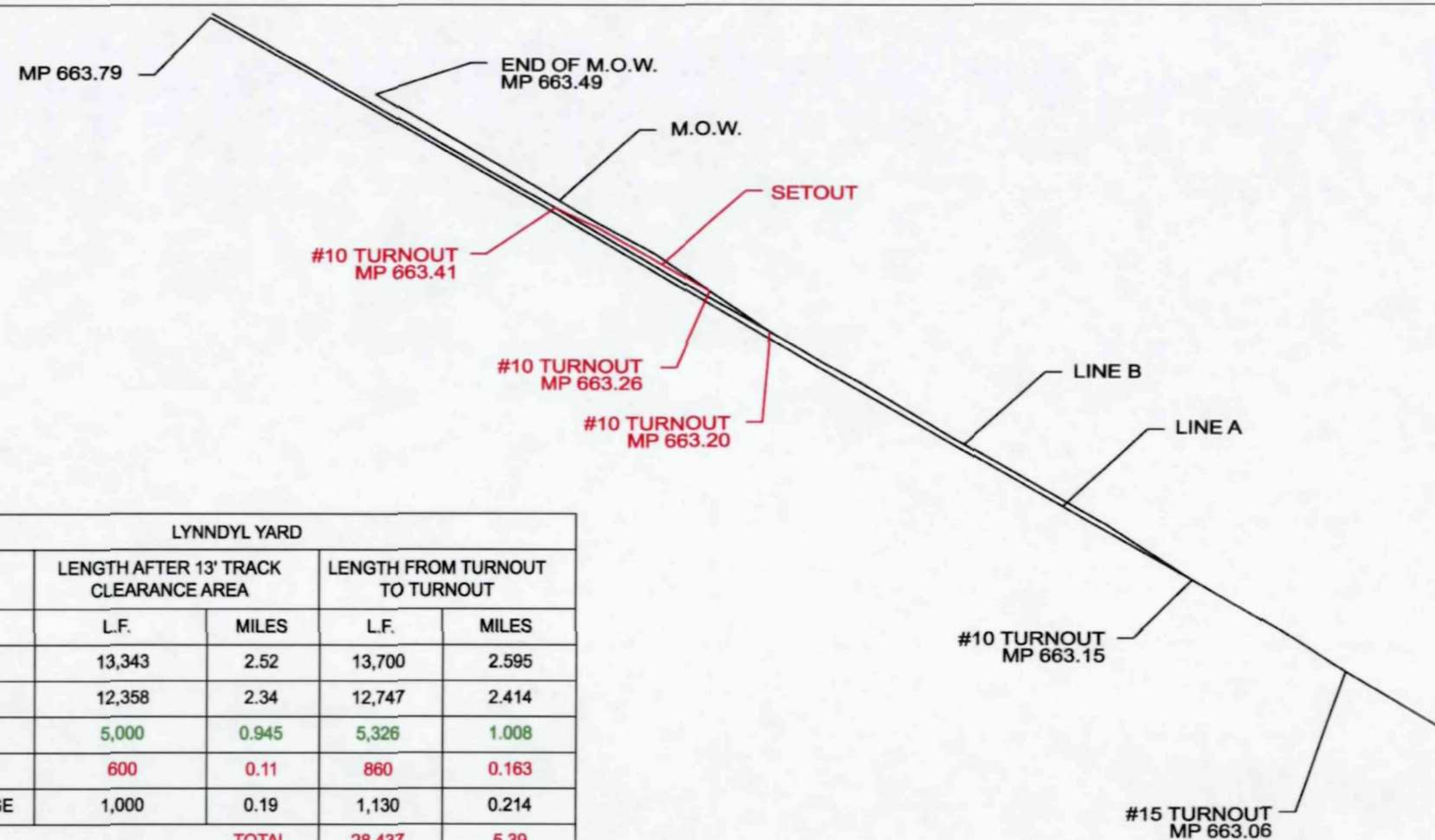
(AEI) 1 AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

* TURNOUT TYPES
20 - #20 ELECTRIC
15E - #15 ELECTRIC
15 - #15 HAND-THROWN
105 - #10 SPRING
10 - #10 HAND-THROWN
10E - #10 ELECTRIC

RED = REMOVE
GREEN = ADD

PREPARED BY:
STV/RALPH WHITEHEAD ASSOCIATES

UP REPLY EXHIBIT:
III-B-2



LYNNDYL YARD				
	LENGTH AFTER 13' TRACK CLEARANCE AREA		LENGTH FROM TURNOUT TO TURNOUT	
LINE	L.F.	MILES	L.F.	MILES
A	13,343	2.52	13,700	2.595
B	12,358	2.34	12,747	2.414
C	5,000	0.945	5,326	1.008
SETOUT	600	0.11	860	0.163
M.O.W. STORAGE	1,000	0.19	1,130	0.214
		TOTAL	28,437	5.39
		TOTAL	32,903	6.23

IRR

SUBDIVISION: LYNNDYL

LYNNDYL YARD

MP 663.79 TO 663.06

DATE: 04/02/13

SCALE: 1"=500"

LEGEND:

136# STANDARD CWR

115# CWR CLASS 1 RELAY

TURNOUT TYPE*

* TURNOUT TYPES

20 - #20 ELECTRIC

15E - #15 ELECTRIC

15 - #15 HAND-THROWN

105 - #10 SPRING

10 - #10 HAND-THROWN

10E - #10 ELECTRIC

FED — FAILED EQUIPMENT DETECTOR WITH NUMBER OF TRACKS COVERED

HB - HOT BEARING DETECTOR

DE OR DED - DRAGGING EQUIPMENT DETECTOR

HW - HOT WHEEL DETECTOR

AEI — AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

RED = REMOVE

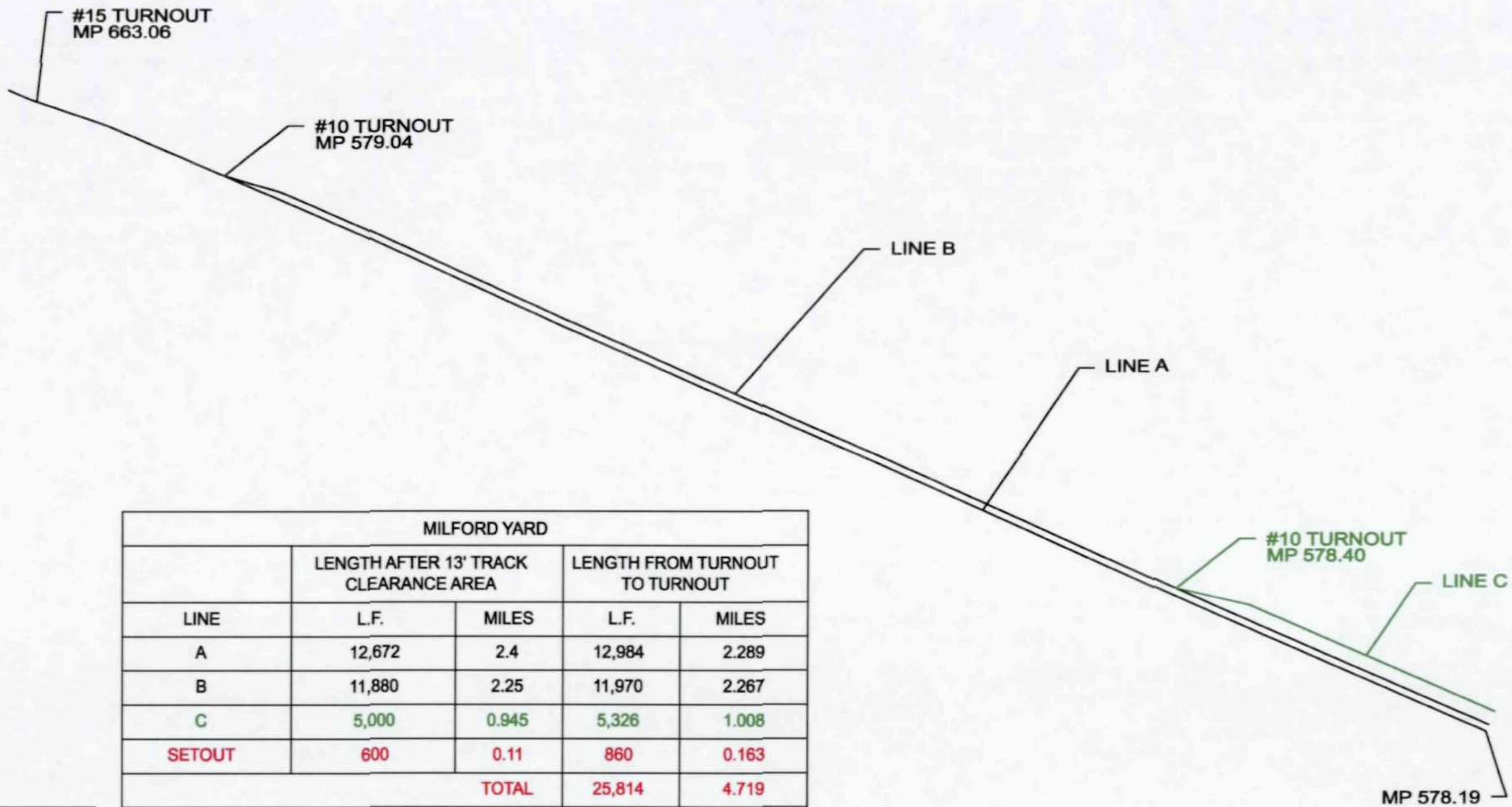
GREEN = ADD

PREPARED BY:

STV/RALPH WHITEHEAD ASSOCIATES

UP REPLY EXHIBIT:

III-B-2



MILFORD YARD				
	LENGTH AFTER 13' TRACK CLEARANCE AREA		LENGTH FROM TURNOUT TO TURNOUT	
LINE	L.F.	MILES	L.F.	MILES
A	12,672	2.4	12,984	2.289
B	11,880	2.25	11,970	2.267
C	5,000	0.945	5,326	1.008
SETOUT	600	0.11	860	0.163
		TOTAL	25,814	4.719
		TOTAL	30,280	5.564

IRR

PAGE: 5 OF 7

SUBDIVISION: **LYNNDYL**

MILFORD YARD

MP 579.17 TO 578.19

DATE: 04/02/13

SCALE: 1"=500"

LEGEND:

