235488

PUBLIC VERSION

BEFORE THE
SURFACE TRANSPORTATION BOARD

TOTAL PETROCHEMICALS & REFINING USA, INC. **Complainant,** **v.** **CSX TRANSPORTATION, INC.** **Defendant.**	**Docket No. NOR 42121**

OPENING EVIDENCE OF TOTAL PETROCHEMICALS & REFINING USA, INC.

Volume I of II

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Case Glossary

AEP Texas I	*AEP Texas North Co. v. BNSF Railway*, STB Docket No. 41191, slip op. (STB served Nov. 8, 2006)
AEP Texas II	*AEP Texas North Co. v. BNSF Railway*, STB Docket No. 41191, slip op. (STB served Sept. 10, 2007)
AEPCO	*Arizona Electric Power Cooperative, Inc. v. BNSF Railway*, STB Docket No. 42113, slip op. (STB served Nov. 22, 2011)
AEPCO II	*Arizona Electric Power Cooperative, Inc. v. BNSF Railway*, STB Docket No. 42113, slip op. (STB served June 27, 2011)
APS	*Arizona Public Service Co. v. Atchison, Topeka & Santa Fe Railway.*, 2 STB 367 (1997)
Cargill	*Cargill, Inc. v. BNSF Railway*, STB Docket No. 42120, slip op. (STB served Aug. 12, 2013)
Coal Rate Guidelines or Guidelines	*Coal Rate Guidelines, Nationwide*, 1 I.C.C. 2d 520 (1985), *aff'd sub nom. Consolidated Rail Corp. v. United States*, 812 F.2d 1444 (3d Cir. 1987)
Coal Trading Corp.	*Coal Trading Corp. v. Baltimore & Ohio R.R.*, 6 I.C.C. 2d 361 (1990)
Cost of Capital – 2008	*Railroad Cost of Capital – 2008*, STB Ex Parte No. 558 (Sub-No. 12) (STB served Sept. 25, 2009)
Cost of Capital – 2009	*Railroad Cost of Capital – 2009*, STB Ex Parte No. 558 (Sub-No. 13) (STB served Oct. 29, 2010)
Cost of Capital – 2010	*Railroad Cost of Capital – 2010*, STB Ex Parte No. 558 (Sub-No. 14) (STB served Oct. 3, 2011)
Cost of Capital – 2011	*Railroad Cost of Capital – 2011*, STB Ex Parte No. 558 (Sub-No. 15) (STB served Sept. 13, 2012)
Cost of Capital – 2012	*Railroad Cost of Capital – 2012*, STB Ex Parte No. 558 (Sub-No. 16) (STB served Aug. 30, 2013)
CP&L	*Carolina Power & Light Co. v. Norfolk Southern Railway,* 7 S.T.B. 235 (2003)
Duke/CSXT	*Duke Energy Corp. v. CSX Transportation, Inc.*, 7 S.T.B. 402 (2004)
Duke/NS	*Duke Energy Corp. v. Norfolk Southern Railway*, 7 S.T.B. 89 (2003)

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FMC	*FMC Wyoming Corp. v. Union Pacific R.R.*, 4 STB 699 (2000)
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PSCo/Xcel I	*Public Service Co. of Colorado d/b/a Xcel Energy v. Burlington Northern & Santa Fe Railway,* 7 S.T.B. 589 (2004)
PSCo/Xcel II	*Public Service Co. of Colorado d/b/a Xcel Energy v. Burlington Northern & Santa Fe Railway,* STB Docket No. 42057 (STB served Jan. 19, 2005)
Rate Regulation Reforms Notice or Ex Parte 715 Notice	*Rate Regulation Reforms,* STB Ex Parte No. 715 (STB served July 25, 2012)
Rate Regulation Reforms or Ex Parte 715 Decision	*Rate Regulation Reforms,* STB Ex Parte No. 715 (STB served July 18, 2013)
TMPA	*Texas Municipal Power Agency v. Burlington Northern & Santa Fe Ry.*, 6 STB 573 (2003)
WFA/Basin I	*Western Fuels Association, Inc. v. BNSF Railway,* STB Docket No. 42088 (STB served Sept. 10, 2007)
WFA/Basin II	*Western Fuels Association, Inc. v. BNSF Railway,* STB Docket No. 42088 (STB served Feb. 18, 2009)

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WFA/Basin III	*Western Fuels Association, Inc. v. BNSF Railway,* STB Docket No. 42088 (STB served June 5, 2012)
Wisconsin P&L	*Wisconsin Power & Light Co., v. Union Pacific R.R.,* 5 STB 955 (2001)
West Texas Utilities	*West Texas Utilities Co. v. Burlington Northern R.R.*, 1 S.T.B 638 (1996), aff'd sub nom. *Burlington Northern R.R. v. STB*, 114 F.3d 206 (D.C. Cir. 1997)

Acronyms

The following acronyms are used:

4WD	Four-wheel drive
AAR	Association of American Railroads
AASHTO	American Association of State Highway Officials
AEI	Automatic Equipment Identification
AEO	EIA's Annual Energy Outlook Forecast
AIILF	All-Inclusive Less Fuel Index, published by AAR
AREMA	American Railway Engineering and Maintenance-of-Way Assoc.
ARRA	American Reinvestment and Recovery Act of 2009
ATC	Average Total Cost
ATF	Across-the-Fence
ATV	All-Terrain Vehicle
B&B	Bridge and Building
BNSF	BNSF Railway Company
C&S	Communications and Signals
CAGR	Compound Annual Growth Rate
CAPM	Capital Asset Pricing Model
CFO	Chief Financial Officer
CMP	Constrained Market Pricing
cmp	Corrugated Metal Pipe
CN	Canadian National Railway
CNW	Chicago and Northwestern
COBRA	Consolidated Omnibus Budget Reconciliation Act
CP	Canadian Pacific Railway
CPI	Consumer Price Index
CSX	CSX Corporation
CSXT	CSX Transportation, Inc.
CTC	Central Traffic Control
CWR	Continuous Welded Rail
CY	Cubic Yards
DCF	Discounted Cash Flow
DOT	Department Of Transportation
DP	Distributed Power
DTL	Direct to Locomotive Fueling
EDI	Electronic Data Interchange
EEO	Equal Employment Opportunity
EIA	Energy Information Administration
EOTD	End of Train Device
FED	Failed-equipment Detector
FRA	Federal Railroad Administration
FSC	Fuel Surcharge
G&A	General and Administrative
GDP-IPD	Gross Domestic Product – Implicit Price Deflator
GWR	Gross Weight on Rail
HDF	On-Highway Diesel Fuel Index

Acronyms

HR	Human Resources
ICC	Interstate Commerce Commission
IDC	Interest During Construction
IDS/IPS	Intrusion Detection System/Intrusion Prevention System
ISS	Interline Settlement System
IT	Information Technology
KCS	Kansas City Southern Railway Company
LAN	Local Area Network
LF	Linear Feet
LMR	Land Mobile Radio
LUM	Locomotive Unit Mile
MACRS	Modified Accelerated Cost Recovery System
MGA	Monongahela Railway
MGT	Million Gross Tons
MIT	Massachusetts Institute of Technology
MLO	Manager of Locomotive Operations
MMM	Maximum Markup Methodology
MOW	Maintenance of Way
MTO	Manager of Train Operations
NCREIF	National Council of Real Estate Investment Fiduciaries
NPI	NCREIF Property Index
NS	Norfolk Southern Railway Company
NT/PC	Network Personal Computer
O/D	Origin/Destination Pair
OSHA	Occupational Safety and Health Administration
PPI	Producer Price Index
PTC	Positive Train Control
R/VC	Revenue to Variable Cost
RCAF-A	Rail Cost Adjustment Factor, adjusted for productivity
RCAF-U	Rail Cost Adjustment Factor, unadjusted for productivity
REDI	CSXT Conductor Training
RMI	A GE Transportation Company
RMS	RMI's Revenue Management Services System
ROW	Right of Way
RSIA	Rail Safety Improvement Act of 2008
RTC	Rail Traffic Controller Model
SAC	Stand-Alone Cost
SARR	Stand-Alone Railroad
SEC	Securities Exchange Commission
STB	Surface Transportation Board
STCC	Standard Transportation Commodity Code
T&E	Train and Engine
TMS	RMI's Transportation Management Services System
TPI	Total Petrochemicals & Refining USA, Inc.
TPIRR	TPI Stand-Alone Railroad
UP	Union Pacific Railroad Company

Acronyms

UPS	Uninterruptible Power Supply
URCS	Uniform Railroad Costing System
USCG	US Coast Guard
USDA	US Department of Agriculture
VHF	Very High Frequency
VP	Vice President
WAN	Wide Area Network
WTI	West Texas Intermediate

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I. COUNSEL'S ARGUMENT AND SUMMARY OF EVIDENCE

Pursuant to the procedural schedule served by the Surface Transportation Board ("Board" or "STB") in this docket on November 25, 2013 (as modified by order served February 11, 2014), Total Petrochemicals & Refining USA, Inc., ("TPI") hereby submits its Opening Evidence and Argument on stand-alone costs ("SAC").[1] TPI's Fourth Amended Complaint challenged the reasonableness of common carrier rail rates established by CSX Transportation, Inc. ("CSXT") that applied to 105 lanes involving the transportation of the following five commodities: polypropylene, polystyrene, polyethylene, styrene, and aromatics (i.e. base chemicals).[2] Over the course of this proceeding, the number of lanes has decreased such that TPI's issue movements now encompass 88 case lanes. TPI has attached a complete list of these lanes, and TPI's customers at each destination, as Opening Exhibit I-1.

The Board previously bifurcated the issue of market dominance from rate reasonableness in a decision served on April 5, 2011, and issued a decision on market dominance, served May 31, 2013 ("*Market Dominance Decision*"), and a decision denying petitions for reconsideration, served December 19, 2013. In its opening evidence on market dominance, TPI elected not to pursue its Complaint with respect to Lane B-99.[3] In the *Market Dominance Decision*, the Board determined that CSXT lacked market dominance over 13 case lanes, with a partial exception for

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[1] Throughout TPI's Opening Evidence, all text within single brackets is {CONFIDENTIAL} and all text within double brackets is {{HIGHLY CONFIDENTIAL}} pursuant to the Protective Order adopted in the Board's decision served on June 23, 2010 in this proceeding.

[2] TPI's Fourth Amended Complaint identified the case lanes in two Exhibits. Exhibit "A" included just one single line CSXT movement, and Exhibit "B" included 104 joint line movements for which TPI challenged just the CSXT bottleneck segment rate. TPI has counted a lane multiple times, even though the origin-destination pair is the same, if the transportation encompasses multiple issue commodities. For example, although Lanes B-67 and B-108 concern the same rate for transportation from Chicago to Akron, TPI counts them separately because Lane B-67 involves the transportation of polypropylene and Lane B-108 involves the transportation of polyethylene. TPI also may have multiple customers within a single case lane.

[3] *Market Dominance Decision*, slip op. at 2, n. 4.

three lanes as they applied to a specific customer location.[4] Finally, in this opening SAC evidence, TPI is withdrawing its Complaint as to six additional lanes.[5] Opening Exhibit I-1 identifies all of the lanes and customers at each location for which the Board evaluated market dominance. TPI has highlighted in red those lanes and/or customers that have been omitted from the SAC analysis as a result of the Board's *Market Dominance Decision*. In addition, TPI has highlighted in green those lanes for which it has elected not to pursue rate relief in the SAC analysis. The lanes and/or customers not highlighted in Exhibit I-1 are the issue movements for which TPI's SAC evidence seeks to establish a maximum reasonable rate.

TPI's Opening Evidence follows the format set forth in *General Procedures for Presenting Evidence in Stand-Alone Cost Rate Cases*, STB Ex Parte No. 347 (Sub-No. 3) (served March 12, 2001) (*General Procedures*). The remainder of this Part I presents the legal argument and a summary of TPI's Opening Evidence, with Part I-A summarizing the SAC evidence, and Part I-B summarizing TPI's request for relief. Part III of this Opening Evidence[6] demonstrates that the challenged rates are unreasonable because they exceed the SAC rate. In Part IV, TPI sets forth the qualifications of its witnesses for its SAC evidence.

A. SAC EVIDENCE AND ARGUMENT

1. Introduction

In *Coal Rate Guidelines – Nationwide*, 5 I.C.C.2d 520 (1985), the Interstate Commerce Commission, the Board's statutory predecessor, adopted constrained market pricing ("CMP") as

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[4] The lanes completely dismissed for lack of market dominance are B-14, B-23, B-31, B-36, B-49, B-59, B-69, B-91, B-94 and B-100. The lanes partially dismissed except as to TPI's customer, {[redacted]}, are Lanes B-60, B-80 and B-112.

[5] TPI is no longer pursuing rate relief for Lanes B-42, B-45, B-66, B-82, B-87 and B-111.

[6] Under *General Procedures*, "Part II" of a Complainant's evidence is reserved for evidence on the issue of market dominance. Since the issue of market dominance was bifurcated in this case and was decided in the *Market Dominance Decision*, there is no Part II to this submission. As set forth in *General Procedures,* TPI will continue to use "Part III" to denominate the section designated for the submission of SAC evidence.

its methodology for determining maximum reasonable rate levels for market dominant traffic, such as TPI's movements that are the subject of this proceeding. Under CMP, a captive shipper should not be required to pay more than is necessary for the carrier involved to earn adequate revenues. Nor should it pay more than necessary for efficient service. Finally, a captive shipper should not be required to bear the cost of any facilities or services from which it derives no benefit. *Id.* at 523-524. These principles have been relied on by the Board and its predecessor for more than twenty-five years. *See, e.g., AEPCO*, slip op. at 3-4, *citing Guidelines*; *WFA/Basin I*, slip op. at 7, *citing Guidelines.*

Under *Guidelines*, CMP contains three main constraints on the extent to which a railroad may charge differentially higher rates on captive traffic: the "revenue adequacy" constraint, *Guidelines* at 535-536; the "management efficiency" constraint, *id.* at 537-542; and the "stand-alone cost" ("SAC") constraint, *id.* at 542-546, which protects a captive shipper from bearing costs or inefficiencies or from cross-subsidizing other traffic by paying more than the revenue needed to replicate rail service to a select subset of the carrier's traffic base.[7] *AEPCO*, slip op. at 4. TPI is proceeding under the SAC prong of CMP.