136# STANDARD CWR
115# CWR CLASS 1 RELAY

20° TURNOUT TYPE*

(FED) 1 FAILED EQUIPMENT DETECTOR WITH NUMBER OF TRACKS COVERED

HB - HOT BEARING DETECTOR
DE OR DED - DRAGGING EQUIPMENT DETECTOR
HW - HOT WHEEL DETECTOR

(AEI) 1 AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

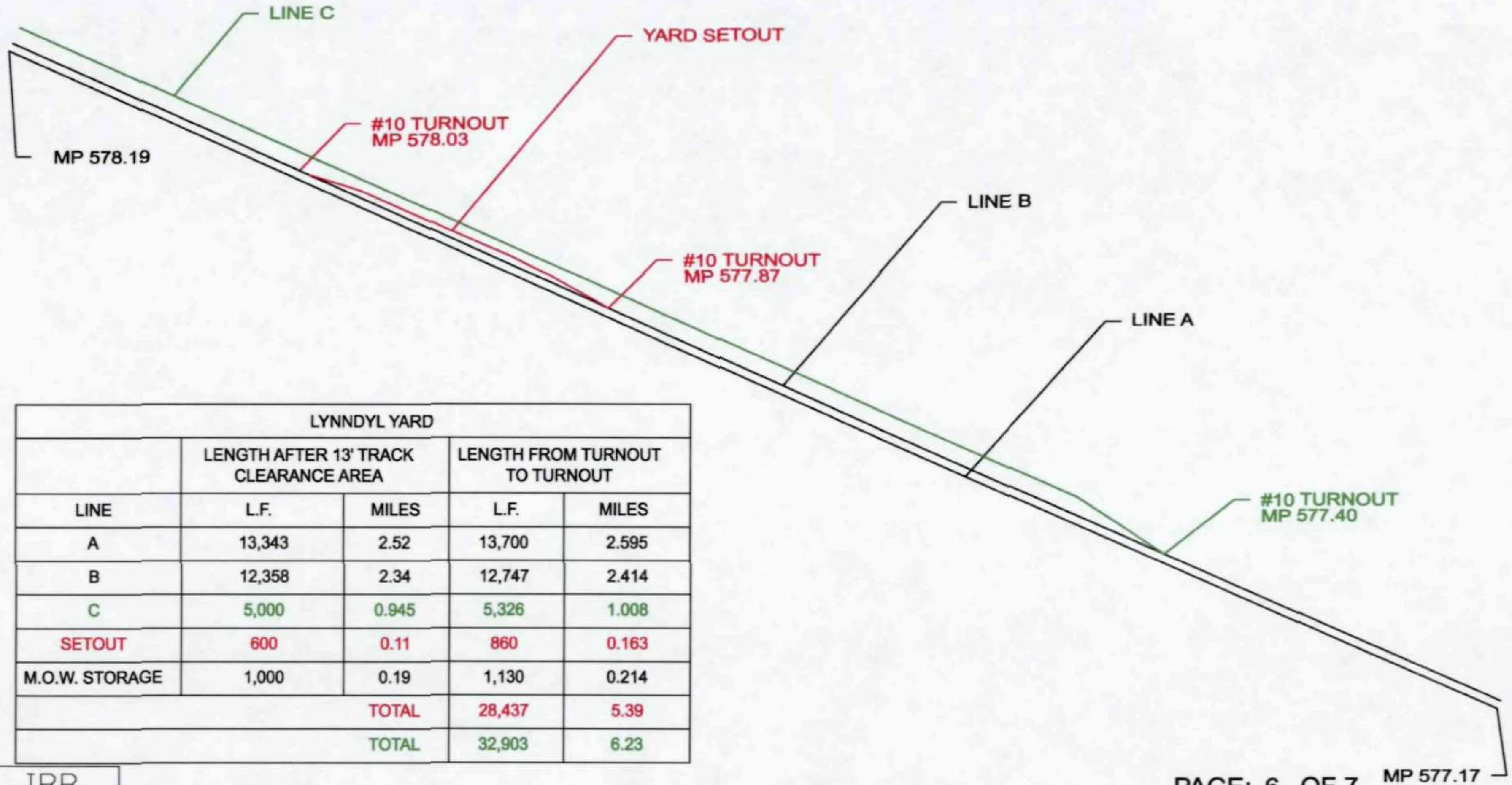
* TURNOUT TYPES
20 - #20 ELECTRIC
15E - #15 ELECTRIC
15 - #15 HAND-THROWN
105 - #10 SPRING
10 - #10 HAND-THROWN
10E - #10 ELECTRIC

RED = REMOVE
GREEN = ADD

PREPARED BY:
STV/RALPH WHITEHEAD ASSOCIATES

UP REPLY EXHIBIT:

III-B-2



LYNNDYL YARD				
	LENGTH AFTER 13' TRACK CLEARANCE AREA		LENGTH FROM TURNOUT TO TURNOUT	
LINE	L.F.	MILES	L.F.	MILES
A	13,343	2.52	13,700	2.595
B	12,358	2.34	12,747	2.414
C	5,000	0.945	5,326	1.008
SETOUT	600	0.11	860	0.163
M.O.W. STORAGE	1,000	0.19	1,130	0.214
		TOTAL	28,437	5.39
		TOTAL	32,903	6.23

IRR

PAGE: 6 OF 7

SUBDIVISION: **LYNNDYL**
MILFORD YARD

MP 578.19 TO 577.17

DATE: 04/02/13
SCALE: 1"=500"

LEGEND:

- - - - 136# STANDARD CWR
——— 115# CWR CLASS 1 RELAY

20* TURNOUT TYPE*

FED 1 FAILED EQUIPMENT DETECTOR WITH NUMBER OF TRACKS COVERED

HB - HOT BEARING DETECTOR
DE OR DED - DRAGGING EQUIPMENT DETECTOR
HW - HOT WHEEL DETECTOR

AEI 1 AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

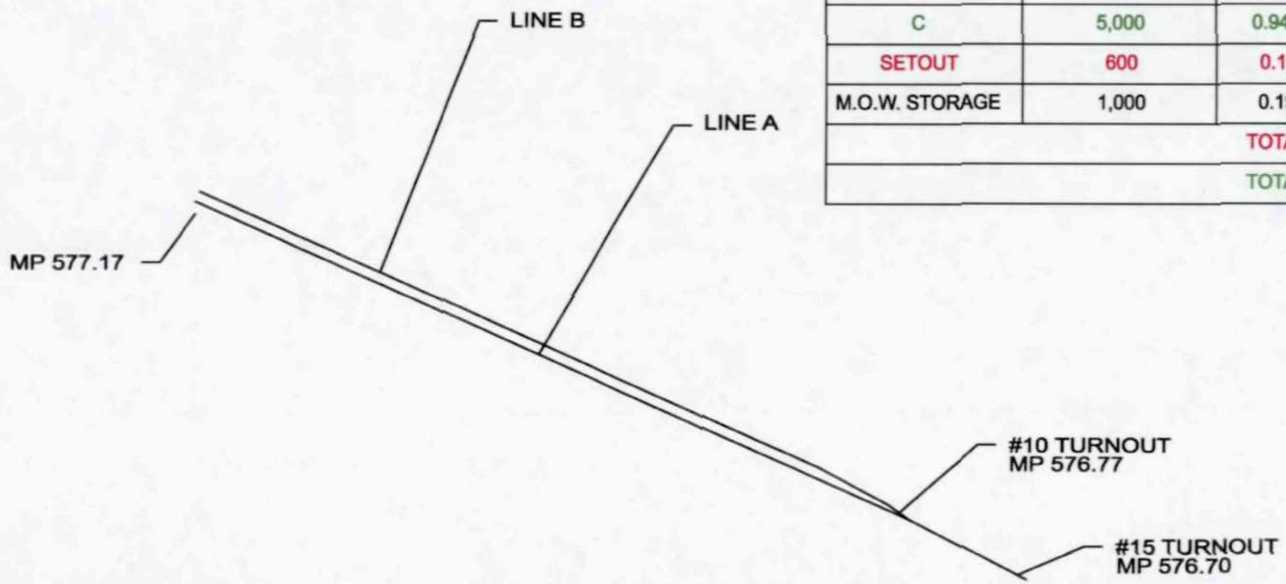
* TURNOUT TYPES
20 - #20 ELECTRIC
15E - #15 ELECTRIC
15 - #15 HAND-THROWN
105 - #10 SPRING
10 - #10 HAND-THROWN
10E - #10 ELECTRIC

RED = REMOVE
GREEN = ADD

PREPARED BY:
STV/RALPH WHITEHEAD ASSOCIATES

UP REPLY EXHIBIT:
III-B-2

LYNNDYL YARD				
	LENGTH AFTER 13' TRACK CLEARANCE AREA		LENGTH FROM TURNOUT TO TURNOUT	
LINE	L.F.	MILES	L.F.	MILES
A	13,343	2.52	13,700	2.595
B	12,358	2.34	12,747	2.414
C	5,000	0.945	5,326	1.008
SETOUT	600	0.11	860	0.163
M.O.W. STORAGE	1,000	0.19	1,130	0.214
		TOTAL	28,437	5.39
		TOTAL	32,903	6.23



IRR

PAGE: 7 OF 7

SUBDIVISION: LYNNDYL
MILFORD YARD

MP 577.17 TO 576.70

DATE: 04/02/13
SCALE: 1"=500"

LEGEND:

136# STANDARD CWR
115# CWR CLASS 1 RELAY

20° TURNOUT TYPE*

FED 1 FAILED EQUIPMENT DETECTOR WITH NUMBER OF TRACKS COVERED

HB - HOT BEARING DETECTOR
DE OR DED - DRAGGING EQUIPMENT DETECTOR
HW - HOT WHEEL DETECTOR

AEI 1 AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

* TURNOUT TYPES
20 - #20 ELECTRIC
15E - #15 ELECTRIC
15 - #15 HAND-THROWN
105 - #10 SPRING
10 - #10 HAND-THROWN
10E - #10 ELECTRIC

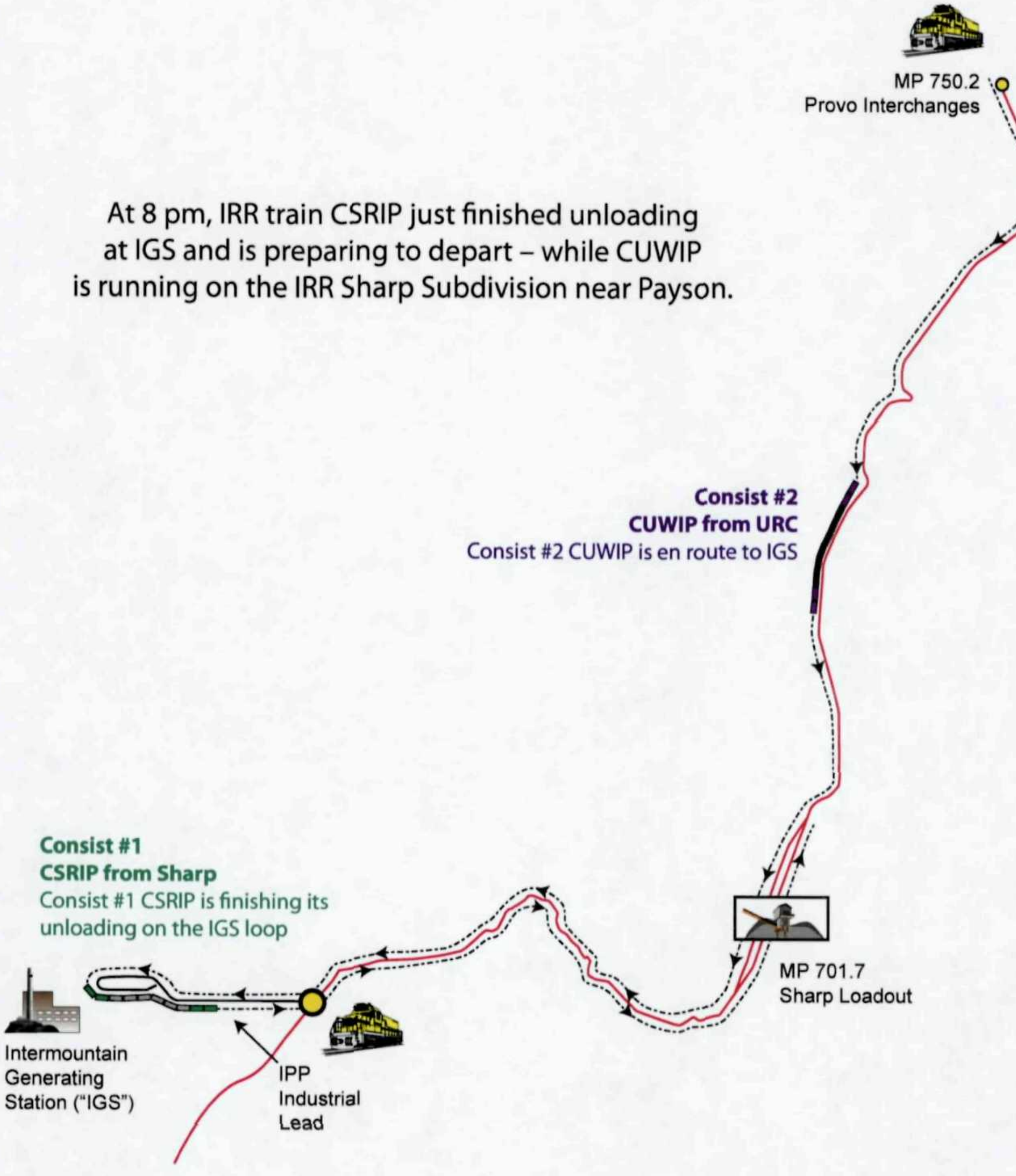
RED = REMOVE
GREEN = ADD

PREPARED BY:
STV/RALPH WHITEHEAD ASSOCIATES

UP REPLY EXHIBIT:
III-B-2

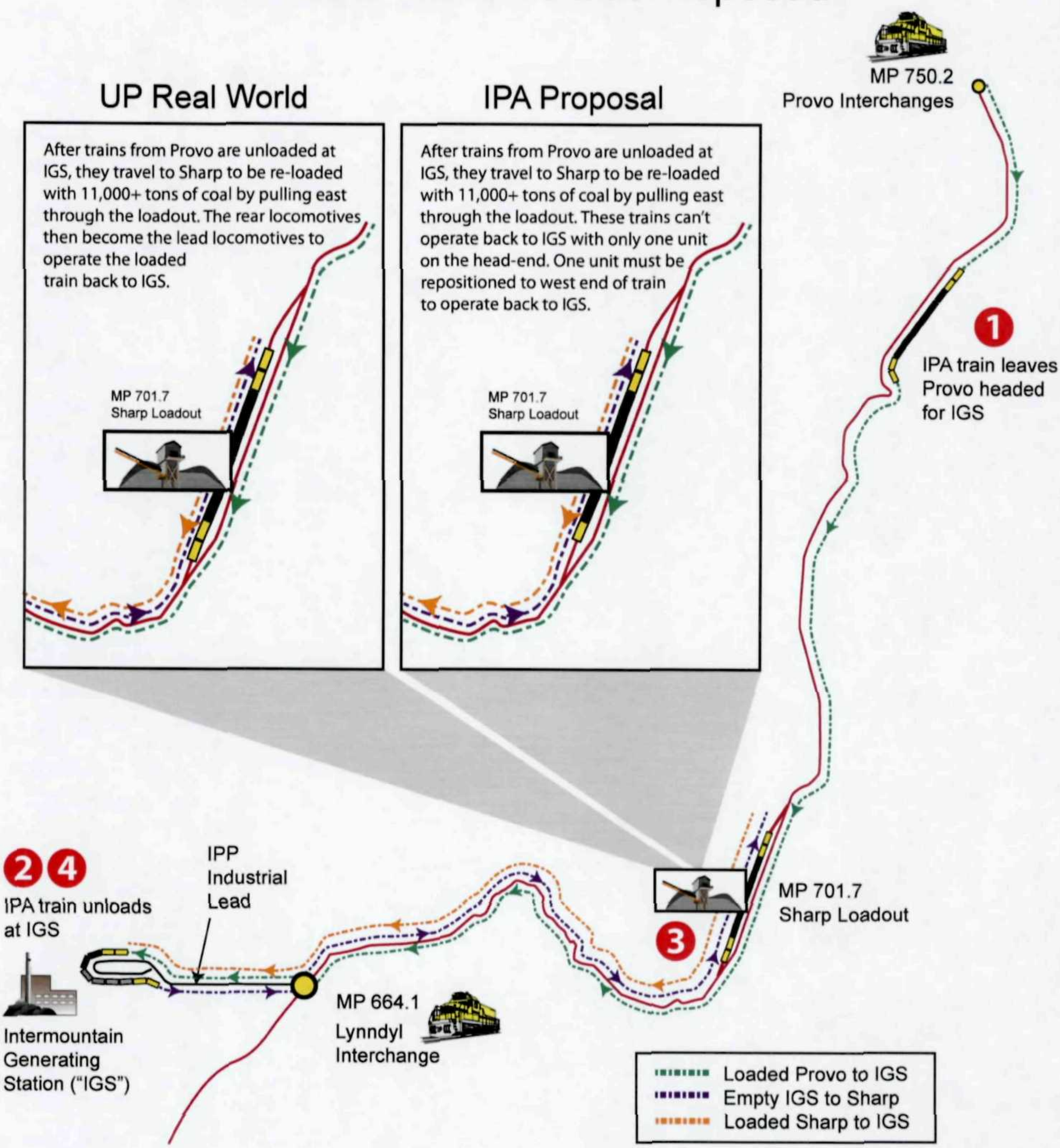
Multiple IPA Coal Trains Operate on IRR at the Same Time

At 8 pm, IRR train CSRIP just finished unloading at IGS and is preparing to depart – while CUWIP is running on the IRR Sharp Subdivision near Payson.

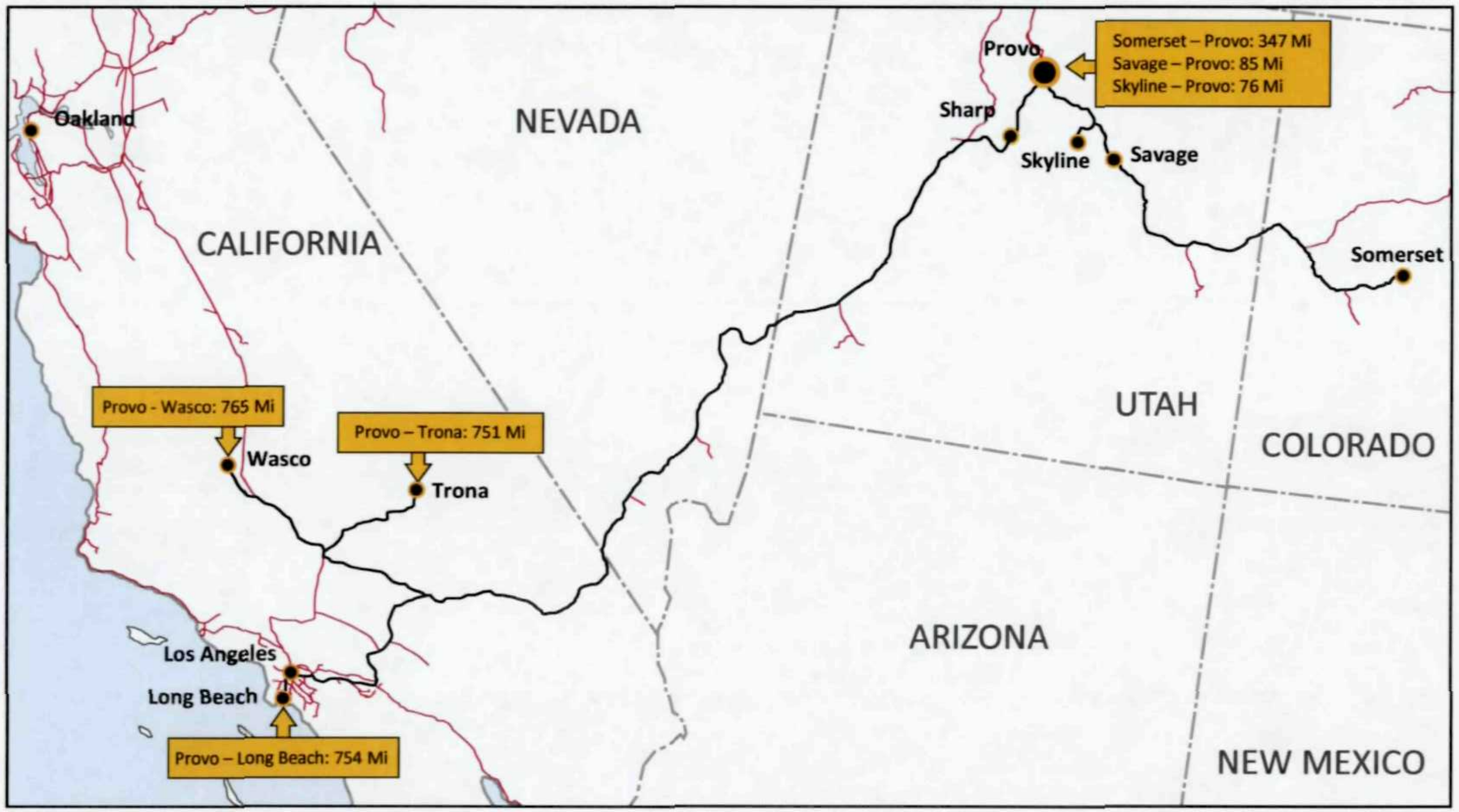


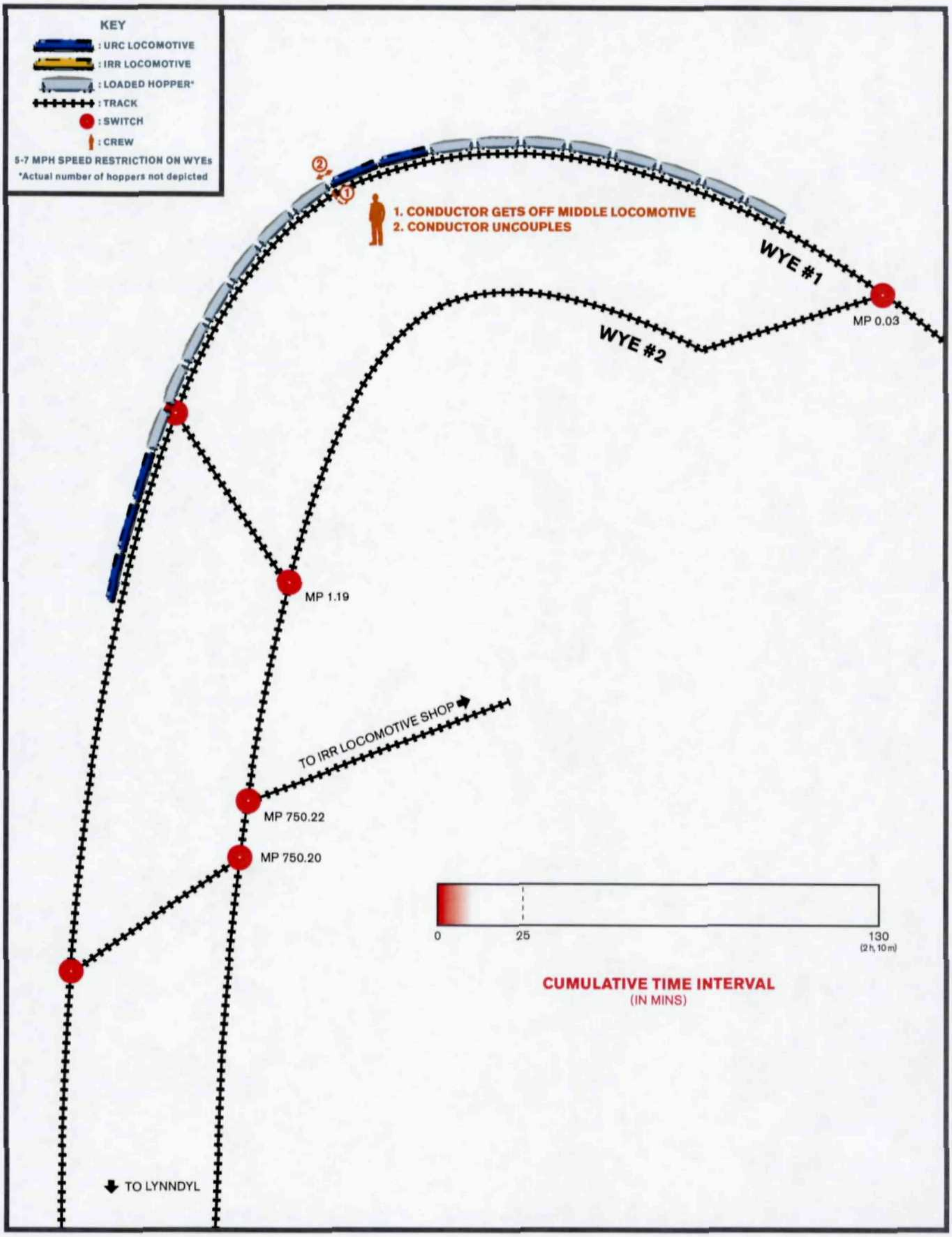
Source: IPA's RTC simulation run, Wednesday evening