Under the principles of SAC, the Board seeks to determine whether a complainant is bearing the cost of any inefficiencies or the cost of any facilities or services from which it derives no benefit, by simulating the rate that would exist in a "contestable market," that is, a market that is free from barriers to entry. *Guidelines*, 1 I.C.C.2d at 528; *AEPCO*, slip op. at 4; *CP&L*, 7 S.T.B. at 244 (SAC analysis seeks to determine the "lowest cost at which a hypothetical, optimally efficient carrier could provide the service. . . if the rail industry were free

[7] *Guidelines* also contains a fourth limitation on a rail carrier's pricing, the phasing constraint. *See, Guidelines*, 1 I.C.C.2d at 546. Phasing does not limit the final price selected by the carrier, but the pace at which a rate increase may be imposed.

of barriers to entry or exit . . ."). Contestable markets have characteristics that preclude monopoly pricing. *Id.* Since real-life rail markets are not contestable due to high barriers to entry that permit a rail carrier to impose monopoly pricing on a captive shipper, the SAC analysis develops a hypothetical alternative – the "Stand Alone Railroad" ("SARR"). *AEPCO,* slip op. at 4. Under the SAC constraint, the rate at issue cannot be higher than what the SARR would need to charge to serve the complaining shipper while fully covering all of its costs, including a reasonable return on investment. The SAC analysis produces a simulated market rate against which to judge the challenged rate. *Guidelines,* 1 I.C.C.2d at 542; *AEPCO*, slip op. at 4; *TMPA*, 6 S.T.B. at 586.

To make a SAC presentation, the complaining shipper designs a SARR specifically tailored to serve an identified traffic group. Using information on the types and amounts of traffic actually moving over the defendant's rail system, the complainant selects a subset of that traffic (including the traffic that is the subject of the complaint) that the SARR would serve. *AEPCO,* slip op. at 4. The complainant then designs a transportation system that would serve that group of traffic efficiently and at the lowest cost, taking into account all essential facilities and operating assets. *See*, *WFA/Basin I,* slip op. at 8; *FMC,* 4 S.T.B. at 721; *Guidelines*, 1 I.C.C.2d at 543-44. An operating plan must be developed to serve the traffic group selected by the complainant, and the system-wide investment requirements and operating expenses must be estimated, including appropriate documentation to support the estimates. *AEPCO*, slip op. at 4-5. The Board's requirements assume that investments are made prior to the start of service, that the SARR would continue to operate into the infinite future, and that recovery of the investment costs would occur over the economic life of the assets. *Id.* at 5. A computerized discounted cash flow ("DCF") model simulates how the SARR would likely recover its capital investments. The annual revenues required to cover the SARR's capital costs and taxes are combined with the annual operating costs to calculate the SARR's total annual revenue requirements. *AEPCO,* slip op. at 5.

The revenue requirements of the SARR are then compared to the revenues that the SARR is expected to earn from the traffic group assuming that it imposes the defendant railroad's rates and surcharges on the traffic. If the present value of the revenues that would be generated by the traffic group exceeds the present value of the revenue requirements of the SARR, the relief provided to the complainant is determined by allocating the excess SARR revenue among the traffic group over time. *Id.*

Thus, the six basic parts of a SAC analysis are: (1) identify the traffic group to be served by the SARR, including historical and projected revenues; (2) design the configuration of, and develop an operating plan for, the SARR to serve the selected traffic group; (3) calculate operating expenses of the SARR to serve the traffic group and implement the operating plan; (4) calculate the road property and equipment investment needed to construct and operate the SARR; (5) develop the DCF analysis; and (6) apply the MMM model. The parts are sequential but the process iterative, since the results of a later step may prompt a revision in an earlier step. As noted above, TPI's SAC evidence is presented in Part III, in the order required by the Board in its decision in *General Procedures*, 5 S.T.B. 441 (2001).

Since the ICC's 1985 decision in *Guidelines*, the ICC and the Board have decided several dozen SAC cases. In developing its evidence and as further discussed in this section, TPI has carefully followed the Board's well-defined set of rules and precedent to guide parties in developing Stand-Alone Cost evidence. *Major Issues*, in particular, established binding rules in four key areas dealing with the development of a SARR and the application of a SARR's costs to determine the maximum reasonable rate. TPI's experts have carefully considered the Board's precedent and have followed the Board's guidance. The Board will determine from the evidence presented in Part III that TPI's SAC analysis is consistent with the parameters that the Board has accepted in past cases, and therefore the Board can and should rely on TPI's evidence in deciding this case. As the Board recently noted, [w]here . . . a complainant has followed established agency precedent, defendant[] carr[ies] the burden to justify a departure from that methodology." *AEPCO*, slip op. at 33, *see also*, *id.*, slip op. at 11.

In this case, TPI's evidence shows that the challenged CSXT rates substantially exceed the measure of reasonableness under the Board's SAC procedures. On the basis of the SAC evidence submitted by TPI, the Board should determine that TPI's rates clearly exceed a reasonable maximum, and should prescribe maximum reasonable rates as requested by TPI.

2. **The TPI Railroad Traffic Group**

TPI's SARR – the "TPI Railroad" or "TPIRR" – has 7,357 route miles, which includes about 491 miles operated under trackage rights and joint facility agreements (as CSXT does today). *See*, Part III-A at 2 and Part III-B at 2. The TPIRR system hypothetically will operate in 17 states and the District of Columbia. *See*, Part III-A at 2 and Exhibit III-A-1. It will carry general freight, coal, and intermodal traffic and is designed to transport a broad range of commodities over its system. *See,* Part III-A at 3. The TPIRR traffic group was developed using CSXT car and container waybill data and CSXT car event data for the third quarter 2010 through the second quarter of 2013, which were produced by CSXT in response to discovery. *See,* Part III-A at 3 In the first year of operation, the TPIRR traffic consists of approximately 5.67 million carloads/containers or nearly 465 million tons of a wide range of commodities. *See,* Part III-A at 4.

a. **Historical and forecasted traffic volumes**

The TPIRR has been constructed to begin operating on July 1, 2010. The TPIRR traffic group uses actual CSXT traffic moving from that date through June 30, 2013. *See*, Part III-A at 6 and Exhibit III-A-2 and Exhibit III-A-3; *AEPCO*, slip op. at 20 (STB accepted base year volumes using actual traffic information). The TPIRR also includes forecasted traffic volumes for the period from July 1, 2013 through June 30, 2020. *See*, Part III-A at 6 and Exhibit III-A-4. Traffic volume forecasts through 2017 were developed using annual volume change indexes developed from CSXT actual 2012 and 2013 data, and CSXT internal forecasts. *See,* Part III-A at 7. TPI aggregated the CSXT forecasted carload and container totals on a commodity group basis and developed year-over-year volume change indices, and applied these indices to the selected TPIRR movements. *See,* Part III-A at 7. For the January 2018 through June 2020 time period, TPIRR volumes were determined by adjusting the prior year volumes by the 2-digit STCC compound annual growth rate developed using the five years of CSXT forecast data for 2013 to 2017.[8] *See,* Part III-A at 8.

By developing commodity group-specific growth rates, TPI was able to better reflect forecasted volume growth in the peak year (3Q19-2Q20) train list. The methodology used by TPI is consistent with the methodology used by the Board in the *CP&L* decision, where the Board recognized that coal business in the east is constantly shifting, and, therefore, to project volumes on an O-D pair-specific basis would be "unduly restrictive" and would not "fairly reflect the traffic that would be available" to the SARR in any one year. *CP&L*, 7 S.T.B. at 249-250. Thus, the Board approved the use of projections on a regional, commodity group basis. *Id.* There is no difference between coal and other commodities in this regard, and TPI has used the

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[8] Coal volume growth rates also considered origin mine region.

same logic to cover all carload movements on the TPIRR. *See,* Part III-A at 8. TPI's use of a compound annual growth rate is consistent with methodologies used by both shippers and railroads in recent Board proceedings. *See,* Part III-A at 8-11.

The TPIRR will serve six coal mines. It also will receive trainloads of coal in interchange from CSXT and other railroads. Some of this coal will terminate at fifteen generating stations and industrial facilities, and the TPIRR will forward some of this coal to utilities off-system. *See,* Part III-A at 9. Electric utility coal volume growth was capped at an 85 percent capacity level consistent with STB decisions in prior SAC cases involving the movement of coal to electric utilities. *See*, Part III-A at 9; *AEPCO,* slip op. at 21; *AEP Texas II,* slip op. at 31. Peak year traffic was projected to occur in the final year of the ten-year model evaluation, from 3Q19 through 2Q20. *See*, Part III-A at 11.

b. **Historical and forecasted revenues**

Historical revenues were developed for the period July 1, 2010 through June 30, 2013 for each unique movement on the TPIRR, defined by O-D pair, STCC, and contract, if available. *See,* Part III-A at 12 to 13 and Exhibit III-A-5. Revenue projections were based on CSXT revenue data, including contract adjustment mechanisms; CSXT internal forecasts; and a compound annual growth rate projection developed using CSXT forecast data. *See*, Part III-A at 13 to 14 and Exhibit III-A-5. All TPIRR single-line movement revenues are assumed to accrue to the TPIRR; interline movement revenues are assumed to accrue to the TPIRR as they would to CSXT. *See,* Part III-A at 16 to 17. Cross-over movement revenues are assumed to be interlined between the TPIRR and the CSXT; the revenues accruing to the TPIRR are calculated using the Average Total Cost ("ATC") revenue division approach adopted in the Board's recent *Rate Regulation Reform* decision, using CSXT 2012 URCS variable and fixed costs, and the density and miles of each segment. *See,* Part III-A at 17, and 29 to 37.

Finally, with respect to fuel surcharge revenue, TPI uses the same fuel surcharge programs that CSXT itself uses, including CSXT's tariffs and contracts, as applicable. *See* Part III-A at 15.

c. **Use of cross-over traffic**

TPI has included cross-over traffic in the SARR traffic group, consistent with longstanding Board precedent and the underlying objectives for the use of cross-over traffic. The agency first approved the use of cross-over traffic in *Nevada Power II,* 10 I.C.C.2d at 265, n. 12, because excluding such traffic would "weaken the SAC test" by "depriv[ing] the SARR of the ability to take advantage of the same economies of scale, scope and density that the incumbents enjoy over the identical route of movement." The agency's decision in *Nevada Power II* recognized that the SAC analysis attempts replicate a contestable market rate, and if the SARR is not able to select from the same traffic that is available to the incumbent, then the SAC analysis cannot replicate a contestable market. *See, Nevada Power II,* 10 I.C.C.2d at 266. Thus, the use of cross-over traffic is an integral part of the Board's fundamental SAC test.

Moreover, the use of cross-over traffic also is necessitated by important practical considerations. As the Board has consistently recognized, the use of cross-over traffic is required in order to keep the SAC inquiry "properly focused on the core inquiry -- whether the defendant railroad is earning adequate revenues on the on the portion of its rail system that serves the complaining shipper." *See, PSCo/Xcel I*, 7 S.T.B. at 601. The agency also has recognized that expanding the SARR to include cross-over traffic would not eliminate such traffic, since every expansion of the SARR would create still another group of cross-over traffic, in a "cascading effect" that would make the litigation of the SAC test impossible as a practical matter, for reasons of cost, complexity, and time. As the Board concluded, "without cross-over traffic, captive shippers might be deprived of a practicable means by which to present their rate complaints to the agency." *Id.,* at 603. The foregoing concerns prompted the Board's recent observation that the use of cross-over traffic "has become an indispensable part of administering a workable [SAC] test." *See, WFA/Basin I,* slip op. at 11.

TPI's use of cross-over traffic is consistent with Board precedent and the reasons why the Board adopted the use of cross-over traffic. TPI's SARR is one of the largest ever presented in a SAC case, at 7,357 route miles. *See,* Part III-A at 22. But TPI's evidence shows that, if the TPIRR were required to build the line segments needed to provide complete end-to-end service for its cross-over traffic, its length would more than *double. See,* Part III-A at 22 and Exhibit III-A-6. This is true at both the line-haul and the local train levels.

For example, even if the TPIRR were expanded just to provide *local* train service for cross-over traffic (*i.e.*, ignoring the segments that would be required to provide line-haul service from end to end), TPI would have to add more than *6,000 route miles* to the TPIRR system, increasing the SARR's route miles by 80%. *See,* Part III-A at 23 and Exhibit III-C-5. Moreover, even if TPI were to expand the TPIRR to handle the local trains that originate and terminate the current group of cross-over traffic, that would simply create a new group of cross-over traffic and local trains, for which a new extension of the TPIRR system would be required. Since just this first addition to the TPIRR's system would increase the SARR's size by 80%, to more than 13,000 route miles, a second "cascade" would bring the SARR to roughly the size of CSXT's entire 21,000 mile system. *See,* Part III-A at 24 and Exhibit III-C-5. This is all without any consideration of the cascading effect associated with line-haul cross-over traffic, which would require further expansion of the TPIRR. *See*, Part III-A-23 and Exhibit III-A-6.