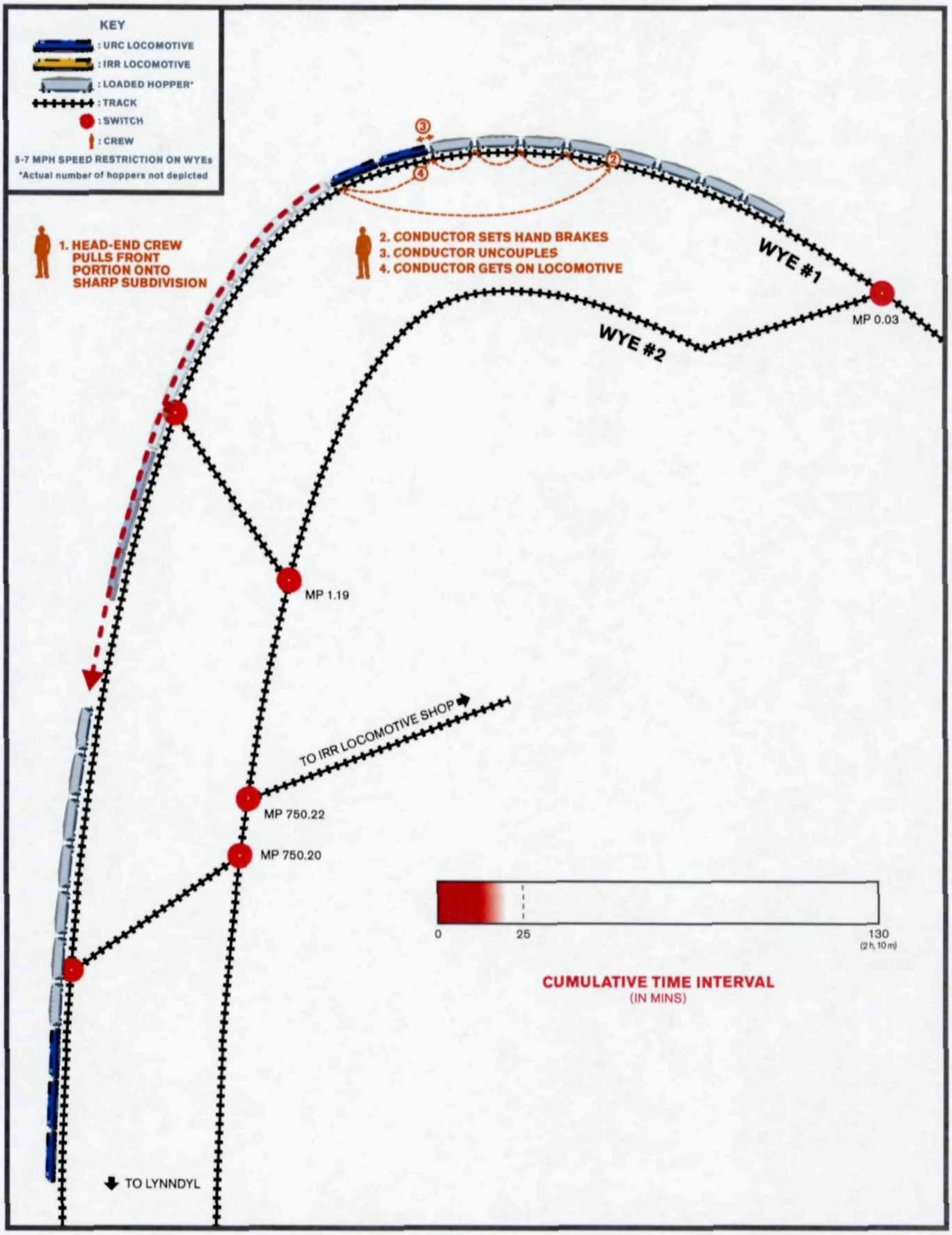
UP Real World vs IPA Proposed

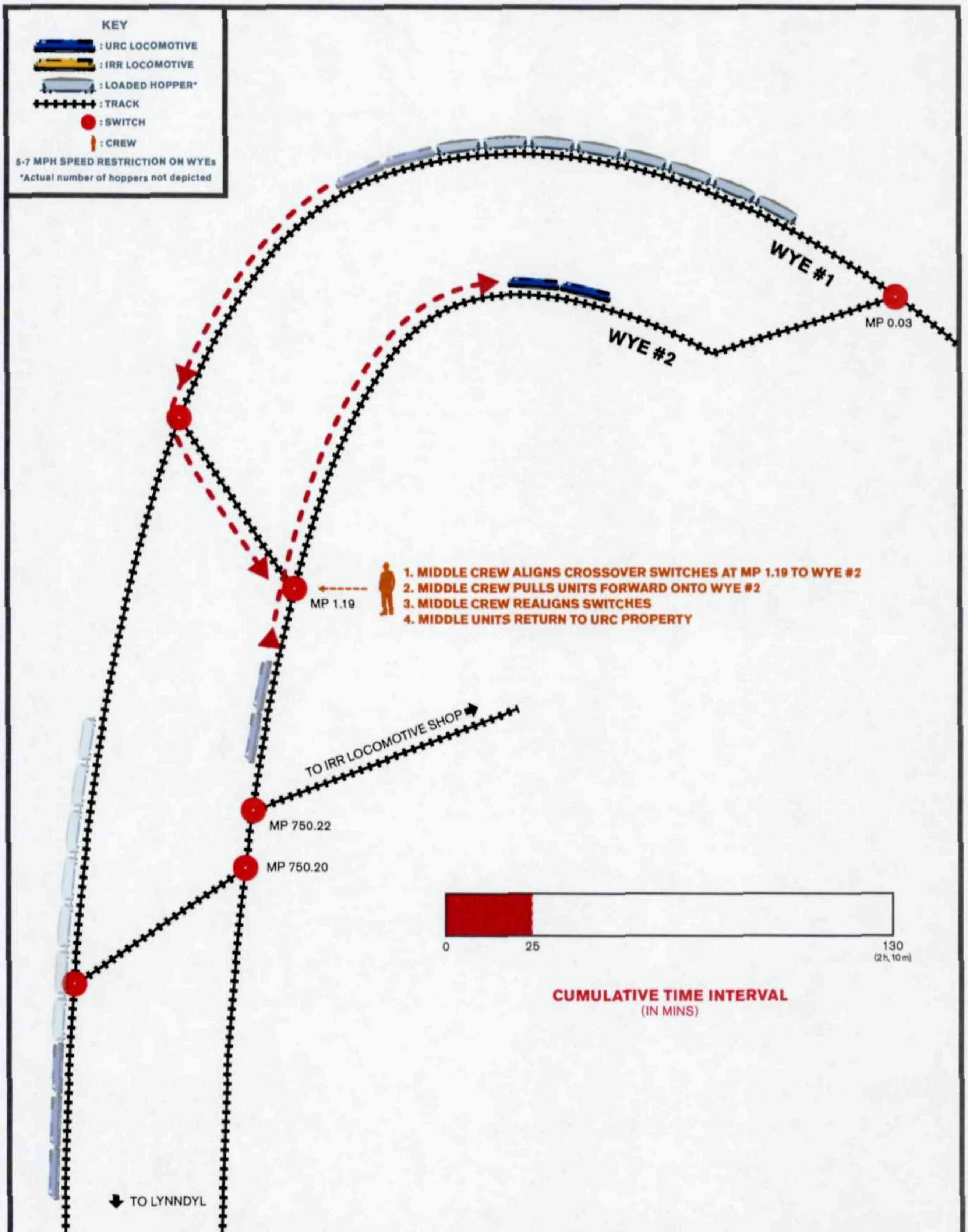


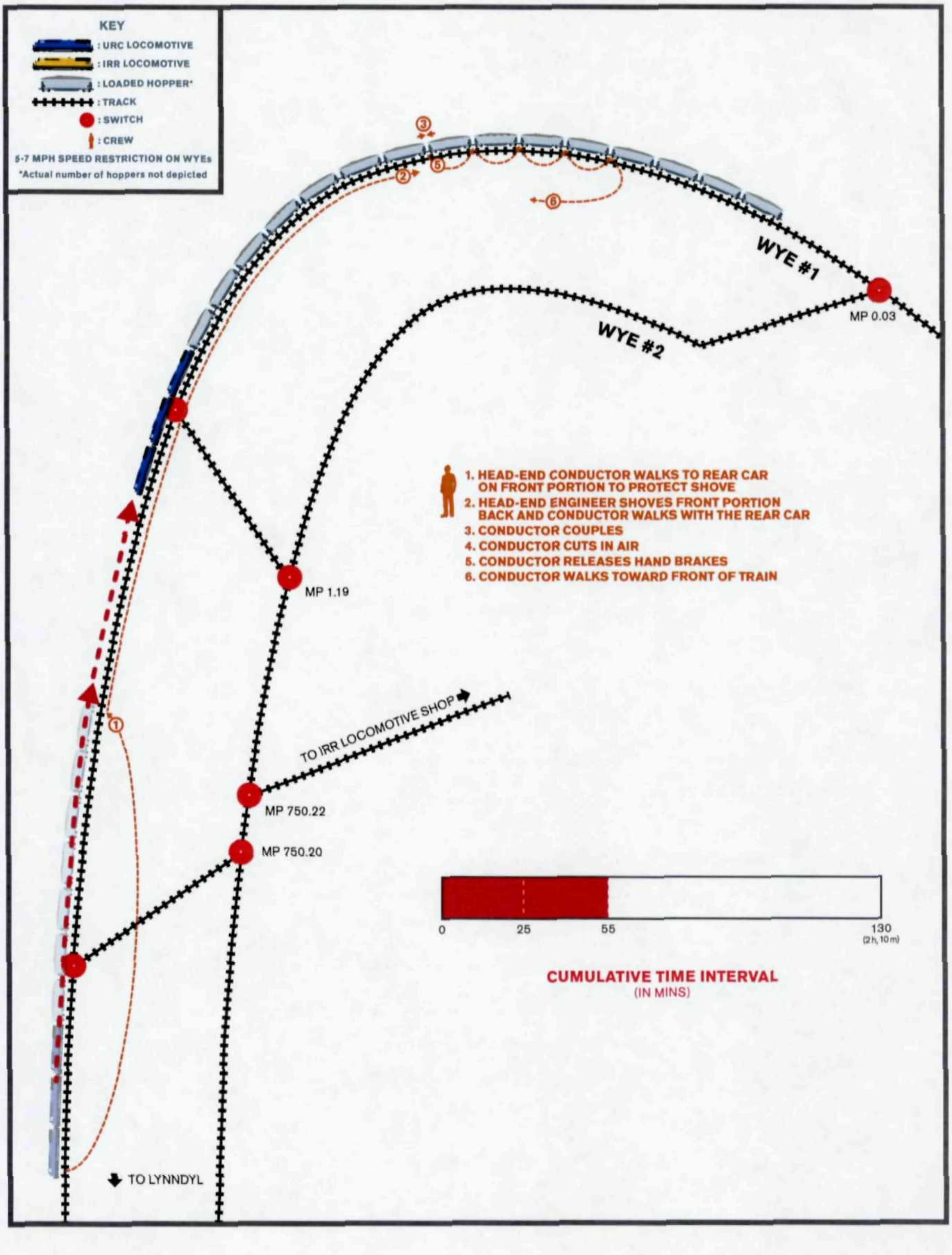
IRR Long-Haul Coal Shipments Require Inspection at Provo in Loaded Direction
Round-Trip Distances to Southern California Destinations Exceed 1,500 Miles

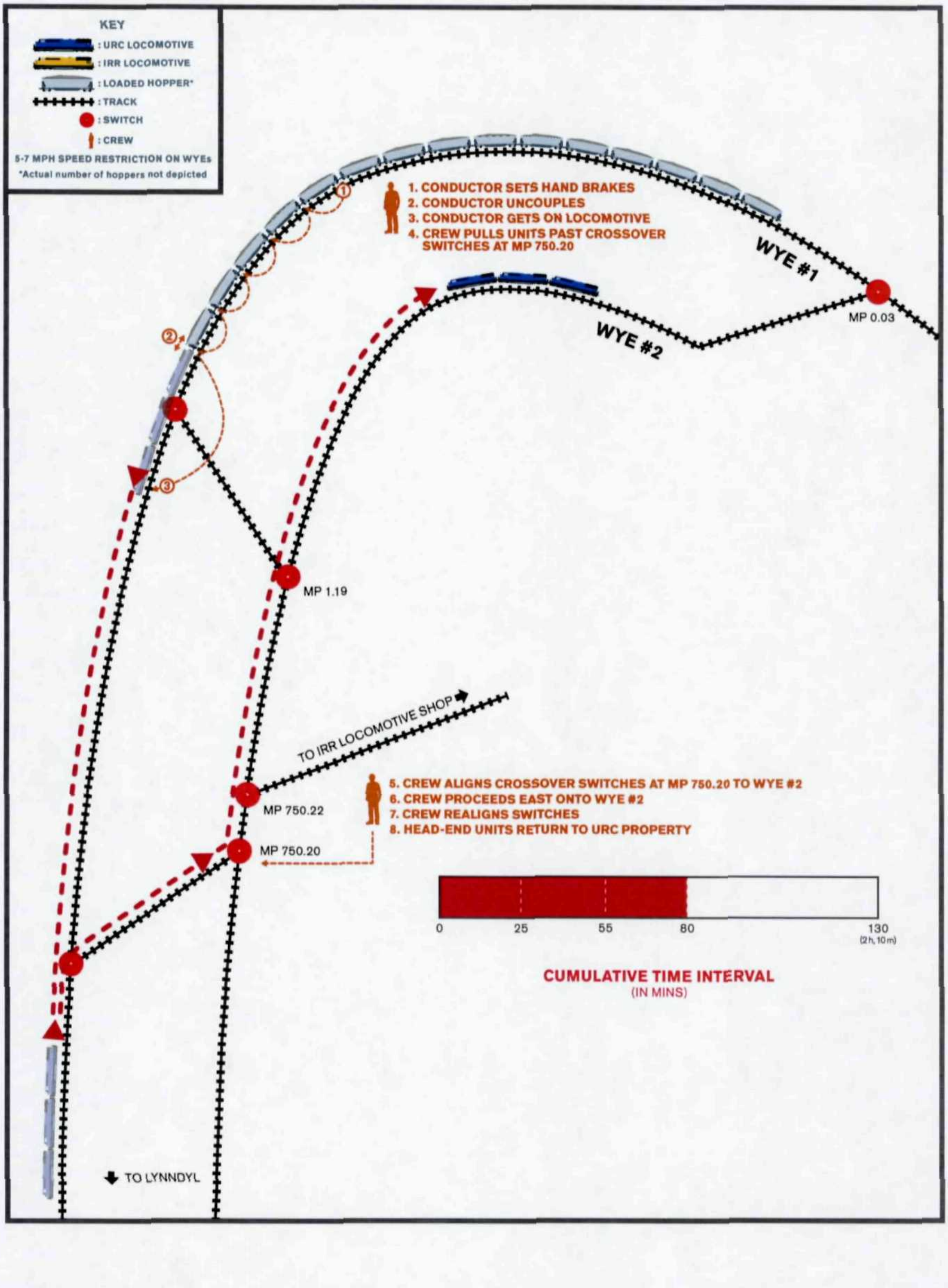


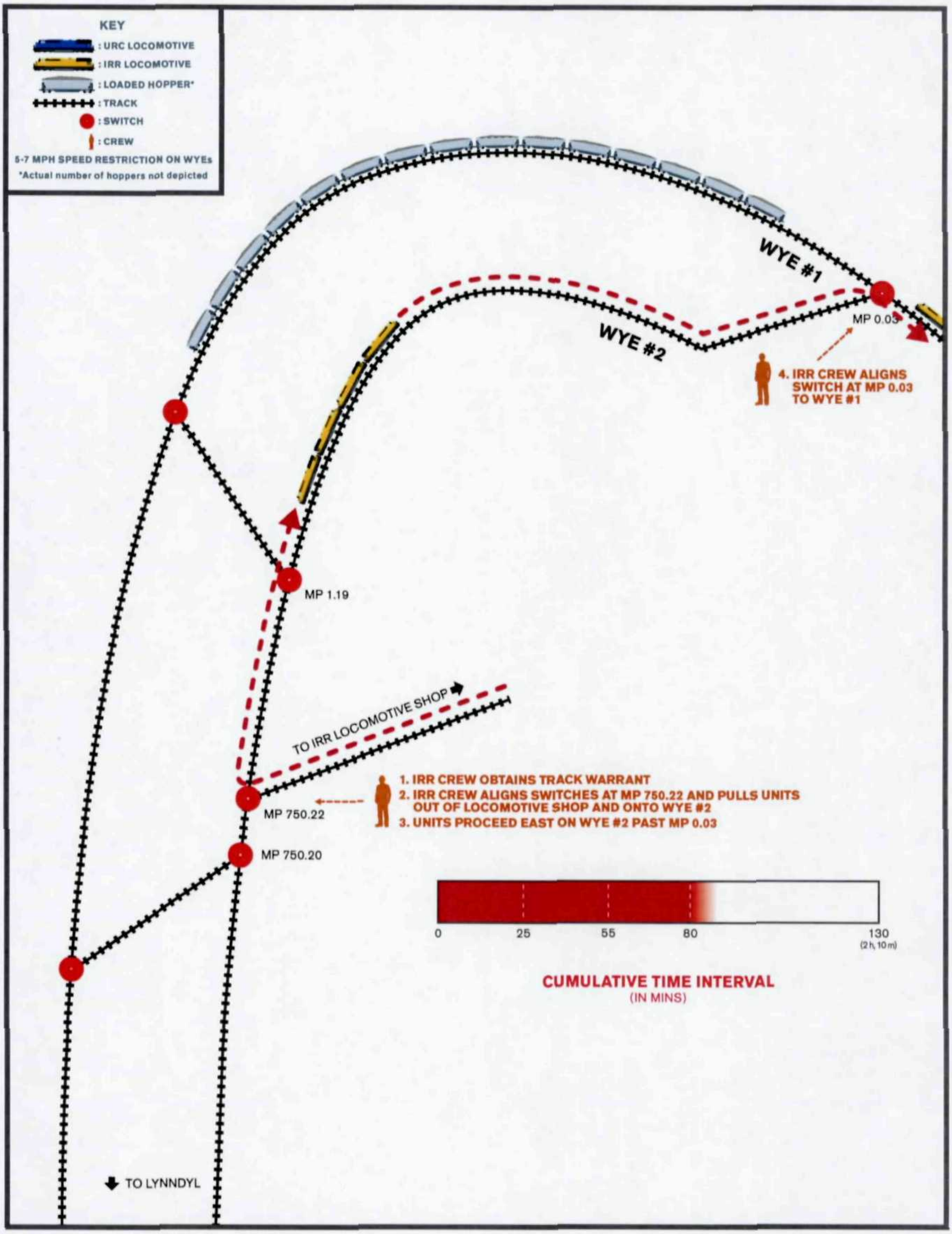

KEY
: URC LOCOMOTIVE
: IRR LOCOMOTIVE
: LOADED HOPPER*
: TRACK
: SWITCH
: CREW
5-7 MPH SPEED RESTRICTION ON WYEs
*Actual number of hoppers not depicted
1. CONDUCTOR GETS OFF MIDDLE LOCOMOTIVE
2. CONDUCTOR UNCOUPLES
WYE #1
WYE #2
MP 0.03
MP 1.19
TO IRR LOCOMOTIVE SHOP
MP 750.22
MP 750.20
0
25
130
(2 h, 10 m)
CUMULATIVE TIME INTERVAL
(IN MINS)
TO LYNNDYL

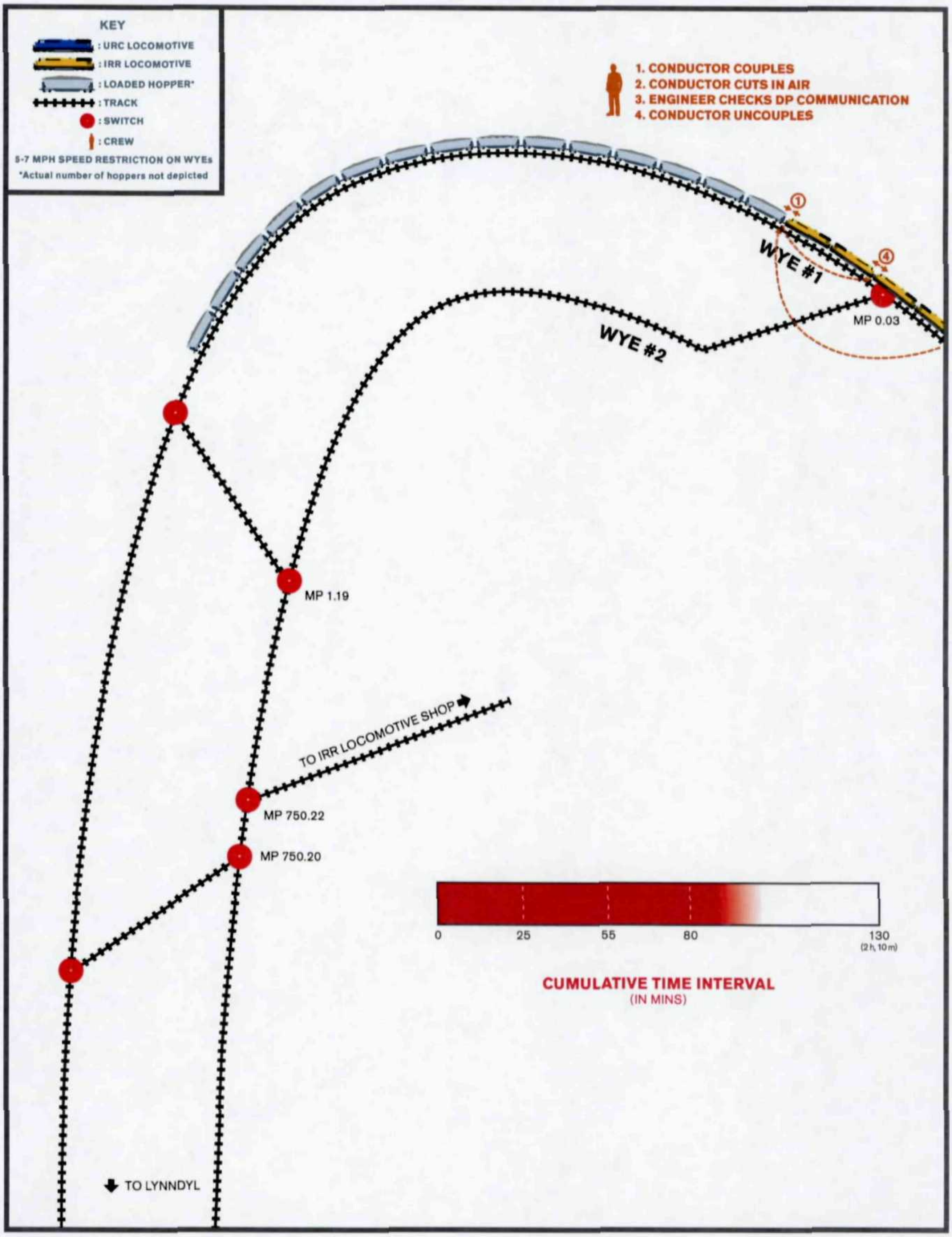

KEY
: URC LOCOMOTIVE
: IRR LOCOMOTIVE
: LOADED HOPPER*
: TRACK
: SWITCH
: CREW
5-7 MPH SPEED RESTRICTION ON WYEs
*Actual number of hoppers not depicted
1. HEAD-END CREW PULLS FRONT PORTION ONTO SHARP SUBDIVISION
2. CONDUCTOR SETS HAND BRAKES
3. CONDUCTOR UNCOUPLES
4. CONDUCTOR GETS ON LOCOMOTIVE
WYE #1
WYE #2
MP 0.03
MP 1.19
TO IRR LOCOMOTIVE SHOP
MP 750.22
MP 750.20
TO LYNNDYL
0
25
130
(2 h, 10 m)
CUMULATIVE TIME INTERVAL
(IN MINS)