In its *Ex Parte 715 Decision*, slip op. at 27, the Board expressed "reservations" about the use of carload and multi-carload cross-over traffic in Full-SAC cases. But in its evidence, TPI shows that the Board's reservations are both misplaced and inapplicable to TPI's situation. That evidence shows, for example, that the Board's ATC revenue allocation methodology does *not* create any shipper bias in the cross-over revenue allocation. *See,* Part III-A at 27 to 28. Most importantly, in the Board's *Ex Parte 715 Notice*, slip op. at 16, the Board indicated that, where a proposed SARR includes a significant amount of carload and multi-carload traffic, a "hook and haul" SARR operation would create a mismatch between the cost-intensive operation of the residual incumbent and the allocation of revenues. But the TPIRR is *not* a predominantly "hook and haul" SARR that leaves all of the origin/termination operations and I&I switching to the residual incumbent. Rather, the TPIRR provides origin/termination services for much of its traffic by means of the over 40,000 local trains that it operates in the base year. *See,* Part III-A at 29. Even for those local trains that the residual CSXT operates, the TPIRR provides the services and facilities needed to switch the cars between the local and the line-haul trains. *See,* Part III-A at 29. Thus, the TPIRR's operations do not implicate the concerns outlined by the Board in the *Ex Parte 715 Notice.*

d. **Rerouting**

With just a few exceptions, the traffic of the TPIRR moves over the same routes utilized by CSXT: there is only limited re-routing; all reroutes are entirely internal to the TPIRR, and any cross-over traffic is still interchanged with CSXT at a point along the actual route of movement. *See*, Part III-A at 4 to 6. TPI has rerouted 10 issue movements and some trains in certain areas within a very limited geographic scope. *See,* Part III-C at 24 to 26.

TPI rerouted the issue traffic in three geographic areas. These reroutes occur on four lanes from New Orleans to the Florida Panhandle;[9] on two lanes from Ohio to West Virginia;[10]

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[9] Lanes B-12, B-16, B-38, and B-104.

and on four lanes in central Indiana.[11] *See*, Part III-C at 26; Part III-A at 5; and Exhibit III-C-1, pp. 35-37. These issue movements were rerouted because the TPIRR does not replicate certain CSXT line segments within their ordinary route of movement in order to operate more efficiently than CSXT. *See*, Part III-A at 4 to 5; Part III-C at 26 to 27. In some instances, the alternate routes used by the TPIRR also were used by CSXT for this same traffic during the Base Year. *See*, Exhibit III-C-1, pp. 35-37.

In addition, TPI has rerouted some trains over parallel or adjacent track in certain (generally urban) areas over a very limited geographic scope in order to consolidate the traffic over these parallel lines onto a single line to achieve greater density. *See,* Part III-A at 5, note 8; Part III-C at 25.

All rerouted traffic is handled in a manner consistent with Board precedent, and the reroutes do not adversely impact the quality of service that the customers in question receive from CSXT today.[12] *See*, Part III-C at 22 to 24. As explained in detail in TPI's evidence, any re-routing of traffic on the TPIRR is entirely internal to the TPIRR, affecting only the manner in which the trains move on the TPIRR, and are still interchanged with CSXT at a point along the actual route of movement. *See*, Part III-A at 5. As the Board has very recently noted, "[t]remendous flexibility is permitted in the design of the SARR," so long as the hypothetical operations are "feasible and supported and that they provide shippers included in the analysis the same or superior service as provided by the actual operations of the defendant railroads." *AEPCO*, slip op. at 10. It is now well-settled that rerouting of traffic to take advantage of

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[10] Lanes B-62 and B-113.

[11] Lanes B-18, B-84, B-109, and B-110.

[12] In the *Duke/NS*, *Duke/CSXT*, and *CP&L* cases, which dealt with movements in the eastern United States, the complainant in those cases utilized extensive rerouting of traffic, where the rerouting of traffic would change the routing on the residual incumbent carrier, *i.e.*, so-called "external" reroutes. *See*, *Duke/NS*, 7 S.T.B. at 112-115; *CP&L*, 7 S.T.B. at 253-254. In contrast, as discussed herein, the TPIRR system uses limited rerouting internal to the SARR.

economies of density is permissible. *See*, *AEPCO*, slip op. at 14-15. Under well-settled precedent, as long as the reroute is "internal" to the SARR, *i.e.*, the "routing differences would be confined to within the SARR's own system," the re-routing is permitted "so long as the routing is reasonable and would meet the shippers' needs." *AEP Texas II*, slip op. at 10-11; *TMPA*, 6 S.T.B. at 594-95; *see also*, *AEPCO*, slip op. at 15 ("as long as the SARR would provide equivalent or superior service to those shippers, the non-issue traffic included in the SAC analysis is permitted to share the expense of those rail facilities."); *PSCo/Xcel I*, 7 S.T.B. at 609 (internal rerouting accepted where complainant offered "comparable or superior" service). Unlike the situation in *Duke/NS*, for example, the TPIRR's routing would not have ramifications extending beyond the SAC analysis to the incumbent railroad. *Compare*, *Duke/NS*, 7 S.T.B. at 112-113. The TPIRR re-routes fully meet governing standards.

3. **The TPIRR Stand-Alone Railroad System**

Under Board precedent, the complainant must create a traffic group by using information on the types and amounts of traffic moving over the defendant's rail system, and by selecting a subset of that traffic (including its own traffic to which the challenged rate applies) that the SARR would serve. *See*, *AEPCO*, slip op. at 16. The selected traffic group must be representative of that which would move on the SARR in the future, and the composition of the traffic group must be realistic, that is, consistent with the principles of real-world railroading. *Id.* The TPIRR transports a broad range of commodities over its system, including chemical, intermodal, agricultural, coal, automotive, metals, paper, and construction materials shipments, and the TPIRR traffic group was developed using CSXT train, car, and container data, as well as a wide variety of other data provided by CSXT in response to TPI discovery requests.

The TPIRR has an extensive system that replicates over a third of CSXT's own system. The entire system covers 7,356.91 route miles, of which 6,856.94 miles are constructed by the

TPIRR and 490.97 miles are utilized by the TPIRR pursuant to trackage rights and joint facilities agreements. *See,* Part III-B at 2. The constructed track includes over 6,100 miles of main-line segments and more than 700 miles of branch lines. *See* Part III-B at 3. The TPIRR has a total of 50 branch lines across its system. *See,* Part III-B at 2. The TPIRR will interchange with 6 Class I railroads and over 75 regional and short-line carriers that CSXT interchanges with today. *See*, Part III-B at 4. The TPIRR system includes main- and branch-line tracks, sidings, interchange tracks, and pocket and set-out tracks, as well as 12 major yards (of which 11 are hump yards), 68 other yards, as well as 19 intermodal facilities, 20 automotive facilities, 23 bulk transfer facilities, and 87 additional interchange yards, which are used solely for interchanging traffic between the TPIRR and other railroads. *See*, Part III-B at 7.

The TPIRR uses new 136-pound continuous welded rail on all constructed main line and passing sidings on line segments carrying 20 million or more gross tons per year and premium rail on curves of 3 degrees or more, with new 115-pound rail used on lighter-density tracks and in yards. *See*, Part III-B at 5, 9. This is consistent with Board precedent. *See*, *AEPCO*, slip op. at 104; *Duke/NS*, 7 S.T.B. at 184-85.

4. **The TPIRR Operating Plan**

The TPIRR's operating plan, described in detail in Part III-C, is designed to enable the TPIRR to transport its peak seven-day traffic volume and train frequencies during the 10-year DCF period, in a manner that meets the transportation needs of the traffic group in compliance with all CSXT transportation and service commitments. *See*, Part III-C at 1. The operating plan was developed using the Board-approved RTC Model, and takes into account the TPIRR's total traffic volume and traffic flows, in full compliance with all applicable CSXT transportation and service commitments to its customers. *See*, Part III-C at 1.

a. **TIPRR Train List Development**

Development of an operating plan begins with the incumbent's traffic data. CSXT first provided traffic data in a variety of forms[13] to TPI between January 2008 through June 2010, and then supplemented its original production in late 2013. Although CSXT provided no caveats about the reliability or fitness of its original 2008-2010 production, TPI counsel received a letter from CSXT counsel dated October 11, 2013 (*see* Exhibit III-C-2) that characterized much of the data provided by CSXT in its supplemental production – which was identically-structured to the data that it had provided three years earlier – as unreliable and unfit for use in evaluating CSXT's rail operations and in developing a plan to replicate portions of CSXT's operations in the TPIRR. *See,* Exhibit III-C-1, pp. 1 to 3 and Exhibit III-C-2.

As discussed at length in TPI's opening evidence, CSXT's claims in its October 11 letter are incorrect, overblown and contradictory; its claims are clearly designed to force TPI into using CSXT's preferred procedure for developing the TPIRR's operating plan built on the MultiRail Freight Edition software. *See,* Exhibit III-C-1, pp. 1 and 4 to 6. Indeed, several of the "reasons" that CSXT provided in October 2013 as to why its own data are unfit and unreliable for developing a SARR operating plan have been true of *every* SAC case with which the Board has been presented; but those "reasons" have *not* provided a basis for rejecting operating plans built on that data. *See,* Exhibit III-C-1, p. 4.

As TPI discusses in its evidence, CSXT historical traffic data – or the data of any other defendant railroad – *must* form the basis of an operating plan, because otherwise a SARR loses all connection to the "real world" of railroad operations. *See,* Exhibit III-C-1, pp. 4 to 5. Two

[13] These included Car Waybill Data, Container Waybill Data, Car Shipment Data, Car Event Data, Network Locations Data, Train Sheet Root Records, Train Sheet Intermediate Station Data, Train Sheet Power Data, and various other forms of provided data. *See,* Exhibit III-C-1, pp. 7-8 and Exhibit III-C-4.

deleterious consequences would flow from such a course. First, from the perspective of the Board and its staff, all SAC cases would become simply an "expert versus expert" argument, in which both the complainant and the defendant would claim that its own expert's proposed operation is "superior" to that of its opponent, without any "check" on these claims provided by the operations of the real-world railroad defendant. Second, the Board's own SAC procedures clearly restrict the SARR from imposing any "downstream" operational changes to the residual incumbent on cross-over movements. *See, TMPA*, 6 S.T.B. at 595. But, if in this case TPI were to ignore the actual operations of CSXT in developing the trains in its operating plan and instead form completely new trains with entirely different car compositions, it would necessarily force the residual CSXT to alter its own operations for those movements, with no assurance that the residual CSXT's service to the ultimate destination would be unaffected. *See,* Exhibit III-C-1, pp. 4 to 5. Finally, in its evidence TPI discusses several other reasons why CSXT's self-serving *caveats* are wrong. *See,* Exhibit III-C-1, pp. 5 to 6.

Nevertheless, once CSXT's self-serving statements are filtered, its October 11 letter does provide some useful information regarding CSXT's historical data and the relative strengths and weakness of various parts of that data in developing SAC evidence. In fact, as TPI discusses extensively in its evidence, TPI has used the October 11 letter from CSXT counsel to guide the development of its train lists and operating plan from CSXT historical data sources. *See,* Exhibit III-C-1, pp. 6 to 34. Specifically, as outlined graphically in Exhibit III-C-4 and described narratively in Exhibit III-C-1, pp. 6 to 34 and in Exhibit III-C-3, TPI has used a *variety* of CSXT data sources, including both CSXT train and car data and other data, to develop its train lists, all checked through a laborious process of data analysis and evaluation, to develop a robust and accurate train list to underlay the TPIRR operating plan. *See,* Exhibit III-C-1, pp. 7 to 9. TPI's evidence describes in exhausting detail how TPI analyzed CSXT's Waybill, Car Shipment and Car Event data and its Train Sheet Data in developing its line-haul merchandise train lists, its unit train list, and its local train list; and to determine on-SARR and off-SARR junctions. *See,* Exhibit III-C-1, pp. 9 to 34 and Exhibit III-C-3.

As noted above, TPI compiled the complete TPIRR train list from the latest available 12 months of historical CSXT-provided traffic data and related sources, from July 2012 through June 2013. *See,* Exhibit III-C-1, p. 38. TPI then applied the relevant growth factors to determine the number of trains that must be added to serve the TPIRR traffic group in the peak year (July 2019 through June 2020), by slotting the required growth trains into the peak year based on the distribution implicit in the base year train list. *See,* Exhibit III-C-1, pp. 38, 43 to 50. As detailed in TPI's evidence, commodity- and train-type-specific procedures were used to develop peak period statistics for unit trains, line-haul merchandise trains, and local trains. *See,* Exhibit III-C-1, pp. 43 to 50.

b. **TPIRR Operations**

The TPIRR's configuration and operating plan have been optimized to provide service to all TPIRR traffic and to accommodate the SARR's peak seven-day traffic volume and train frequencies during the 10-year DCF period. *See,* Part III-C at 2. It is important to note that TPI has relied on CSXT's *own* operations as the basis for the TPIRR's operating plan. As the Board has noted, a SARR operating plan must be "realistic, i.e., consistent with the underlying realities of real-world railroading." *WFA/Basin I*, slip op. at 15. Moreover, the Board has repeatedly emphasized that a SARR cannot stray too far from the incumbent's real-world operation without running the risk of being rejected as infeasible. In *Duke/NS,* for example, the Board emphasized that "the proponent of a SARR may not assume a changed level of service to suit its proposed configurations unless it also presents evidence showing that the affected shippers, connecting carriers, and receivers would not object." *Duke/NS*, 7 S.T.B. at 115. *See* also, *CP&L,* 7 S.T.B at 259; *Duke/CSXT,* 7 S.T.B. at 426-27; *PSCo/Xcel,* 7 S.T.B. at 610; *McCarty Farms,* 2 S.T.B. at 478; *West Texas Utilities,* 1 S.T.B. at 665; *FMC*, 4 S.T.B. at 736. To carry out this direction, for example, TPI has used train sizes and consists that are comparable to those used by CSXT as identified in CSXT's own data. *See,* Part III-CPart III- at 5. Base year TPIRR trains and cars mirror the movement of corresponding CSXT traffic, and peak period trains also reflect real-world CSXT operations. *See,* Part III-C at 5. While certain peak period trains are longer and heavier than their base period counterparts, peak period train sizes were limited by commodity-group and lane-specific information from real-world base year trains. *See,* Part III-C at 5 to 6.

The TPIRR's operating plan reflects the different commodities that it handles, from different origins and destinations, and the types of service that each of these commodities and lanes require. *See,* Part III-C at 6 to 7. The TPIRR operating plan also meets the needs of the railroads with which it interchanges traffic, including six different Class I carriers (including the residual CSXT) and more than 75 regional and short line carriers, including pre-blocking of cars forwarded to connecting carriers, run through power, joint use and trackage agreements, and other operational requirements. *See,* Part III-C at 7 to 9.