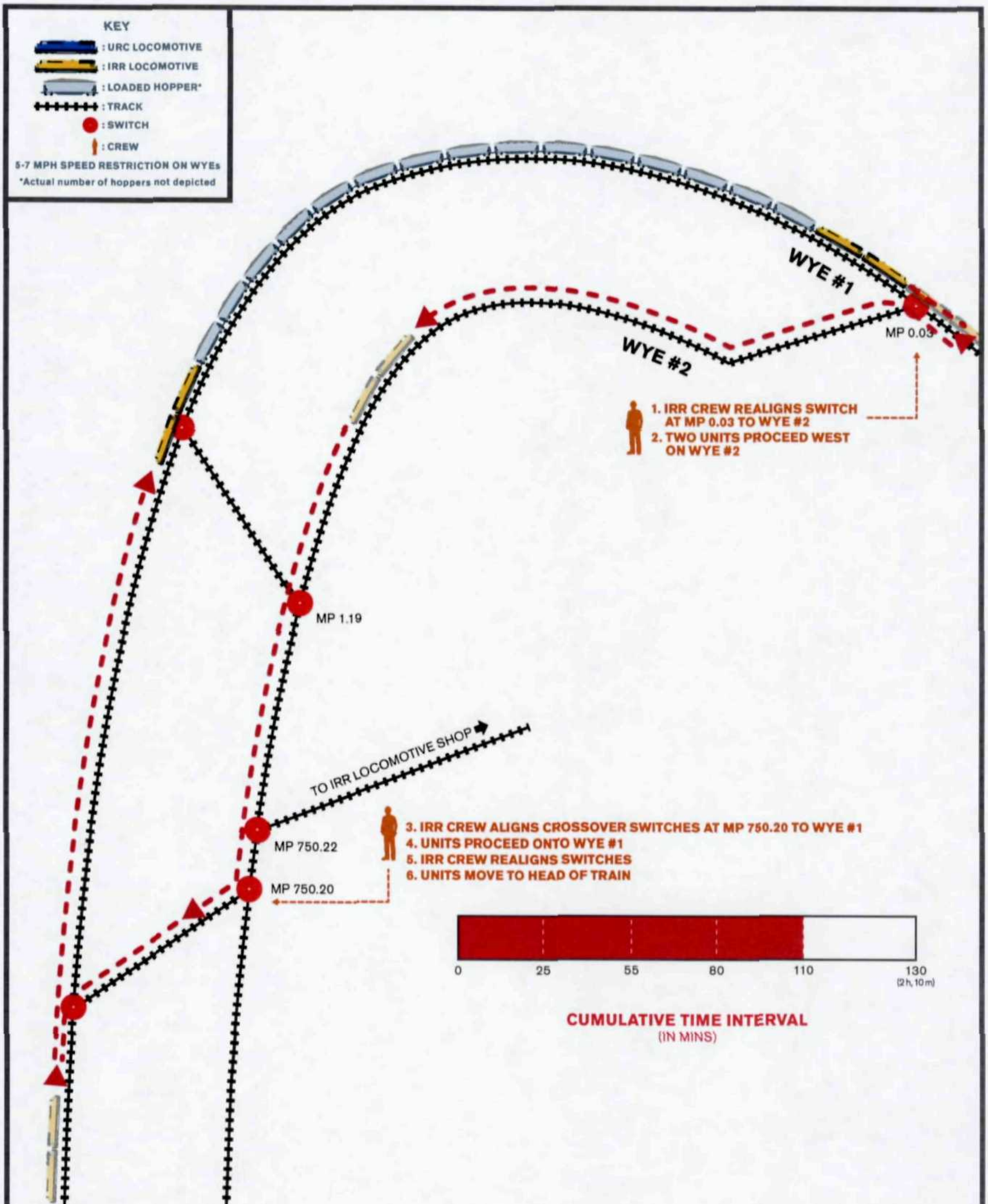

KEY
: URC LOCOMOTIVE
: IRR LOCOMOTIVE
: LOADED HOPPER*
: TRACK
: SWITCH
: CREW
5-7 MPH SPEED RESTRICTION ON WYEs
*Actual number of hoppers not depicted
WYE #1
WYE #2
MP 0.03
MP 1.19
1. MIDDLE CREW ALIGNS CROSSOVER SWITCHES AT MP 1.19 TO WYE #2
2. MIDDLE CREW PULLS UNITS FORWARD ONTO WYE #2
3. MIDDLE CREW REALIGNS SWITCHES
4. MIDDLE UNITS RETURN TO URC PROPERTY
TO IRR LOCOMOTIVE SHOP
MP 750.22
MP 750.20
0
25
130
(2 h, 10 m)
CUMULATIVE TIME INTERVAL
(IN MINS)
TO LYNNDYL

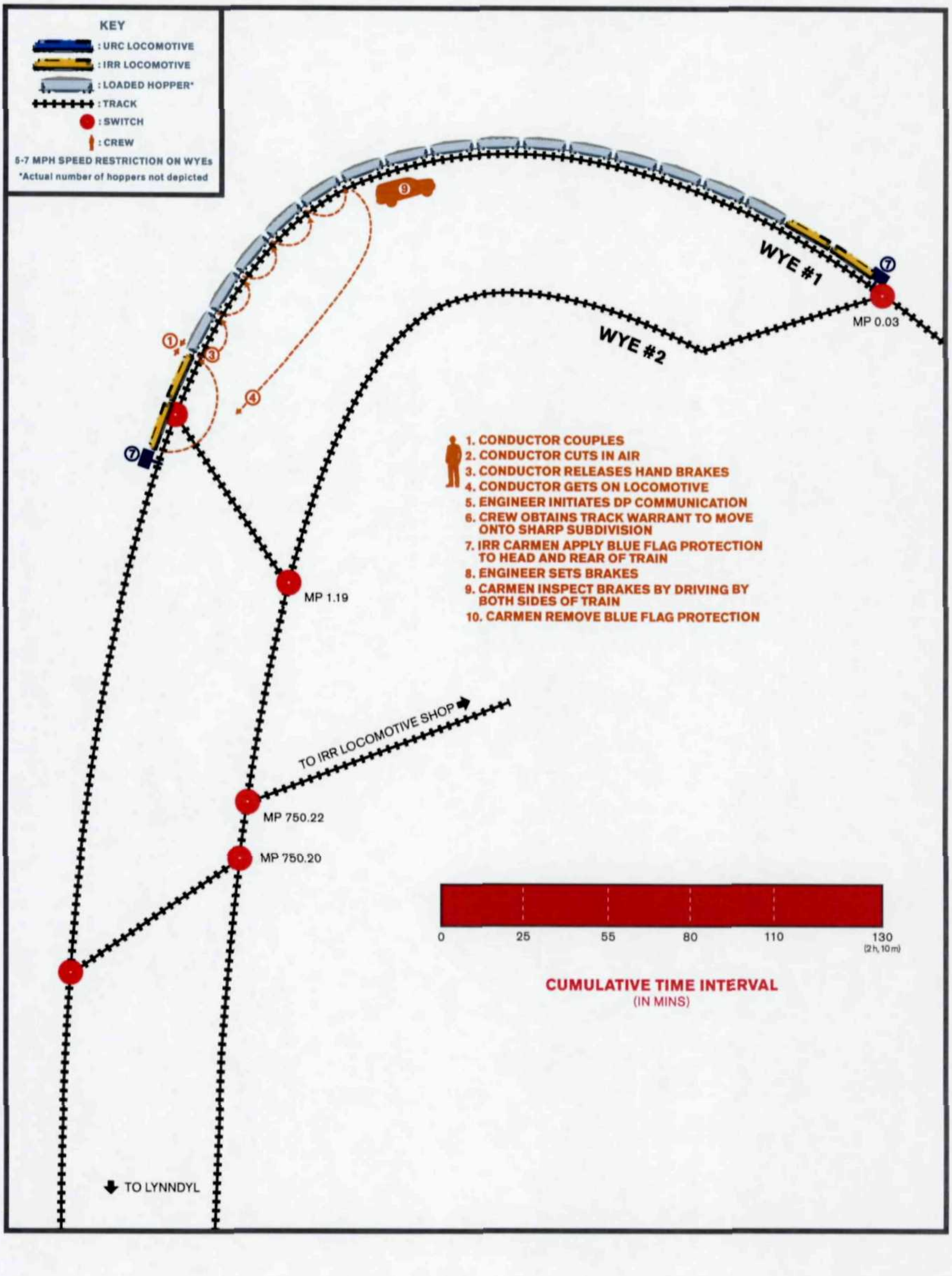

KEY
: URC LOCOMOTIVE
: IRR LOCOMOTIVE
: LOADED HOPPER*
: TRACK
: SWITCH
: CREW
5-7 MPH SPEED RESTRICTION ON WYEs
*Actual number of hoppers not depicted
WYE #1
WYE #2
MP 0.03
MP 1.19
MP 750.22
MP 750.20
TO IRR LOCOMOTIVE SHOP
TO LYNNDYL
1. HEAD-END CONDUCTOR WALKS TO REAR CAR ON FRONT PORTION TO PROTECT SHOVE
2. HEAD-END ENGINEER SHOVES FRONT PORTION BACK AND CONDUCTOR WALKS WITH THE REAR CAR
3. CONDUCTOR COUPLES
4. CONDUCTOR CUTS IN AIR
5. CONDUCTOR RELEASES HAND BRAKES
6. CONDUCTOR WALKS TOWARD FRONT OF TRAIN
0
25
55
130
(2h, 10m)
CUMULATIVE TIME INTERVAL
(IN MINS)


KEY
: URC LOCOMOTIVE
: IRR LOCOMOTIVE
: LOADED HOPPER*
: TRACK
: SWITCH
: CREW
5-7 MPH SPEED RESTRICTION ON WYEs
*Actual number of hoppers not depicted
1. CONDUCTOR SETS HAND BRAKES
2. CONDUCTOR UNCOUPLES
3. CONDUCTOR GETS ON LOCOMOTIVE
4. CREW PULLS UNITS PAST CROSSOVER SWITCHES AT MP 750.20
WYE #1
WYE #2
MP 0.03
MP 1.19
TO IRR LOCOMOTIVE SHOP
MP 750.22
MP 750.20
5. CREW ALIGNS CROSSOVER SWITCHES AT MP 750.20 TO WYE #2
6. CREW PROCEEDS EAST ONTO WYE #2
7. CREW REALIGNS SWITCHES
8. HEAD-END UNITS RETURN TO URC PROPERTY
0
25
55
80
130
(2h, 10m)
CUMULATIVE TIME INTERVAL
(IN MINS)
TO LYNNDYL


KEY
: URC LOCOMOTIVE
: IRR LOCOMOTIVE
: LOADED HOPPER*
: TRACK
: SWITCH
: CREW
5-7 MPH SPEED RESTRICTION ON WYEs
*Actual number of hoppers not depicted
WYE #1
WYE #2
MP 0.03
4. IRR CREW ALIGNS SWITCH AT MP 0.03 TO WYE #1
MP 1.19
TO IRR LOCOMOTIVE SHOP
MP 750.22
MP 750.20
1. IRR CREW OBTAINS TRACK WARRANT
2. IRR CREW ALIGNS SWITCHES AT MP 750.22 AND PULLS UNITS OUT OF LOCOMOTIVE SHOP AND ONTO WYE #2
3. UNITS PROCEED EAST ON WYE #2 PAST MP 0.03
0
25
55
80
130
(2h,10m)
CUMULATIVE TIME INTERVAL
(IN MINS)
TO LYNNDYL


KEY
: URC LOCOMOTIVE
: IRR LOCOMOTIVE
: LOADED HOPPER*
: TRACK
: SWITCH
: CREW
5-7 MPH SPEED RESTRICTION ON WYEs
*Actual number of hoppers not depicted
1. CONDUCTOR COUPLES
2. CONDUCTOR CUTS IN AIR
3. ENGINEER CHECKS DP COMMUNICATION
4. CONDUCTOR UNCOUPLES
①
④
WYE #1
MP 0.03
WYE #2
MP 1.19
TO IRR LOCOMOTIVE SHOP
MP 750.22
MP 750.20
0
25
55
80
130
(2 h, 10 m)
CUMULATIVE TIME INTERVAL
(IN MINS)
TO LYNNDYL


KEY
: URC LOCOMOTIVE
: IRR LOCOMOTIVE
: LOADED HOPPER*
: TRACK
: SWITCH
: CREW
5-7 MPH SPEED RESTRICTION ON WYEs
*Actual number of hoppers not depicted
WYE #1
WYE #2
MP 0.03
1. IRR CREW REALIGNS SWITCH AT MP 0.03 TO WYE #2
2. TWO UNITS PROCEED WEST ON WYE #2
MP 1.19
TO IRR LOCOMOTIVE SHOP
MP 750.22
MP 750.20
3. IRR CREW ALIGNS CROSSOVER SWITCHES AT MP 750.20 TO WYE #1
4. UNITS PROCEED ONTO WYE #1
5. IRR CREW REALIGNS SWITCHES
6. UNITS MOVE TO HEAD OF TRAIN
0
25
55
80
110
130
(2h, 10 m)
CUMULATIVE TIME INTERVAL
(IN MINS)
TO LYNNDYL


KEY
: URC LOCOMOTIVE
: IRR LOCOMOTIVE
: LOADED HOPPER*
: TRACK
: SWITCH
: CREW
5-7 MPH SPEED RESTRICTION ON WYEs
*Actual number of hoppers not depicted
WYE #1
WYE #2
MP 0.03
MP 1.19
MP 750.22
MP 750.20
TO IRR LOCOMOTIVE SHOP
TO LYNNDYL
1. CONDUCTOR COUPLES
2. CONDUCTOR CUTS IN AIR
3. CONDUCTOR RELEASES HAND BRAKES
4. CONDUCTOR GETS ON LOCOMOTIVE
5. ENGINEER INITIATES DP COMMUNICATION
6. CREW OBTAINS TRACK WARRANT TO MOVE ONTO SHARP SUBDIVISION
7. IRR CARMEN APPLY BLUE FLAG PROTECTION TO HEAD AND REAR OF TRAIN
8. ENGINEER SETS BRAKES
9. CARMEN INSPECT BRAKES BY DRIVING BY BOTH SIDES OF TRAIN
10. CARMEN REMOVE BLUE FLAG PROTECTION
0
25
55
80
110
130
(2h, 10m)
CUMULATIVE TIME INTERVAL
(IN MINS)

IRR Provo Interchanges

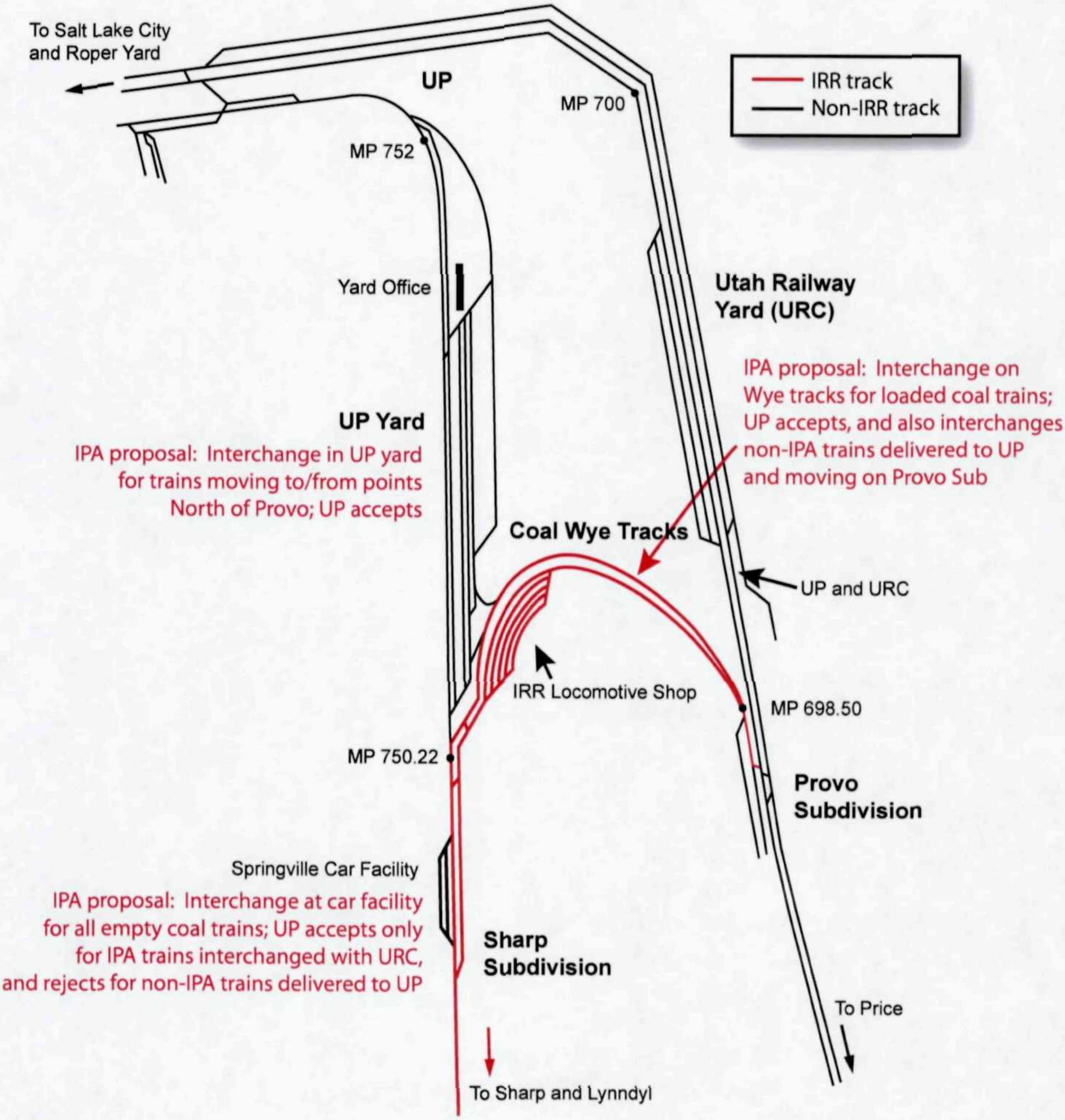


TABLE L: IRR STAND-ALONE COSTS AND REVENUES

Revenue Requirements to Cover Total Stand-Alone Costs

UP Reply

Period (1)	Quarter (2)	Quarterly Capital Requirement Road Property (3)	Quarterly Operating Expense (4)	Annual Stand-Alone Requirement (5)	Annual Stand-Alone Revenues (6)	Overpayments Or Shortfalls In Revenues (7)	PV Difference (8)	Cumulative PV Difference (9)
1	Nov 2 - Dec 31, 2012	$10,520,786	$10,151,334	$20,672,120	$14,313,732	-$6,358,388	-$6,534,829	-$6,534,829
2	1Q 2013	$16,058,909	$15,819,947					
3	2Q 2013	$16,102,603	$15,850,005					
4	3Q 2013	$16,274,506	$15,800,870					
5	4Q 2013	$16,463,990	$15,556,921	$127,927,750	$88,160,786	-$39,766,964	-$36,671,482	-$43,206,311
6	1Q 2014	$16,642,762	$15,539,147					
7	2Q 2014	$16,687,960	$15,677,445					
8	3Q 2014	$16,869,145	$15,691,555					
9	4Q 2014	$17,071,411	$15,831,210	$130,010,635	$90,099,141	-$39,911,494	-$33,035,336	-$76 241,647
10	1Q 2015	$17,218,894	$16,057,751					
11	2Q 2015	$17,367,692	$16,103,318					
12	3Q 2015	$17,517,817	$16,149,015					
13	4Q 2015	$17,669,281	$16,194,841	$134,278,610	$92,881,328	-$41,397,282	-$30,755,818	-$106,997,465
14	1Q 2016	$17,793,807	$16,352,754					
15	2Q 2016	$17,919,247	$16,509,110					
16	3Q 2016	$18,045,610	$16,666,961					
17	4Q 2016	$18,172,903	$16,826,322	$138,286,714	$94,125,209	-$44,161,505	-$29,449,236	-$136,446,701
18	1Q 2017	$18,318,917	$17,425,635					
19	2Q 2017	$18,466,125	$17,566,565					
20	3Q 2017	$18,614,540	$17,708,634					
21	4Q 2017	$18,764,170	$17,851,852	$144,716,438	$99,964,247	-$44,752,191	-$26,786,697	-$163,233,398
22	1Q 2018	$18,927,213	$18,274,431					
23	2Q 2018	$19,091,686	$18 429,130					
24	3Q 2018	$19,257,604	$18,585,140					
25	4Q 2018	$19,424,978	$18,742,469	$150,732,651	$104,677,043	-$46,055,608	-$24,743,555	-$187,976,954
26	1Q 2019	$19,592,065	$18,986,765					
27	2Q 2019	$19,760,607	$19,126,607					
28	3Q 2019	$19,930,618	$19,267,479					
29	4Q 2019	$20,102,109	$19,409,389	$156,175,639	$107,923,871	-$48,251,768	-$23,268,454	-$211,245,408
30	1Q 2020	$20,264,953	$19,717,920					
31	2Q 2020	$20,429,148	$19,835,082					
32	3Q 2020	$20,594,706	$19,952,940					
33	4Q 2020	$20,761,638	$20,071,498	$161,627,885	$112,004,854	-$49,623,031	-$21,478,913	-$232,724,320
34	1Q 2021	$20,919,490	$20,320,074					
35	2Q 2021	$21,078,593	$20,404,295					
36	3Q 2021	$21,238,958	$20,488,864					
37	4Q 2021	$21,400,594	$20,573,784	$166,424,652	$115,910,586	-$50,514,066	-$19,625,288	-$252,349,608
38	1Q 2022	$21,569,259	$20,863,018					
39	2Q 2022	$21,739,289	$20,935,589					
40	3Q 2022	$21,910,695	$21,008,413					
41	Oct 1 - Nov 1, 2022	$7,681,214	$7,332,692	$143,040,169	$100,461,239	-$42,578,929	-$14,848,178	-$267,197,786