The TPIRR's operating plan provides for efficient modern railroad practices, such as calling train crews in advance of the train's arrival at a designated interchange point; maximization of crew assignments within the confines of current law; maximum train speeds consistent with modern practices; and appropriate operational staffing. *See*, Part III-C at 10 to 11.

Consistent with the principle of tying the SARR's operations closely to the incumbent's real-world operations, *see, Guidelines,* 1 I.C.C.2d at 543, the TPIRR operates the same trains with the same mix of traffic as CSXT, including stopping trains en route for spotting and pulling cars, and blocking cars in the same manner as CSXT does today. *See,* Part III-C at 12 to 13. And, because the TPIRR's yards are in the same locations as CSXT, TPI also adopts CSXT's car classifications for cars on the TPIRR system. *See,* Part III-C at 13.

The number of locomotives on the TPIRR is sufficient to handle the peak period traffic volume. Locomotives used on the TPIRR are consistent with locomotives used in actual service on the CSXT, including distributed power (DP) configurations used by rail carriers across the country, including CSXT. *See*, Part III-C at 16 to 17. The count of road locomotives includes a spare margin of {{[redacted]}} percent for ES44AC locomotives and {{[redacted]}} percent for SD-40-2 locomotives. *See*, Part III-C at 17. TPI experts have also calculated a peaking factor of 5.3%, using the same process as that approved by the Board in recent cases. *See*, Part III-C at 18 and *WFA/Basin I*, slip op. at 33-34 ; *PSCo/Xcel II*, slip op. at 13; *AEPCO*, slip op. at 32 (peaking factor of 5.9%).

Railcar requirements for the TPIRR traffic group were determined from data produced by CSXT in discovery. *See*, Part III-C at 20 and Part III-D at 7 to 8. The TPIRR car requirements were increased by a {{[redacted]}} percent spare margin based on a review of contracts provided by CSXT in discovery. *See,* Part III-C at 20 and Part III-D at 9. This spare margin figure is consistent with the range of spare margins for cars utilized by the parties or decided by the Board in a number of recent cases. *See*, Part III-C-20, note 29. The car requirements were also increased by the peaking factor used for locomotives described previously. *See* Part III-C at 20 to 21.

The TPIRR's operating plan is based on the RTC model to optimize the TPIRR's system track configuration and to provide a basis for many of the SARR's operating metrics. *See,* Part

III-C at 21 to 22 and Exhibit III-C-6, p. 1. TPI's use of the RTC model is consistent with numerous prior SAC cases, where the model has been relied upon by the Board to evaluate the feasibility of a SARR's operating plan. *See,* AEPCO, slip op. at 28; *WFA/Basin I*, slip op. at 16; *PSCo/Xcel I,* 7 S.T.B. at 613; *Otter Tail,* slip op. at 24. In Exhibit III-C-6, TPI's experts explain in detail the RTC modeling procedures used, including the use of road locomotives, train size, helper districts, maximum train speeds, dwell times, interchanges with other railroads, local train operations, crew districts, track inspections, random outages, and the like.

The TPIRR's operating plan is consistent with the Board's fundamental requirement that the operating plan must "meet the transportation needs of the traffic the SARR proposes to serve." *WFA/Basin I*, slip op. at 15. In making that determination, the Board looks to the adequacy of the configuration, to ensure that the SARR will have sufficient capacity to handle the peak forecast, and the cycle times, to determine whether the service will be adequate. The TPIRR meets these tests. The RTC Model confirms that the train cycle and transit times during the 2019 peak week are equal to or faster than the CSXT actual cycle and transit times for comparable trains during the 2012 peak week. *See,* Part III-C at 22 to 24.

c. **Treatment of Positive Train Control (PTC)**

The TPIRR system is constructed in conformity with the latest requirements. Although current federal law mandates the use of Positive Train Control ("PTC") on select line segments only by December 31, 2015, the TPIRR is constructed at the outset with a PTC system on its entire network, both for safety reasons and for reasons of cost and efficiency, because it is more cost-efficient to construct a PTC communications system during the initial construction of the TPIRR than to construct a Centralized Traffic Control ("CTC") system that would be converted to PTC just 5 years later. *See,* Part III-B at 10, Part III-C at 27 to 28 and Part III-F at 47 to 51.

As TPI's evidence shows, the technology existed in 2008 to implement a PTC-compliant system, including the technology upon which CSXT's own PTC system is based. *See,* Part III-F at 48 to 49. Indeed, several PTC technologies were in active service well before the TPIRR would begin operating in 2010. Many suppliers had been working on PTC systems for several years, and a lab demonstration of a system was completed in late 2008 using actual hardware and following recommended practices. Thus, it is clear that by 2008, the technology was available to implement a PTC-compliant signaling system, and suppliers were in a position to quickly develop and supply necessary components to a buyer if there had been an actual project such as the TPIRR.

Because the TPIRR's PTC system is based upon the system being deployed by CSXT, TPI has used costs provided by CSXT in discovery to estimate the costs of the various PTC system components. *See,* Part III-F at 47 to 48. TPI included costs for three basic components: track (wayside), geographic information systems, and locomotive communications and onboard equipment. *See,* Part III-F at 49 to 51. TPI's total costs, however, are less that CSXT's costs because TPI will install its PTC system as part of the newly-constructed TPIRR rather than as a conversion from an existing signaling system. For example, the cost for interlocking controllers includes the PTC component, whereas CSXT must add a PTC wayside interface unit to existing interlocking controllers. *See,* Part III-F at 48, note 147. TPI's installation of PTC also does not have the added cost and complexity of being performed under traffic on active rail lines. Moreover, TPI will only have a single installation, instead of two installations associated with CTC and then installing PTC components 5 years later.

5. **Operating Expenses**

The TPIRR's operating expenses are described in Part III-D of TPI's evidence, which sets forth the costs of equipment, personnel, general and administrative, information technology, and maintenance of way requirements, and the development of related service units and costs. Exhibit III-D-1 details the procedures used to calculate the costs for the TPIRR operating personnel; Exhibit III-D-2 explains the calculation of the TPIRR general and administrative expenses; and Exhibit III-D-3 describes the development of the TPIRR maintenance of way costs.

a. **Locomotives, Railcars, and Operating Personnel**

The TPIRR's operating expenses reflect the results of the RTC Model simulation, which was used to calculate the TPIRR's locomotive hours and car hours for the peak week of the peak year (3Q19-2Q20), which was then used to calculate locomotive hours, car hours, locomotive unit miles, and car miles for the July 1, 2012 through June 30, 2013 Base Year. *See,* Part III-D at 1. The resulting statistics were then utilized to determine overall locomotive and car ownership requirements as well as personnel requirements. *See*, Part III-D at 1 to 2. The procedures used to develop the TPIRR's operating expense for the Base Year were those approved by the Board in *WFA/Basin I*, by applying transit times calculated for the peak period of the peak year to a full year of train data in order to calculate operating statistics. *See*, Part III-D at 28 to 29.

Acquisition costs for locomotives, depending on the type of locomotive acquired, were developed from various sources, including prior Board decisions, the public record of prior cases, information provided by CSXT in discovery, and industry publications. *See* Part III-D at 3 to 4. The cost of locomotive maintenance was based on an actual locomotive maintenance agreement between CSXT and an industry supplier, as well as CSXT's 2010 Annual Report Form R-1 filed with the STB. *See*, Part III-D at 5. Fuel costs for locomotives are based on the prices that CSXT actually paid for fuel in 3Q10, as reported by CSXT to the Securities and Exchange Commission, and fuel consumption was based on CSXT's fuel consumption data provided in discovery. *See*, Part III-D at 6. All of these sources provide strong support for the TPIRR's cost of operations.

The TPIRR was conceived as a railroad that would primarily handle goods using non-union personnel, as permitted by Board precedent. *See*, Part III-D at 10; *PSCo/Xcel I*, 7 S.T.B. at 651 (non-unionized workforce); *TMPA*, 6 S.T.B. at 687. The TPIRR's staffing plan permits the SARR to handle peak traffic volume safely and efficiently, taking advantage of modern technology applied to the TPIRR's traffic volume. Train and engine ("T&E") crew counts are based on the number of trains moving over the various parts of the TPIRR system and were developed using the train counts over an annual period, as the Board has authorized in past cases. *See*, Part III-D at 11 and Exhibit III-D-1 at 2; *PSCo/Xcel I*, 7 S.T.B. at 645 (citing *Duke/CSXT, CP&L*, *Duke/NS*, and *TMPA*). Consistent with Board precedent, TPI's SARR recognizes that train crews could work 270 shifts per year. *See,* Part III-D at 11 to 12 and Exhibit III-D-1, p. 2; *TMPA*, 6 S.T.B. at 644 (270 crew shifts per year); *WFA/Basin II,* slip op. at 47 (270 crew shifts per year). T&E crew compensation for the TPIRR was derived from CSXT's own Wage Forms and is established at the same level as those paid by CSXT for comparable positions. *See,* Part III-D at 12 and Exhibit III-D-1, p. 16. Fringe benefits were based on the average ratio of fringe benefits to total wages paid in 2010 to employees of all Class I carriers, as reported by the AAR, a method approved by the Board in *WFA/Basin I,* slip op. at 66. *See,* Exhibit III-D-1, pp. 18. The cost of taxi trips and overnight stays were also calculated as approved in prior cases. *See*, Part III-D at 13 to 14 and Exhibit III-D-1, p. 19; *WFA/Basin I*, slip op. at 48 (taxi and overnight expenses); *PSCo/Xcel I,* 7 S.T.B. at 651-52 (annual calculation of taxi expenses).

b. **General and Administrative**

As noted above, the TPIRR has approximately 7,357 route miles. The TPIRR's General and Administrative ("G&A") staff, composed of 304 personnel, was developed by considering the needs of the TPIRR traffic base, the size and scope of the TPIRR design, and the commodities handled, all in light of the experience of TPI's witnesses in the rail industry, information from CSXT in discovery, and public information. *See*, Part III-D at 15 and Exhibit III-D-2, pp. 1 to 3. It is important to note that the TPIRR is one of the largest SARR's considered by the Board. *See,* Exhibit III-C-6, p. 1. The TPIRR's G&A staffing, therefore, has been designed, where appropriate, to take advantage of the economies of scale and scope for a railroad of its size. *See,* Part III-D at 16 to 17 and Exhibit III-D-2, pp. 2 to 3. The TPIRR also has been designed to take advantage of the latest technology, unencumbered by organizational structures from past mergers, labor union requirements, or the like. *See,* Part III-D at 16 and Exhibit III-D-2, pp. 2 to 3 and 10 to 11.

From a G&A standpoint, the TPIRR is difficult to benchmark against any existing railroad. From the point of view of size and traffic mix, the TPIRR is unlike any current railroad existing in the United States today: it is smaller than the largest Class I railroads, but larger than KCS and the regional railroads; it has fewer branch lines than other major railroads, both past and present; and it has a mix of traffic (44% intermodal and 13% coal) unlike existing rail carriers. *See,* Exhibit III-D-2, pp. 2 to 3. However, TPI's experts are able to compare the TPIRR to the Chicago and North Western Railway (C&NW), as it existed in 1994, because the C&NW was a railroad of similar size. Based on the number of non-T&E employees per route mile, the TPIRR compares reasonably well with the 1994 C&NW, especially considering the technology improvements that have taken place since 1994 and the more complex C&NW system. *See*, Part III-D at 16 to 18 and Exhibit III-D-2, pp. 8 to 12.

Annual salaries for the TPIRR's G&A employees are based on data contained in CSXT's Wage Forms A&B, except that the salaries for the TPIRR's President and Vice Presidents are based on the salaries, including bonuses, of the Kansas City Southern Lines, a holding company operating three major lines of railroad that combined approximate the size of the TPIRR, *See,* Part III-D at 20 and Exhibit III-D-2, pp. 36 to 37.

The TPIRR's Executive Department consists of 30 people, with a President, the heads of the seven major departments reporting to him, and a variety of other managerial personnel, including Human Resources, Government Relations, and others. *See,* Exhibit III-D-2, pp. 12 to 15. The TPIRR uses a seven-member Board of Directors (the President of the TPIRR, the Vice-President – Operations and five outside directors), larger than the number that has been approved by the Board in past cases, to account for the relatively larger size and scope of the TPIRR compared to past cases. *See*, Exhibit III-D-2, p. 4 and p. 13, and *AEP Texas II,* slip op. at 53-54, *citing PSCo/Xcel I*, *Duke/CSXT*, and *TMPA.*

The TPIRR Sales and Marketing Department consists of 56 people, headed by a VP Sales and Marketing and assisted by eight Assistant Vice Presidents. *See,* Part III-D at 18 and Exhibit III-D-2, pp. 15 to 19. It is important to note that the size of the TPIRR Sales and Marketing Department is significantly affected by the nature of the TPIRR's traffic base. Unlike many other carriers, a large percentage of the TPIRR's traffic is not originated on the TPIRR, but is received in interchange service from other carriers. *See,* Exhibit III-D-2, p. 16. Thus, its sales and marketing staff is less than existing Class I railroads, which have a larger percentage of originating and terminating traffic. *See,* Exhibit III-D-2, p. 16.

The TPIRR's Finance and Accounting Department consists of 100 people to handle the TPIRR's financial and accounting functions, headed by a Vice President Finance and Accounting. *See*, Part III-D at 19 and Exhibit III-D-2, pp. 5 to 6 and p. 24. This is consistent with the finance and accounting functions that the Board has approved in recent cases, with additions to account for the TPIRR's larger number of carload transactions and more varied traffic base. *See*, Exhibit III-D-2, p. 24 and, *e.g.*, *AEPCO,* slip op. at 55 (32-person Finance and Accounting Department approved); *AEP Texas II,* slip op. at 52 (32-person Finance and Accounting Department approved); *WFA/Basin I*, slip op. at 43 (15-person Finance and Accounting Department approved); *PSCo/Xcel I*, 7 S.T.B. at 648 (16-person Finance and Accounting Department approved).

The TPIRR's Law Department is composed of 45 people, headed by a Vice President – Law who is responsible for the TPIRR's legal affairs, as well as real estate, claims and security. *See,* Part III-D at 19 and Exhibit III-D-2, p. 7 and p. 29. This is larger than the same function that has been approved by the Board in past cases, again to reflect the requirements of the TPIRR's larger traffic base. *Compare AEPCO*, slip op. at 55 (29 Legal and Administrative personnel approved); *WFA/Basin I*, slip op. at 43 (9 Legal and Administrative personnel approved); *Otter Tail*, slip op. at C-8 (9 Legal and Administrative personnel approved); *PSCo/Xcel I*, 7 S.T.B. at 648 (14 Legal and Administrative personnel approved, plus IT function); *AEP Texas II*, slip op. at 53 (9 Legal and Administrative personnel approved).

In the same way, the TPRR's IT function, consisting of 73 people, is larger than the IT function approved in recent cases, reflecting the TPIRR's larger and more varied traffic base. *See*, Part III-D at 19 and Exhibit III-D-2, pp. 7 to 8; and *AEPCO*, slip op. at 55 (41 IT personnel); *WFA/Basin I*, slip op at 43 (8 IT personnel); *AEP Texas II*, slip op at 52 (12 IT personnel); *Otter Tail*, slip op. at C-8 (9 IT personnel). TPI's evidence shows that the TPIRR's information technology systems enable the railroad to safely and efficiently handle the TPIRR's average of 555 train movements per day in the peak week. *See,* Part III-D at 21 and Exhibit III-D-2, pp. 31 to 36 and 42 to 52.

Start-up and training costs for TPIRR employees are based upon information provided by CSXT in discovery. *See*, Exhibit III-D-2, p. 55. Consistent with *WFA/Basin I*, slip op. at 53, and other Board precedent, the costs of training and recruiting employees is treated as an operating expense in the TPIRR's first year of operation. *See*, Part III-D at 23 to 24 and Exhibit III-D-2, p. 55.

c. **Maintenance of Way**

The MOW plan for the TPIRR was developed by TPI's experts from a wide variety of sources, and is based on real-world maintenance of way functions and needs given the gross tonnage over each section of the TPIRR system, regulatory requirements, and a wide variety of other considerations. *See,* Part III-D at 24 to 26 and Exhibit III-D-3, pp. 1-3. The details of TPI's MOW plan for the TPIRR, including how it was developed, are described in detail in Exhibit III-D-3.

The TPIRR is a newly-designed and newly-constructed system, using the latest technology and modern materials and methods. All track, turnouts, bridges, signals, tunnels and all other infrastructure components are brand new. Thus, maintenance needs on the newly-constructed TPIRR will be much less than on the existing, aging CSXT infrastructure. *See,* Exhibit III-D-3, pp. 4 to 7. This conclusion logically and necessarily follows from the fact that a SARR is newly-constructed, and is charged with the replacement cost for supplying the transportation service required. Thus, as a newly-constructed entity, the TPIRR will have higher costs than the incumbent in some areas (such as new construction costs), but lower costs (such as maintenance of way) in others. This does not mean that the TPIRR will not have any maintenance needs or that the TPIRR is deferring maintenance; it merely means that the maintenance needs for the first ten years of an entirely brand new rail infrastructure will be much less than CSXT's aging infrastructure.

TPI's evidence details the many areas where the TPIRR's maintenance of way needs will be less than those of the existing CSXT infrastructure, which is composed of a mixture of new and aging components, including antiquated timber and masonry bridges, a mix of old and new rail, and older ditches and culverts. *See,* Exhibit III-D-3, pp. 4 to 7. For example, all bridges on the TPIRR are new, concrete and/or steel structures, which will have no significant maintenance needs for many decades. *See,* Exhibit III-D-3, pp. 4 and 6. Similarly, the TPIRR roadbed is newly-constructed with well-compacted roadbed and fully cleared right of way; therefore, there will be no immediate need for ditch maintenance. *See,* Exhibit III-D-3, p. 5. Because TPI is starting with all new rail, internal fatigue defects will likely be very low, since rail tends to accumulate such defects as it accumulates tonnage. *See,* Exhibit III-D-3, pp. 17. TPI has compared and contrasted the maintenance requirements of the brand new TPIRR infrastructure against CSXT's aging infrastructure in Table 1 of Exhibit III-D-3. *See,* Exhibit III-D-3, p. 6. It would be inequitable for the Board to impose the cost of constructing brand new rail infrastructure upon the TPIRR, but not allow the TPIRR to benefit from the lower maintenance costs associated with that investment.

In developing an appropriate MOW plan for the TPIRR's brand new infrastructure, TPI's experts started by considering the real-world maintenance functions that needed to be performed and then developed an appropriate organization to carry out those functions. *See,* Exhibit III-D-3, pp. 1 to 3. TPI's experts have included a substantial field staff to perform day-to-day inspection and maintenance activities, supported by a managerial/office engineering and support staff reporting to a Vice President Engineering and Mechanical. *See*, Part III-D at 25 and Exhibit III-D-3, p. 2; and *WFA/Basin I,* slip op. at 57. This is consistent with the approach taken by complainants in recent cases, much of which the Board has accepted. *See*, *AEPCO*, slip op. at

65, 72, 74 (Board approves MOW staffing for various categories); *WFA/Basin I*, slip op. at 57 (same).

In order to validate the reasonableness of their estimates, TPI's experts compared the number of TPIRR route miles by MOW employee positions, and the number of employees per position, to the equivalent positions enumerated in discovery materials provided by CSXT. This was done for *each* MOW department and position. *See,* Exhibit III-D-3, pp. 3 to 4 and pp. 8 to 10, 21, 25, 30, and 35 to 37. In order to develop an appropriate comparison given the TPIRR's brand new infrastructure, TPI's experts first removed from the CSXT data employees required for program maintenance, new construction, floating crews, system crews, and other positions not needed on the TPIRR. *See,* Exhibit III-D-3, p. 4. Overall, the comparison is very favorable: there are {{[redacted]}} route miles, and {{[redacted]}} track miles per CSXT MOW employee, whereas there are 5.99 route miles and 9.04 track miles per TPIRR MOW employee. *See,* Exhibit III-D-3, pp. 4, 8. Table 8 of Exhibit III-D-3, pp. 35 to 37, provides these statistical comparisons for each individual MOW position on the TPIRR and CSXT.

TPIRR MOW employee salaries and compensation are based on the salaries paid by CSXT to MOW personnel as shown in CSXT's Wage Forms A and B. *See,* Exhibit III-D-3, p. 37.

The Board has recognized, in *WFA/Basin I* and in *AEPCO,* that some maintenance can be contracted out, and TPI's experts have followed that precedent here. *See*, Exhibit III-D-3, p. 3 and p. 39; *WFA/Basin I*, slip op. at 69-73, and *AEPCO*, slip op. at 77. This contracted work includes planned (or routine) maintenance that can be scheduled on a regular basis, such as track geometry testing, rail grinding and vegetation control; certain unplanned maintenance such as snow removal; and some other large unplanned maintenance, such as derailments, washouts or environmental cleanups. *See*, Exhibit III-D-3, pp. 39-55; *WFA/Basin I*, slip op. at 70 (track geometry testing, etc.) and 73 (snow removal, environmental cleanup and derailments); *AEPCO*, slip op. at 75-77. As TPI's evidence notes, real-world rail carriers also utilize contract personnel for maintenance. *See*, Exhibit III-D-3, p. 3, note 4.

d. **Other Operating Expenses**

Ad valorem taxes were developed by calculating the amount of tax that CSXT paid per route mile in each of the states in which the TPIRR operates; these amounts were then applied to the TPIRR's route miles in each state. *See,* Part III-D at 27. This method is consistent with Board precedent. *See, AEPCO,* slip op. at 79 (ad valorem taxes calculated by the amount that the incumbent paid per route mile in the various states). Loss and damage costs were based on CSXT's actual 2010 loss and damage per ton, a method supported by Board precedent. *See,* Part III-D at 26; *WFA/Basin I,* slip op. at 55 (loss and damage based on the incumbent's experience). Similarly, the TPIRR's insurance expenses were calculated using CSXT's average insurance ratio for the period 2010 through 2012. *See,* Part III-D at 26.

6. **Road Property Investment Cost**

Part III-F describes the acquisition of land and the construction of roadbed, track tunnels, bridges, signals, etc. on approximately 6,866 route miles of the TPIRR's system[14] through seventeen states and the District of Columbia. Total road property investment costs for the TPIRR total about $28.8 billion, or about $4.2 million per route mile. *See,* Part III-F at 1 and Exhibit III-F-1; *compare*, *AEPCO*, slip op. at 31 and 81 (SARR approved by Board at approximately $3.2 million per route mile); *PSCo/Xcel I*, 7 S.T.B. at 632 and 666 (SARR

[14] The TPIRR also runs over approximately 491 miles of trackage rights, for a total of 7,357 route miles of operations.

approved by Board at approximately $3.2 million per route mile); *AEP Texas II*, slip op. at 27 and 75 (SARR approved by Board at approximately $2.4 million per route mile).

Land acquisition amounts are consistent with the methodologies employed by the Board in past cases. The standard "Across the Fence" ("ATF") methodology was used to estimate the value of the right of way, by establishing the value of adjacent land in proximity to the SARR's ROW with the same zoning as lands abutting the ROW. *See*, Part III-F at 2; and, *e.g.*, *Duke/CSXT,* 7 S.T.B at 168-169. The majority of the TPIRR's ROW is an average width of 100 feet, with 75 feet used in urban locations. *See*, Part III-F at 3. This is consistent with the amounts of land utilized in past cases. *See*, *AEP Texas II*, slip op. at 75 (100 foot/75 foot widths used); *WFA/Basin I*, slip op. at 78 (100 foot widths generally used); *PSCo/Xcel I*, 7 S.T.B at 667 (100 foot/75 foot widths used); *Duke/NS*, 7 S.T.B. at 168 (parties agreed on 100 foot widths in most locations, but 75 foot widths in industrial, commercial and urban areas); *Wisconsin P&L*, 5 S.T.B. at 1018 (100 foot width is "standard," except 75-foot in urban locations); *West Texas Utilities*, 1 S.T.B. at 702; *Duke/CSXT,* 7 S.T.B. at 472-473. In each location where additional trackage or space is required, acreage has been added. *See,* Part III-F at 3.

Land acquisition costs were determined by evaluating the value of land adjacent to or in the neighborhood of the TPIRR ROW, consistent with standard Board practice. *See,* Part III-F at 4; *Duke/CSXT,* 7 S.T.B. at 473 ("The land along the ROW is a prime indicator of a ROW's value and has been used in all prior SAC cases"). TPI's experts utilized imagery from Google Earth Pro to view adjacent land uses and to define the land use type; in addition, a detailed physical inspection was performed on the ROW in seventeen urban areas to determine the proper land use classification. *See,* Part III-F at 4 to 5. Sales of comparable lands were determined to estimate the value of the SARR ROW. *See,* Part III-F at 5 to 6.

Roadbed preparation quantities for clearing, grubbing, earthwork, etc., were developed using ICC Engineering Reports. *See,* Part III-F at 7 and pp. 11-12. Roadbed preparation costs for these various elements were developed using a combination of Means Handbook costs and the cost of constructing a complicated new railroad construction project in 2007 – the Trestle Hollow Project in Tennessee -- in an area of the country in which the TPIRR would operate, in terrain and conditions similar to (and in fact more challenging than) those which the TPIRR would encounter in constructing much of its system. *See,* Part III-F at 7 to 10 and pp. 13-16. Means Handbook costs are very conservative for estimating the costs of constructing the TPIRR, because the Means Handbook has no method to adjust for the large economies of scale that would apply to a construction project the size of the TPIRR. *See,* Part III-F at 7 and 13. Thus, where real-world construction costs are available, they are the best evidence of record. *See, WFA/Basin I,* slip op. at 86; *AEPCO,* slip op. at 86-88. For the TPIRR, TPI has proposed, and the Board should adopt, costs for clearing and grubbing and common earthwork based on costs actually incurred on the Trestle Hollow Project. *See,* Part III-F at 9 to 10 and 13 to 16.

Other design parameters for the ROW, such as the TPIRR's 24-foot single-track roadbed width, the 1.5:1 side-slope measurements, and other features of the roadway investment, are based on Board-approved parameters from prior cases. *See*, Part III-F at 11 to 12; and, *e.g.*, *AEPCO,* slip op. at 90 (15-foot track centers); *WFA/Basin I,* slip op. at 82 and 83 (24-foot roadbed width and 1.5:1 side slopes); *Otter Tail*, slip op. at D-7-8 (24-foot roadbed widths used and 1.5:1 side slopes); *PSCo/Xcel I,* 7 S.T.B at 671-672; *WFA/Basin I,* slip op. at 83 (1.5:1 side slope); *AEP Texas II,* slip op. at 79-80 (24-foot roadbed width and 1.5:1 side slope); *Duke/NS*, 7 S.T.B. at 171. Similarly, TPI has adopted a variety of construction elements for the TPIRR consistent with the agency's practice in past cases, including one foot of fill height for yard earthwork,[15] ditches,[16] and the costs and amounts of solid rock excavation.[17] *See*, Part III-F at 12, -17 and -23. TPI also utilized, consistent with Board precedent, ICC Engineering Reports and information provided by CSXT in discovery and from the Means Handbook for culverts, retaining walls, rip rap, seeding and topsoil, along with other information. *See*, Part III-F at 20 to 25.[18]

Similarly, track construction for the TPIRR hews closely to Board precedent and the CSXT's own specifications. The TPIRR incorporates geotextile fabric in the construction of its lines, in accordance with past cases. *See*, Part III-F at 28; *AEPCO*, slip op. 103; *WFA/Basin I*, slip op. at 94-95. Quantities of ballast and subballast conform to CSXT's standard roadbed section, and prices from quotes obtained from suppliers and data obtained from CSXT in discovery. *See*, Part III-F at 28 to 30. The TPIRR's 20.5 inch spacing of wood ties conforms to the railroad industry standard that has been approved in numerous Board decisions. *See*, Part III-F at 30; *AEPCO*, slip op. at 103; *WFA/Basin I*, slip op. at 95-96; *AEP Texas II*, slip op. at 88; *West Texas*, 1 S.T.B. at 707. The TPIRR's use of 136-pound continuous welded rail ("CWR") for main tracks and 115-pound rail for lighter density lines conforms to standard Board practice. *See*, Part III-F at 31; *AEPCO*, slip op. at 104; *WFA/Basin I*, slip op. at 98; *AEP/Texas II*, slip op. at 88; *Duke/NS*, 7 S.T.B. at 184-85. Tunnel costs are based on information provided by CSXT in discovery and from public sources. *See,* Part III-F at 38. Bridge quantities were developed from CSXT bridge inventory information, and bridge design was based on CSXT information and

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[15] *See*, *AEPCO*, slip op. at 90; *Wisconsin P&L*, 5 S.T.B. at 1022; *PSCo/Xcel I* at 675; *Duke/CSXT*, 7 S.T.B. at 477; *CP&L*, 7 S.T.B. at 310-311; *Duke/NS*, 7 S.T.B. at 172; *Otter Tail*, slip op. at D-10.