TABLE L: IRR STAND-ALONE COSTS AND REVENUES

Revenue Requirements to Cover Total Stand-Alone Costs

EP 715 Proposal 1

Period (1)	Quarter (2)	Quarterly Capital Requirement Road Property (3)	Quarterly Operating Expense (4)	Annual Stand-Alone Requirement (5)	Annual Stand-Alone Revenues (6)	Overpayments Or Shortfalls In Revenues (7)	PV Difference (8)	Cumulative PV Difference (9)
1	Nov 2 - Dec 31, 2012	$9,246,170	$2,229,089	$11,475,260	$5,487,507	-$5,987,753	-$6,153,908	-$6,153,908
2	1Q 2013	$14,112,941	$3,482,893					
3	2Q 2013	$14 153,294	$3,489,510					
4	3Q 2013	$14,303,227	$3,478,693					
5	4Q 2013	$14,468,511	$3,407,058	$70,896,126	$33,658,042	-$37,238,084	-$34,339,519	-$40,493,427
6	1Q 2014	$14,625,055	$3,311,174					
7	2Q 2014	$14,666,803	$3,340,644					
8	3Q 2014	$14 825,475	$3,343,650					
9	4Q 2014	$15,003,217	$3,373,409	$72,489,427	$32,628,790	-$39,860,638	-$32,993,390	-$73,486,817
10	1Q 2015	$15,132,351	$3,353,241					
11	2Q 2015	$15,262,635	$3,362,756					
12	3Q 2015	$15,394,078	$3,372,299					
13	4Q 2015	$15,526,691	$3,381,869	$74,785,921	$32,326,174	-$42,459,746	-$31,545,392	-$105,032,209
14	1Q 2016	$15,635,932	$3,394,258					
15	2Q 2016	$15,745,978	$3,426,712					
16	3Q 2016	$15,856,834	$3,459,476					
17	4Q 2016	$15,968,507	$3,492,554	$76,980,251	$32,215,087	-$44,765,164	-$29,852,076	-$134,884,286
18	1Q 2017	$16,096,710	$3,561,582					
19	2Q 2017	$16,225,962	$3,590,386					
20	3Q 2017	$16,356,274	$3,619,424					
21	4Q 2017	$16,487,654	$3,648,696	$79,586,688	$33,221,450	-$46,365,238	-$27,752,537	-$162,636,823
22	1Q 2018	$16,630,873	$3,682,534					
23	2Q 2018	$16,775,349	$3,713,708					
24	3Q 2018	$16,921,094	$3,745,146					
25	4Q 2018	$17,068,119	$3,776,850	$82,313,672	$33,535,513	-$48,778,159	-$26,206,646	-$188,843,468
26	1Q 2019	$17,214,843	$3,799,930					
27	2Q 2019	$17,362,844	$3,827,917					
28	3Q 2019	$17,512,136	$3,856,111					
29	4Q 2019	$17,662,728	$3,884,512	$85,121,021	$33,741,069	-$51,379,952	-$24,777,390	-$213,620,858
30	1Q 2020	$17,805,592	$3 899,267					
31	2Q 2020	$17,949,641	$3,922,436					
32	3Q 2020	$18,094,886	$3,945,743					
33	4Q 2020	$18,241,337	$3,969,188	$87,828,090	$33,888,956	-$53,939,134	-$23,347,568	-$236,968,426
34	1Q 2021	$18,379,674	$3 973,370					
35	2Q 2021	$18,519,109	$3,989,838					
36	3Q 2021	$18,659,650	$4,006,375					
37	4Q 2021	$18,801,305	$4,022,980	$90,352,302	$33,973,698	-$56,378,604	-$21,904,222	-$258,872,648
38	1Q 2022	$18,949,298	$4,082,086					
39	2Q 2022	$19,098,489	$4,096,285					
40	3Q 2022	$19,248,889	$4,110,531					
41	Oct 1 - Nov 1, 2022	$6,748,003	$1,434,721	$77,768,307	$29,105,077	-$48,663,230	-$16,970,330	-$275,842,978

TABLE L: IRR STAND-ALONE COSTS AND REVENUES

Revenue Requirements to Cover Total Stand-Alone Costs

EP 715 Proposal 2

Period (1)	Quarter (2)	Quarterly Capital Requirement Road Property (3)	Quarterly Operating Expense (4)	Annual Stand-Alone Requirement (5)	Annual Stand-Alone Revenues (6)	Overpayments Or Shortfalls In Revenues (7)	PV Difference (8)	Cumulative PV Difference (9)
1	Nov 2 - Dec 31, 2012	$10,172,977	$7,033,108	$17,206,085	$11,713,350	-$5,492,735	-$5,645,155	-$5,645,155
2	1Q 2013	$15,527,887	$11,099,026					
3	2Q 2013	$15,570,681	$11,120,114					
4	3Q 2013	$15,736,577	$11,085,642					
5	4Q 2013	$15,919,444	$10,878,424	$106,937,796	$72,077,361	-$34,860,435	-$32,146,895	-$37,792,050
6	1Q 2014	$16,092,144	$10,794,199					
7	2Q 2014	$16,136,412	$10,890,267					
8	3Q 2014	$16,311,447	$10,900,068					
9	4Q 2014	$16,507,020	$10,997,079	$108,628,636	$73 057,285	-$35,571,352	-$29,442,968	-$67,235,018
10	1Q 2015	$16,649,489	$11,112,077					
11	2Q 2015	$16,793 226	$11,143,610					
12	3Q 2015	$16,938,245	$11,175,232					
13	4Q 2015	$17,084,557	$11,206,945	$112,103,382	$74,558,447	-$37,544,935	-$27,893,792	-$95,128,811
14	1Q 2016	$17,204,904	$11 252,062					
15	2Q 2016	$17,326,137	$11,359,648					
16	3Q 2016	$17,448,261	$11,468,263					
17	4Q 2016	$17,571,284	$11,577,916	$115,208,476	$74,716,112	-$40,492,363	-$27,002,521	-$122,131,332
18	1Q 2017	$17,712,432	$12,010,106					
19	2Q 2017	$17,854,735	$12,107,238					
20	3Q 2017	$17,998,204	$12,205,155					
21	4Q 2017	$18,142,848	$12,303,864	$120,334,580	$79,276,135	-$41,058,445	-$24,575,858	-$146,707,190
22	1Q 2018	$18,300,476	$12,581,247					
23	2Q 2018	$18,459,488	$12,687,752					
24	3Q 2018	$18,619,896	$12,795,158					
25	4Q 2018	$18,781,712	$12,903,474	$125,129,202	$82,679,440	-$42,449,762	-$22,806,384	-$169,513,574
26	1Q 2019	$18,943,236	$13,013,364					
27	2Q 2019	$19,106,168	$13,109,210					
28	3Q 2019	$19,270,518	$13,205,763					
29	4Q 2019	$19,436,300	$13,303,026	$129,387,585	$84,505,410	-$44,882,175	-$21,643,628	-$191,157,201
30	1Q 2020	$19,593,684	$13,484,875					
31	2Q 2020	$19,752,374	$13,565,001					
32	3Q 2020	$19,912,381	$13,645,602					
33	4Q 2020	$20,073,716	$13,726,683	$133,754,317	$87,219,331	-$46,534,986	-$20,142,377	-$211,299,579
34	1Q 2021	$20,226,232	$13,861,594					
35	2Q 2021	$20,379,958	$13,919,046					
36	3Q 2021	$20,534,902	$13,976,736					
37	4Q 2021	$20,691,075	$14,034,665	$137,624,209	$89,730,283	-$47,893,926	-$18,607,437	-$229,907,016
38	1Q 2022	$20,854,090	$14,204,167					
39	2Q 2022	$21,018,425	$14,253,576					
40	3Q 2022	$21,184,089	$14 303,156					
41	Oct 1 - Nov 1, 2022	$7,426,468	$4,992,316	$118,236,287	$77,460,900	-$40,775,387	-$14,219,332	-$244,126,349

TABLE L: IRR STAND-ALONE COSTS AND REVENUES

Revenue Requirements to Cover Total Stand-Alone Costs

No Crossover

Period	Quarter	Quarterly Capital Requirement Road Property	Quarterly Operating Expense	Annual Stand-Alone Requirement	Annual Stand-Alone Revenues	Overpayments Or Shortfalls In Revenues	PV Difference	Cumulative PV Difference
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)

THIS PAGE IS A HIGHLY CONFIDENTIAL DOCUMENT

TABLE L: IRR STAND-ALONE COSTS AND REVENUES

Revenue Requirements to Cover Total Stand-Alone Costs

ECP

Period (1)	Quarter (2)	Quarterly Capital Requirement Road Property (3)	Quarterly Operating Expense (4)	Annual Stand-Alone Requirement (5)	Annual Stand-Alone Revenues (6)	Overpayments Or Shortfalls In Revenues (7)	PV Difference (8)	Cumulative PV Difference (9)
1	Nov 2 - Dec 31, 2012	$10,520,786	$10,151,334	$20,672,120	$9,128,074	-$11,544,046	-$11,864,384	-$11,864,384
2	1Q 2013	$16,058,909	$15,819,947					
3	2Q 2013	$16,102,603	$15,850,005					
4	3Q 2013	$16,274,506	$15,800,870					
5	4Q 2013	$16,463,990	$15,556,921	$127,927,750	$55,494,211	-$72,433,539	-$66,795,274	-$78,659,658
6	1Q 2014	$16,642,762	$15,539,147					
7	2Q 2014	$16,687,960	$15,677,445					
8	3Q 2014	$16,869,145	$15,691,555					
9	4Q 2014	$17,071,411	$15,831,210	$130,010,635	$56,484,415	-$73,526,220	-$60,858,741	-$139,518,402
10	1Q 2015	$17,218,894	$16,057,751					
11	2Q 2015	$17,367,692	$16,103,318					
12	3Q 2015	$17,517,817	$16,149,015					
13	4Q 2015	$17,669,281	$16,194,841	$134,278,610	$57,878,979	-$76,399,631	-$56,760,566	-$196,278,968
14	1Q 2016	$17,793,807	$16,352,754					
15	2Q 2016	$17,919,247	$16,509,110					
16	3Q 2016	$18,045,610	$16,666,961					
17	4Q 2016	$18,172,903	$16,826,322	$138,286,714	$58,660,928	-$79,625,786	-$53,098,700	-$249,377,668
18	1Q 2017	$18,318,917	$17,425,635					
19	2Q 2017	$18,466,125	$17,566,565					
20	3Q 2017	$18,614,540	$17,708,634					
21	4Q 2017	$18,764,170	$17,851,852	$144,716,438	$61,425,383	-$83,291,055	-$49,854,370	-$299,232,038
22	1Q 2018	$18,927,213	$18,274,431					
23	2Q 2018	$19,091,686	$18,429,130					
24	3Q 2018	$19,257,604	$18,585,140					
25	4Q 2018	$19,424,978	$18,742,469	$150,732,651	$63,338,685	-$87,393,966	-$46,952,750	-$346,184,788
26	1Q 2019	$19,592,065	$18,986,765					
27	2Q 2019	$19,760,607	$19,126,607					
28	3Q 2019	$19,930,618	$19,267,479					
29	4Q 2019	$20,102,109	$19,409,389	$156,175,639	$64,781,457	-$91,394,182	-$44,073,023	-$390,257,812
30	1Q 2020	$20,264,953	$19,717,920					
31	2Q 2020	$20,429,148	$19,835,082					
32	3Q 2020	$20,594,706	$19,952,940					
33	4Q 2020	$20,761,638	$20,071,498	$161,627,885	$66,198,038	-$95,129,848	-$41,176,156	-$431,433,968
34	1Q 2021	$20,919,490	$20,320,074					
35	2Q 2021	$21,078,593	$20,404,295					
36	3Q 2021	$21,238,958	$20,488,864					
37	4Q 2021	$21,400,594	$20,573,784	$166,424,652	$68,113,187	-$98,311,465	-$38,195,120	-$469,629,088
38	1Q 2022	$21,569,259	$20,863,018					
39	2Q 2022	$21,739,289	$20,935,589					
40	3Q 2022	$21,910,695	$21,008,413					
41	Oct 1 - Nov 1, 2022	$7,681,214	$7,332,692	$143,040,169	$58,130,400	-$84,909,769	-$29,609,841	-$499,238,929