[16] *See*, *Duke/NS*, 7 S.T.B. at 171; *Duke/CSXT*, 7 S.T.B. at 476; *TMPA*, 6 S.T.B. at 701, n. 83; *Wisconsin P&L*, 5 S.T.B. at 1023.

[17] *See*, for costs of excavation, *AEPCO,* slip op. at 89-90; *PSCo/Xcel I*, 7 S.T.B. at 677-678; *WFA/Basin I*, slip op. at 86-87; *AEP Texas I*, slip op. at 82. *See*, for 50/50 split for solid and loose rock, *AEPCO*, slip op. at 90; *PSCo/Xcel I*, 7 S.T.B. at 677; *Duke/NS*, 7 S.T.B. at 174; *CP&L,* 7 S.T.B. at 312; *Duke/CSXT*, 7 S.T.B. at 478.

[18] The STB has relied on ICC Engineering Reports, Means, and defendant's information for these construction elements in approving the complainant's estimates in, for example, *AEPCO,* slip op. at 85, 92, 95, and 96.

TPI's expert judgment where more efficient spans can be used, consistent with past Board practice. *See*, Part III-F at 38 to 47; see, *e.g.*, *Duke/NS,* 7 S.T.B at 190-191; CP*&L*, 7 S.T.B. at 327; *Duke/CSXT,* 7 S.T.B at 496; *WFA/Basin I,* slip op. at 108-112.

As discussed in more detail above, the TPIRR will employ a PTC system for all train control and communications on the entirety of its constructed rail network. *See,* Part III-F at 47 to 51.

TPI has incorporated a 2.7% mobilization factor, a figure which is slightly higher (and thus more conservative) than the figure adopted by the Board in past cases;[19] a 10% additive for engineering costs;[20] and a 10% contingency factor.[21] These are all consistent with Board precedent.

Finally, consistent with Board precedent, TPI projects a 30-month period to construct the TPIRR, controlled by the time it takes to construct the most time-consuming single component, and in accordance with the principle of barrier-free entry, which in turn demands that there be unconstrained resources and simultaneous construction of the SARR. *See*, Part III-F at 64 to 65; *Coal Trading Corp.*, 6 I.C.C.2d at 412-413; *West Texas,* 1 S.T.B. at 674; *Guidelines*, 1 I.C.C.2d at 529-530.

7. **Discounted Cash Flow Analysis and Application to SAC Analysis**

The DCF methodology presented by TPI in Part III-G and Part III-H of its evidence is consistent with *Guidelines* and *Major Issues*, as applied in recent cases such as *WFA/Basin I* and *WFA/Basin II*, *AEP Texas II*, and *AEPCO.* As explained in TPI's evidence, the function of a

[19] *See,* Part III-F-63. *See, Duke/CSXT,* 7 S.T.B at 505; *CP&L,* 7 S.T.B. at 338 (2.6% mobilization factor); *Duke/NS,* 7 S.T.B. at 201 (2.5% mobilization factor); *AEPCO,* slip op. at 132 (2.4% mobilization factor).

[20] *See,* Part III-F-64. *See, PSCo/Xcel I,* 7 S.T.B. at 697-698.

[21] *See,* Part III-F-64. *See, WFA/Basin I,* slip op. at 132-133; *AEP Texas II,* slip op. at 104-105; *PSCo/Xcel I,* 7 S.T.B. at 698; *TMPA,* 6 S.T.B. at 746-747; *West Texas Utilitities,* 1 S.T.B. at 710; *APS,* 2 S.T.B. at 402.

SAC analysis is to identify the cost associated with providing the most-efficient, least-cost service to the captive shipper. Therefore, the design of the stand-alone system and the traffic it carries are chosen to achieve the goals of maximizing revenues and minimizing service costs to the shipper, regardless of the actual circumstances of the incumbent railroad. This means that the TPIRR must be considered a replacement for the relevant portions of the CSXT system, not a rival, and must be afforded the flexibility to configure its system and service scope in a manner that maximizes efficiency and cost effectiveness. *See*, Part III-G at 2. These principles inform not only such areas as traffic group, design, configuration, and planned operation of the TPIRR as detailed in TPI's evidence, but also the proper treatment of capital cost recovery, inflation and taxes. *See,* Part III-G at 2

The Board consistently has accepted the general railroad industry's average costs of common equity, debt and preferred equity (if any), and their percentage mix within the industry's capital structure, in forming a capital structure for the SARR over the relevant construction period (January 1, 2008 through June 30, 2010 in this case) and operating period (July 1, 2010 through June 30, 2020). TPI has followed these principles in developing its discounted cash flow analysis. *See*, Part III-G at 3

First, debt cost for the TPIRR for the construction period equals the railroad industry average cost of debt for each year; for the remaining years of the DCF model, the TPIRR's cost of debt reflects the weighted average of the construction years' debt costs. *See*, Part III-H at 1. The debt for road property investment is assumed to follow real world industry practices, in which the railroads are constantly reissuing debt as debt is repurchased or paid off. *See*, Part III-H at 2 to 7. In previous SAC cases, the parties assumed that the SARR would issue debt structured similar to a typical home mortgage loan, with quarterly payments consisting of an interest and a principal component, with the former declining and the latter rising over time. *See,* Part III-H at 2 to 3. This is not, however, consistent with actual railroad industry debt payments, nor that of CSXT itself. TPI's evidence shows that more than ninety percent of both railroad industry debt and the debt of CSXT are notes and debentures paying only fixed interest payments. *See,* Part III-H at 3. If Board precedent assumes – as it does – that the SARR's cost of debt should mirror that of the industry, the SARR debt should also mirror the composition of that debt and how interest is paid. *See,* Part III-H at 4. There are numerous reasons why the industry structures debt in this way, including the ability to manage earnings, cash flexibility, the maintenance of financial slack, and sound financial management. *See,* Part III-H at 5. TPI, therefore, has developed a quarterly coupon payment of interest only, consistent with real-world debt financing, rather than amortizing principal with each payment. *See,* Part III-H at 6.

The cost of equity for the TPIRR is the then-current year railroad industry cost of equity. Thus, the TPIRR uses the industry average costs determined by the Board in its annual cost of capital proceedings to calculate the capital recovery charges for all road property investment. *See*, Part III-G at 3.[22] This methodology is the same as the Board has used in its most recent SAC decision, where it adopted the methodology used in its decision in *Use of a Multi-Stage Discounted Cash Flow Model in Determining the R.R. Industry's Cost of Capital* ("*Multi-Stage DCF*"), Ex Parte No 664 (Sub-No. 1), STB served January 28, 2009. *See*, *AEPCO,* slip op. at 137; *see also*, *WFA/Basin I*, slip op. at 135; *AEP Texas II*, slip op. at 107; *Duke/NS,* 7 S.T.B. at 123; *CP&L*, 7 S.T.B. at 261. The TPIRR's cost of capital reflects the numbers approved by the

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[22] If the Board has not calculated the cost of equity capital for such year, the simple average of all prior years' costs of equity capital beginning in the first year of the SARR's construction is used. *See, AEP Texas II* at 107-108; *see also, Otter Tail* at E-2; *WFA/Basin II* at 26.

Board in its cost of capital determinations for 2008 through 2010 for the cost of debt and 2008 through 2012 for the cost of equity.[23] *See*, Part III-G at 3 to 4.

Operating costs have been indexed, as required by the Board's decision in *Major Issues*, based upon an index composed of the RCAF-U and RCAF-A with expenses adjusted based on a changing "mix" of the two indices over time. *See*, Part III-G at 9 to 10; *Major Issues,* slip op. at 39. TPI also uses inflation indices for various road property components based on actual railroad prices and wage rates developed by the AAR, along with a Global Insight's December 2013 Rail Cost Adjustment Factor forecast, as approved by the Board in *AEP Texas II*, slip op. at 109; *Duke/NS*, 7 S.T.B. at 123; *Otter Tail,* slip op. at E-2 to E-3; and *CP&L*, 7 S.T.B. at 261. *See*, Part III-G at 5. For land asset value inflation, TPI has used the Board's most recent approach applied in the *AEPCO* decision, specifically, a weighted combination of indices that reflect rural and urban land prices in proportion to the mix of land values on the TPIRR system routes, instead of a combination of indices that reflect the percentage of SARR acres that were rural versus urban. *See*, Part III-G at 6 and *AEPCO*, slip op. at 139.

TPI also has conformed to the Board's preference, expressed in *AEPCO*, for using a "longer rather than a shorter period of historic data when forecasting future economic trends, such as an inflation rate for land values or the cost of equity." *AEPCO,* slip op at 139. Accordingly, TPI has developed an historic annual and quarterly percentage change in rural land values for the eighty-year period between 1933 and 2013 for the TPIRR states, similar to the time period that the Board used in developing its own risk premium in the cost of capital proceedings. *See*, *Multi-Stage DCF*, slip op. at 10-11; *AEPCO*, slip op. at 139. *See*, Part III-G at

[23] *Railroad Cost of Capital – 2008,* Ex Parte No. 558 (Sub-No. 12), served September 25, 2009; *Railroad Cost of Capital – 2009*, Ex Parte No. 558 (Sub-No. 13), served October 29, 2010; *Railroad Cost of Capital – 2010*, Ex Parte No. 558 (Sub-No. 14), served October 3, 2011; *Railroad Cost of Capital – 2011*, Ex Parte No. 558 (Sub-No. 15), served Sept. 13, 2012; and *Railroad Cost of Capital – 2012*, Ex Parte No. 558 (Sub-No. 16), served Aug. 30, 2013.

6. As explained in TPI's evidence, this approach is consistent with recent research regarding trends in rural land values. See, Part III-G at 7 to 8. For urban land values, which are assumed to consist of a mix of industrial, residential and commercial properties, TPI used a combination of indexes published by investment reporting firms Moody's and Standard & Poor's. These indexes are the same ones used by TPI's land acquisition experts, which maintains consistency between the land inflation values used in the land appraisals and in the DCF model. *See*, Part III-G at 8 to 9. As with rural land values, TPI utilized a longer rather than a shorter period of historic data when forecasting future economic trends; in the case of urban land values, TPI used the period 2001 to 2013, since Moody's data only goes back to 2001. *See*, Part III-G at 9.

Federal taxes for the TPIRR were calculated on the assumption that it pays federal taxes at the 35% corporate rate, with payments for debt interest, state income taxes and depreciation treated as reductions in taxable income. *See,* Part III-G at 10. State tax liability for the TPIRR was calculated by determining the taxes applicable to railroads in each state, weighted together based on the TPIRR route miles located within each state, consistent with Board precedent. *See,* Part III-G at 10 to 11; *Coal Trading Corp.*, 6 I.C.C.2d at 527.

The TPIRR will take advantage of "bonus" depreciation provisions enacted as part of the Economic Stimulus Act of 2008 and the American Reinvestment and Recovery Act of 2009 (ARRA"). *See*, Part III-H at 8 to 10. Although, in *AEPCO*, slip op. at 141-142, the Board noted that it would not "necessarily accept" the application of these tax benefits in calculating the DCF in future cases, the Board should accept the application of those benefits in this case, because otherwise it would introduce a barrier to entry forbidden by *Guidelines*, since it would force the SARR to pay a cost that the incumbent did not incur. CSXT itself took advantage of those same bonus provisions in 2008 through 2010 to defer significant taxes to later years. *See*, Part III-H at

9. Moreover, CSXT has received the benefit of favorable tax treatment for investments made throughout its history that are not available to the TPIRR. *See,* Part III-H at 10. The Board also should not be concerned by the "temporary" nature of these bonus depreciation provisions because they repeatedly have been extended over at least six (6) tax years. *See*, Part III-H at 9 to 10. Finally, bonus depreciation was in fact a tax benefit that would have been available to the TPIRR under then-applicable tax laws. Existing laws should not be disregarded because they might be changed: that is always the case with any statute, and to ignore existing law because of its temporary nature or uncertain duration would introduce subjective speculation into the SAC analysis. *See,* Part III-H at 10. As a policy matter, the Board was exactly correct when it recently stated that "we must follow existing law . . . We have no reason in this 10-year DCF analysis to exclude costs that are required by Federal law because of the possibility that the law might change in the future . . ." *See, AEPCO*, slip op. at 34 (requiring the SARR to construct a PTC system in compliance with existing statutory deadlines despite legislation to extend those deadlines).

TPI's evidence conforms to the requirements of *Major Issues*, which dictates a ten-year analysis period, but assumes that the TPIRR would continue to operate in perpetuity. *See*, Part III-G at 11. TPI's calculation accounts for the costs associated with the renewed investments after the 10-year analysis period. *See*, *AEP Texas II*, slip op. at 105-106. TPI's evidence also utilizes, as required by Board precedent, a real capital carrying charge that is equal in each year of the DCF period, regardless of changes in volume. *See*, *WFA/Basin I*, slip op. at 134-135; *AEPCO,* slip op. at 134-135; and Part III-G at 12.

Finally, TPI has introduced a modification to Board precedent in order to correct a flaw. Prior to its decision in *AEPCO*, unused depreciation was accounted for in an undiscounted terminal value calculation. *AEPCO* changed that approach to calculate the present value of unused depreciation in the terminal value calculation. *See, AEPCO,* slip op. at 140-141. TPI's evidence conforms to the Board's conclusions in *AEPCO*, but has identified a flaw in the Board's model. Specifically, the STB's DCF model assumes that the SARR's capital structure will remain constant; but the model also assumes that, after year 20 and until the first assets are replaced, the railroad has no debt – thus creating a mismatch between the SARR's cost of capital and its cash flows. *See,* Part III-H at 12 to 13. To correct for this flaw, TPI has adjusted the terminal value in the capital carrying charge to reflect the assumption that the level of debt is held constant. *See,* Part III-H at 13. This corrects the flaw in the STB's DCF model, and also aligns the SARR with real-world railroad practices and financial theory. *See,* Part III-H at 13 to 15.

TPI's DCF model combines all of the analyses above, and others set forth in its evidence, to develop a quarterly levelized capital carrying charge equaling the required investment to be recovered from the quarterly capital recovery flow. *See*, Part III-H at 15. This is then combined with the TPIRR's tax liability and operating expenses over the ten-year analysis period to show a summary of the SAC for the TPIRR. *See*, Part III-H at 19.

8. TPI's SAC Analysis Shows That the Rates Charged by CSXT Far Exceed a Reasonable Maximum

TPI's SAC analysis was developed with the Board's principles in *Guidelines,* the Board's rules in *Major Issues*, and the procedures adopted by the Board in its past SAC decisions in mind, and is consistent with those decisions. Application of those procedures shows that, over the 10-year DCF period, the revenues generated by the TPIRR exceed its total capital and operating costs, indicating that the rates being charged by the CSXT exceed a reasonable maximum level under the SAC constraint set forth in *Guidelines*. *See*, Part III-H at 19.

In such a case the Board must then decide "what relief to provide to the complainant by allocating the revenue requirements of the SARR among the traffic group and over time." *AEPCO*, slip op. at 143-144. In *Major Issues*, the Board adopted the Maximum Markup Methodology ("MMM") as its new rate prescription approach. *Major Issues*, slip op. at 14-23. TPI has utilized the Board's MMM procedures, with revenues expressed as each movement's stand-alone revenue calculated using the Board's ATC methodology detailed in Part III-A at 36-37. Revenues are categorized based on traffic type (*i.e.,* coal, intermodal or general freight), CSXT origin and destination, and TPIRR origin and destination. *See,* Part III-H at 19. Variable costs, using the CSXT's 2012 URCS costs for the portion of the movement replicated by the TPIRR, are based on the nine cost inputs identified in *Major Issues*. *See*, Part III-H at 19 to 20.

In *Major Issues*, the Board determined that parties in SAC cases should use the incumbent railroad's unadjusted Phase III variable costs as the cost input for the MMM model. *Major Issues*, slip op. at 14. In *AEPCO*, however, the Board expressed a concern that use of variable costs based on a movement's characteristics on the incumbent carrier would not, in some cases, reflect the movement's characteristics when it moved over the SARR. *AEPCO*, slip op. at 35; *see,* Part III-H at 20. In *AEPCO*, the Board asked future litigants to consider this issue. In its evidence, TPI deals at length with this issue. TPI strongly believes that variable cost adjustments posited in *AEPCO* would be flatly inconsistent with the focus on the incumbent's costs set forth in *Major Issues* and its treatment of the question in *WFA/Basin II*. *See,* Part III-H at 21 to 23; *Major Issues,* slip op. at 20; and *WFA/Basin II*, slip op. at 30. TPI also shows that such variable cost adjustments would be inconsistent with the Long-Cannon factors in the statute. *See,* Part III-H at 23 to 25. The Board should reject *any* adjustments – especially piecemeal adjustments -- to URCS variable costs in determining maximum reasonable rates under the MMM method. *See,* Part III-H at 25 to 27; *Major Issues,* slip op. at 51; *cf., Cargill, Inc. v. BNSF Railway Company,* STB Docket No. 42120, slip op. at 11 (served August 12, 2013) ("we conclude that permitting piecemeal movement-specific adjustments to URCS in the fuel surcharge context...would not likely lead to more accurate results, and would almost certainly increase litigation and litigation costs.")

Finally, in its evidence TPI addresses the indexing of variable costs in the MMM model. In *Major Issues*, the Board indicated that parties in SAC cases should project base year URCS variable costs forward using the hybrid RCAF approach used to index a SARR's operating expenses. *See, Major Issues*, slip op. at 14, note 19. However, in *WFA/Basin II*, the Board revised this position, indicating that the parties should use the RCAF-A to project forward the base year URCS variable costs. *See, WFA/Basin II,* slip op. at 30. Although the RCAF-A is a better method for indexing than the hybrid RCAF approach, TPI believes that the Board's standard URCS indexing method is superior to both, and that the Board should use the standard URCS method to index URCS variable costs under the MMM in this proceeding. *See,* Part III-H at 27 to 29.

Application of the MMM yields maximum R/VC ratios for each year of the DCF model ranging from 124.5 percent to 222.5 percent, and application of those percentages yields maximum reasonable rates for TPI's traffic, using the greater of the jurisdictional threshold or the MMM maximum rates. *See*, Part III-H at 30. TPI's rates exceed a maximum reasonable level for all movements and all time periods.

9. **Rate Relief and Damages**

Based on the evidence presented herein, the Board should find that the rates set forth in the CSXT tariffs at issue in this Complaint exceed the maximum reasonable levels as determined under the SAC constraint of the *Guidelines* and are therefore unlawful under 49 U.S.C. §10701(d).

In addition, since July 1, 2010 and various dates thereafter depending upon the issue movement, TPI has paid CSXT freight charges at tariff rates significantly higher than the lawful maximum rates. Pursuant to 49 U.S.C. §11704(b), the Board should award TPI damages resulting from the payment of rates that exceed a reasonable maximum. The Board should therefore award damages to TPI, consisting of a refund of overpayments plus interest.

B. CONCLUSION

For the foregoing reasons, TPI requests that the Board find that:

1. the challenged rates for each of the issue movements are unreasonable;
2. TPI is entitled to reparations for monies paid in excess of a reasonable rate from July 1, 2010 through the present; and
3. TPI is entitled to a reasonable prescribed rate for a period of 10 years beginning on July 1, 2010.

Respectfully submitted,

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February 18, 2014

PUBLIC VERSION

CERTIFICATE OF SERVICE

I hereby certify that this 18th day of February 2014, I served a copy of the Opening Evidence and Argument for Total Petrochemicals and Refining USA, Inc. upon Defendant via hand-delivery at the address below:

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III. STAND-ALONE COST

A. STAND-ALONE TRAFFIC GROUP

The testimony in this Part is being sponsored by Thomas D. Crowley, Michael E. Lillis (historical traffic and volumes), Daniel L. Fapp (revenue) and Sean D. Nolan (forecasted traffic and volumes), all of L.E. Peabody & Associates, Inc. Their credentials are detailed in Part IV and summarized herein.

For the last 43 years, Mr. Crowley has been analyzing and evaluating economic and transportation options available to users of all transportation modes, as well as the transporters of products. In addition to railroads, pipelines, and truck transporters, Mr. Crowley has assisted shippers of chemical traffic, coal and aggregate traffic, grain and agriculture traffic, intermodal traffic as well as lumber and raw materials traffic, to analyze and evaluate different transportation options available to them in both competitive and captive environments in all parts of the United States. Mr. Crowley has sponsored economic evidence in every maximum rail-rate proceeding based on the stand-alone cost test filed at the Surface Transportation Board ("STB" or "Board") and its predecessor agency, the Interstate Commerce Commission ("ICC"), since the adoption of the 1985 *Guidelines.*

Mr. Lillis has more than 25 years of experience solving economic, transportation, and fuel supply problems for different shippers throughout the United States. He has performed extensive analyses in the area of stand-alone costing, including traffic group identification, route layout, design and construction costs, revenue development, forecasting, and the development of detailed operating plans for various stand-alone railroads.

For over 20 years, Mr. Fapp has been involved in solving transportation, information systems, manufacturing, service, and operating issues. Mr. Fapp's primary experience lies in the fields of transportation management, optimization, cost of capital, and cost improvement. He has designed and executed analyses of the capital and operating costs associated with moving bulk commodities by diverse modes of transportation including rail, full truckload, less than truckload, and ocean vessel.

Mr. Nolan has spent his 20-year consulting career evaluating railroad cost of service, pricing, and operations issues on behalf of shippers and government departments and agencies. The nature of his work has been supporting shippers in their procurement initiatives, including the purchase of fuel, transportation services, and equipment and the management of inventories. His development and analysis of alternative scenarios have been supported by tailored financial models used to estimate cost reductions and savings, actual versus budgeted variances, revenue to variable cost of service relationships, cash flows, and break-even and sensitivity analyses.

A more detailed description of each of the above witnesses' credentials is included in Part IV of this opening evidence.

The TPI Stand-Alone Railroad ("TPIRR") comprises 7,357 route miles, including 491 miles over which TPIRR will operate under trackage rights or joint facility agreements (as CSXT does today). The TPIRR system includes route miles in 17 states—Alabama, Florida, Georgia, Illinois, Indiana, Kentucky, Louisiana, Maryland, Mississippi, New York, North Carolina, Ohio, Pennsylvania, South Carolina, Tennessee, Virginia, and West Virginia—and the District of Columbia. A schematic of the TPIRR routes appears in Exhibit III-A-1.

The TPIRR stand-alone traffic group volumes and associated revenues are discussed in the remainder of this Part III-A under the following topical headings:

1. Stand-Alone Railroad Traffic
2. Volumes (Historical and Projected)
3. Revenues (Historical and Projected)

1. Stand-Alone Railroad Traffic

The TPIRR is designed to transport a broad range of commodities over its system, similar to what CSXT does over many of the same rail lines today. The TPIRR traffic group was developed utilizing CSXT car and container waybill data and CSXT car-event data for the third quarter ("3Q") 2010 through the second quarter ("2Q") 2013, which were produced by CSXT in response to TPI discovery requests. The development of the TPIRR traffic group based on data produced by CSXT was a complicated, time consuming, and data intense endeavor. The analytical processes undertaken to identify the CSXT traffic data and then to select the TPIRR traffic involved many steps. These steps as well as the data and decoders utilized by TPI are detailed in Exhibit III-A-2.

The resulting traffic includes merchandise (general freight), coal, and intermodal traffic.[1] The TPIRR traffic for the period from July 1, 2010 through June 30, 2011 ("3Q10-2Q11" or "First Year") is shown in Exhibit III-A-3. The units (carloads/containers/trailers) and tons associated with this traffic are summarized in Table III-A-1 below.

[1] For purposes of this analysis, coal includes all traffic with a 2-digit STCC of "11", general freight includes all other carload traffic, and intermodal includes all container/trailer waybill traffic.

Table III-A-1
Summary of TPIRR First Year Carloads/Containers/Trailers and Tons
(3Q10 – 2Q11)

Commodity	First Year Traffic Data Units	Gross Tons 1/	Percent of Col (2) Total
(1)	(2)	(3)	(4)
1. Coal	{{[redacted]}}	{{[redacted]}}	{{[redacted]}}
2. Chemicals or Allied Products	{{[redacted]}}	{{[redacted]}}	{{[redacted]}}
3. Transportation Equipment	{{[redacted]}}	{{[redacted]}}	{{[redacted]}}
4. Food or Kindred Products	{{[redacted]}}	{{[redacted]}}	{{[redacted]}}
5. Pulp, Paper, or Allied Products	{{[redacted]}}	{{[redacted]}}	{{[redacted]}}
6. Farm Products	{{[redacted]}}	{{[redacted]}}	{{[redacted]}}
7. Primary Metal Products	{{[redacted]}}	{{[redacted]}}	{{[redacted]}}
8. Non-metallic Minerals	{{[redacted]}}	{{[redacted]}}	{{[redacted]}}
9. Petroleum or Coal Products	{{[redacted]}}	{{[redacted]}}	{{[redacted]}}
10. Clay, Concrete, Glass, Stone Products	{{[redacted]}}	{{[redacted]}}	{{[redacted]}}
11. Waste or Scrap Material	{{[redacted]}}	{{[redacted]}}	{{[redacted]}}
12. Lumber or Wood Products	{{[redacted]}}	{{[redacted]}}	{{[redacted]}}
13. Metallic Ores	{{[redacted]}}	{{[redacted]}}	{{[redacted]}}
14. Other	{{[redacted]}}	{{[redacted]}}	{{[redacted]}}
15. Intermodal	{{[redacted]}}	{{[redacted]}}	{{[redacted]}}
16. Total	{{[redacted]}}	{{[redacted]}}	{{[redacted]}}

Source: TPI Opening Exhibit III-A-3.
1/ CSXT only provided gross tons for intermodal traffic. For consistency, all volumes are therefore shown in gross tons.

As shown in Table III-A-1 above, the TPIRR First Year traffic consists of approximately 5.7 million units (carloads/containers/trailers) or 464 million gross tons of a wide range of commodities.

a. Re-routed Traffic

As detailed further in Section B(8) of Exhibit III-C-1, the routing of certain issue traffic moving on the TPIRR differs in part from the actual historical routing utilized by the corresponding traffic on CSXT rail lines. These reroutes are entirely internal to the TPIRR network. The reroutes were required because TPI did not replicate every line segment traversed by TPI issue traffic in the real world. However, the TPIRR network and operations ensure that the issue traffic moves efficiently over TPIRR trains along a valid route. The three areas where TPIRR reroutes issue traffic are discussed below.

1. Florida Panhandle. Historically CSXT routed issue traffic moving between New Orleans and Florida destinations[2] {[redacted]}. The TPIRR does not include the segment between {[redacted]} over which this traffic moved in the real world. Therefore, TPIRR rerouted this traffic in alternative manifest trains[3] via Montgomery, AL, Atlanta, GA, and Waycross, GA.

2. Ohio to West Virginia. Historically CSXT routed issue traffic moving between Chicago and Clarksburg, WV[4] via {[redacted]}. The TPIRR does not include the segments between {[redacted]} or between {[redacted]} over which this traffic moved in the real world. Therefore, TPIRR rerouted this traffic in alternative trains[5] via Connellsville, PA, Newell, PA, and Grafton, WV.

3. Central Indiana. Historically CSXT routed issue traffic moving between Chicago and Ohio destinations[6] via {[redacted]}. The TPIRR does not include the segment between {[redacted]} over which this traffic moved in the real world. Therefore, TPIRR rerouted this traffic in alternative manifest trains[7] via Deshler, OH or Fostoria, OH and Lima, OH.

In addition to rerouted issue-traffic carloads, the route for some TPIRR trains differs slightly from their real-world counterparts.[8] The reroutes are internal to the SARR segment between the TPIRR on-junction and the TPIRR off-junction, and any "cross-over" traffic is still interchanged with CSXT at a point along the actual route of movement. Board precedent permits such reroutes as long as they are reasonable and do not adversely impact the quality of service

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2 Lanes B12 (New Orleans – Oneco), B16 (New Orleans - Galloway), B38 (New Orleans – De Land), and B104 (New Orleans – De Land).

3 Trains Q612 and Q551.

4 Lanes B62 and B113.

5 Trains Q368, E833, E809, and B713.

6 Lanes B18 (Chicago – Cincinnati), B84 (Chicago – Wapakoneta), B109 (Chicago – Lima), and B110 (Chicago – Lima).

7 Trains Q501 (Lanes B18, B109, B110), Q382 (Lane B84), and Q339 (Lane B84).

8 CSXT operates many parallel line segments through major metropolitan areas that are relatively short in length. Where these short parallel lines occur, TPI has consolidated the traffic moving over these parallel lines into a single line, while ensuring that all TPI traffic is still adequately served.

that the customers in question otherwise would receive from CSXT.[9] The TPIRR reroutes meet these standards.

2. Volumes (Historical and Projected)

a. Historical Volumes

TPIRR historical traffic volumes were selected from the actual CSXT traffic data provided for the historical time period from July 1, 2010 through June 30, 2013. The TPIRR traffic selected for the First Year is summarized in Table III-A-2 below.

Table III-A-2
Summary of TPIRR First Year Traffic – 3Q10-2Q11

Train Type (1)	Carloads/ Containers (2)	Gross Tons (3)	Percent of Col (2) Total (4)
1. General Freight	{[redacted]}	{[redacted]}	{[redacted]}
2. Coal	{[redacted]}	{[redacted]}	{[redacted]}
3. Intermodal	{[redacted]}	{[redacted]}	{[redacted]}
4. Total	{[redacted]}	{[redacted]}	{[redacted]}

Source: TPI Opening Exhibit III-A-3.

As shown in Table III-A-2 above, the TPIRR First Year traffic comprises approximately 5.7 million carloads/containers/trailers and 464.7 million gross tons. TPIRR traffic for each year of the Discounted Cash Flow ("DCF") model is shown in Exhibit III-A-4.

b. Projected Volumes

TPI forecasted TPIRR traffic volumes for the time period from July 1, 2013 through June 30, 2020. TPI's forecast of TPIRR traffic volumes was based on actual CSXT public data, CSXT traffic data produced in discovery, and CSXT internal forecasts provided in discovery. TPI began the forecasting process by aggregating TPIRR traffic volumes first by 2-digit Standard Transportation Commodity Code ("STCC"), and then into one of five Commodity

[9] *See TMPA* at 594-595; *AEP Texas II* at 11.

Groups—Coal, Grain, Auto, Other Merchandise,[10] or Intermodal—moving in identifiable trains moving on the TPIRR. TPI undertook this supplemental aggregation of forecast data on a Commodity Group basis to maintain consistency between the traffic-volume forecast and the train-growth forecast.

i. For The Period From July 1, 2013 through December 31, 2017

For the period July 1, 2013 through December 31, 2017, TPIRR traffic volumes were projected by adjusting Base Year (July 1, 2012 to June 30, 2013) traffic (which were the latest available twelve months of actual data) by annual volume change indices developed from CSXT shipment-volume forecasts provided in discovery. Specifically, using a purported CSXT internal traffic forecast[11] covering the 2013-2017 time periods that was produced in discovery, TPI aggregated the CSXT forecasted carload and container shipments by 2-digit STCC and Commodity Group, and developed year-over-year volume change indices.[12] The CSXT coal-volume-forecast indices were then disaggregated based on Energy Information Administration ("EIA") coal-production regions. TPI then applied these annual volume-change indexes to the selected TPIRR Base Year traffic group.

By developing Commodity Group-specific growth rates, TPI was able to accurately reflect forecasted volume growth in the TPIRR traffic-group and train list. This aggregate approach is consistent with the model accepted by the STB in *CP&L*.[13] In *CP&L*, the Board recognized that coal business in the East constantly shifts on an origin (origin district)/destination ("O/D") pair basis and that an O/D-pair-specific approach to forecasting the

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[10] Other Merchandise is broken into an additional 26 groups.

[11] *See* "2013-2017STRATPLAN.xlsx" created by FTI consultant Rob Fisher on September 18, 2013 based on proprietary information contained in the file, and forwarded under a cover letter from CSXT's external counsel on October 4, 2013 in response to TPI Request For Production numbers 30 and 157.

[12] For example, the projected issue-traffic volumes were developed based on CSXT's forecasted growth rates for 2-digit STCC codes 28 and 29.

[13] *See CP&L* at 249-251.

traffic group would be too restrictive and result in understated volume growth. The same holds true for this case.[14]

ii. For The Period From January 1, 2018 through June 30, 2020

For the January 1, 2018 through June 30, 2020 time period, TPIRR traffic volumes, excluding coal, were determined by calculating the compound annual growth rate ("CAGR") over the five (5) years of CSXT internal forecast data (i.e., for 2013 to 2017), and applying these compounded growth rates on a 2-digit STCC basis.

Using a CAGR approach to forecasting traffic volumes is consistent with Board precedent and has been accepted by railroads in recent SAC presentations. The Board accepted the use of compounded historic growth factors in developing traffic forecasts in *FMC*,[15] and the Board used the same approach in developing the cost of equity in *AEP Texas II*.[16] For coal shipments during the 2017 to 2020 time period, TPI continued to rely on the CAGR approach discussed above, aggregated based on EIA coal-production regions. Coal is a significant

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[14] Although the issue in *CP&L* was limited to coal-volume forecasting, the principles behind the Board's decision are relevant to the forecast of coal and other commodities in this case. TPI applied the *CP&L* volume-forecasting methodology to all selected movements in its forecast model. As stated by the STB in *CP&L* "[a] customer may ship from one mine in one year, then shift to another the next year, and back to the first mine in the following year." *CP&L* at 249. Similarly, a customer may not ship from a SARR-served mine in the base year, but it may do so in some or all subsequent years. Consequently, requiring exact origin-destination matches between forecasted traffic volumes and the selected base year is unduly restrictive and does not fairly reflect the traffic that would be available to the SARR in any given year. The better (and Board-endorsed) approach is to view the base-year traffic group selected by the shipper as a snapshot that is reflective of the traffic that can reasonably be assumed to be available to the SARR for any given year of the model period. Thus, the fact that some traffic would not continue to move from a specific origin to a specific destination throughout the SAC analysis period does not mean that other traffic would not move from the origins served by the SARR. It is therefore reasonable to treat the base traffic group selected by the shipper as a representative traffic group for all modeled years. Theoretically, there is no difference between coal and other commodities in this regard, so we have extended this Board-approved logic to cover all existing carload movements on the SARR.

[15] *See FMC* at 730-732. A CAGR approach was presented by the shipper, used by the UP, the defendant railroad, and accepted by the Board in *FMC* for forecasting volumes and revenues. For "traffic volumes generally", FMC "estimate(d) traffic growth beyond 2001 (or 2002)" using "the average (geometric mean) of the annual percentage change in traffic volumes contained in the LRP's from 1997 to that time." The Board decided to "use the traffic forecasts in the LRP's for the years 1997 through 2001…for carrying those forecasts forward through 2017." The UP in that same case "used the compounded average growth rate from 1999 through 2007…to develop its growth rate for soda ash for the period 2008-2017."

[16] *See AEP Texas II*, slip op. at 107.

commodity for the TPIRR. The TPIRR will serve six origin coal mines directly and will terminate coal shipments at 15 generating stations and industrial facilities located on the TPIRR system. In addition, the TPIRR will receive and/or deliver coal with other railroads that will transport this traffic to electric utilities, ocean coal terminals, or industrial facilities off system.

For all forecast years, electric-utility coal-volume growth was capped at an 85 percent plant capacity level at identified generating stations consistent with prior STB decisions in rate reasonableness proceedings involving the forecasted growth of coal to electric utilities. Because capping the amount of coal traffic to individual generating stations results in overall TPIRR coal volumes below the level that would result from universal application of the aggregate growth factor implicit in the CSXT coal-volume forecasts (adjusted by the annual growth factors described above), TPI recalibrated the growth factor for non-capped generating stations to accommodate the give-and-take needed to retain the overall growth projections reflected in the CSXT internal coal forecast. For example, assume a SARR serves two coal customers and each shipped 1 million tons in the base year (2 million tons in total). Also assume an aggregate forecast growth rate of 10 percent in year two, or 1.1 million tons to each generating station for a total of 2.2 million tons. Now assume one plant is capped at 1.05 million tons based on the 85 percent capacity factor limitation. The foregone growth from the limited generating station would be moved to the generating station with no capacity limit. In effect, one generating station would be receiving 1.05 million tons and the other 1.15 million tons resulting in the retention of the original aggregate 10 percent growth projection.[17]

As discussed above, CSXT internal forecasts for coal traffic have been broken out by EIA production region based on origin designations. For capped plants, the capped tons were

[17] *See AEPCO* at 21.

distributed to other shippers moving coal from the same origin regions to maintain the overall regional growth forecasted by CSXT.

Table III-A-3 below is a summary of the CSXT growth factors for coal by EIA production region.

Table III-A-3
TPIRR Traffic Growth Rates for Coal by EIA Production Region

	Time Period (1)	CAPP (2)	EINT (3)	NAPP (4)	SAPP (5)	WPRB (6)	Other (7)
1.	Jul 1 - Dec 31, 2010 1/	x	x	x	x	x	x
2.	2011 1/	x	x	x	x	x	x
3.	2012 1/	x	x	x	x	x	x
4.	2013 2/	{{[redacted]}}	{{[redacted]}}	{{[redacted]}}	{{[redacted]}}	{{[redacted]}}	{{[redacted]}}
5.	2014 3/	{{[redacted]}}	{{[redacted]}}	{{[redacted]}}	{{[redacted]}}	{{[redacted]}}	{{[redacted]}}
6.	2015 3/	{{[redacted]}}	{{[redacted]}}	{{[redacted]}}	{{[redacted]}}	{{[redacted]}}	{{[redacted]}}
7.	2016 3/	{{[redacted]}}	{{[redacted]}}	{{[redacted]}}	{{[redacted]}}	{{[redacted]}}	{{[redacted]}}
8.	2017 3/	{{[redacted]}}	{{[redacted]}}	{{[redacted]}}	{{[redacted]}}	{{[redacted]}}	{{[redacted]}}
9.	2018 4/	{{[redacted]}}	{{[redacted]}}	{{[redacted]}}	{{[redacted]}}	{{[redacted]}}	{{[redacted]}}
10.	2019 4/	{{[redacted]}}	{{[redacted]}}	{{[redacted]}}	{{[redacted]}}	{{[redacted]}}	{{[redacted]}}
11.	Jan 1 - June 30, 2020 5/	{{[redacted]}}	{{[redacted]}}	{{[redacted]}}	{{[redacted]}}	{{[redacted]}}	{{[redacted]}}

Source: e-workpaper "Coal Volume Forecast Matrix.xlsx".
1/ Traffic volumes are based on actual historical volumes for 2010 through June 30, 2013.
2/ Based on CSXT's actual volumes as reported in its 2012 10-K Report and CSXT's forecasted 2013 volumes from CSXT's internal forecast "2013-2017STRATPLAN.xlsx".
3/ Based on CSXT's internal forecast "2013-2017STRATPLAN.xlsx" for STCC 11.
4/ Based on the "Compound Annual Growth Rate (CAGR)" for the CSX 2013-2017 internal forecast.
5/ Represents 6 months of growth in the developed CAGR.

Table III-A-4 below summarizes the year-over-year TPIRR traffic growth rates by Commodity Group.

Table III-A-4
TPIRR Traffic Growth Rates by Major Commodity Group (2 Digit STCC Code)

	Time Period (1)	Coal (STCC 11) (2)	Grain (STCC 1) (3)	Auto (STCC 37) (4)	Other Merch 1/ (5)	Intermodal ("IN") (6)
1.	July 1 - Dec 31, 2010 2/	x	x	x	x	x
2.	2011 2/	x	x	x	x	x
3.	2012 2/	x	x	x	x	x
4.	2013 3/	{{[redacted]}}	{{[redacted]}}	{{[redacted]}}	{{[redacted]}}	{{[redacted]}}
5.	2014 4/	{{[redacted]}}	{{[redacted]}}	{{[redacted]}}	{{[redacted]}}	{{[redacted]}}
6.	2015 4/	{{[redacted]}}	{{[redacted]}}	{{[redacted]}}	{{[redacted]}}	{{[redacted]}}
7.	2016 4/	{{[redacted]}}	{{[redacted]}}	{{[redacted]}}	{{[redacted]}}	{{[redacted]}}
8.	2017 4/	{{[redacted]}}	{{[redacted]}}	{{[redacted]}}	{{[redacted]}}	{{[redacted]}}
9.	2018 5/	{{[redacted]}}	{{[redacted]}}	{{[redacted]}}	{{[redacted]}}	{{[redacted]}}
10.	2019 5/	{{[redacted]}}	{{[redacted]}}	{{[redacted]}}	{{[redacted]}}	{{[redacted]}}
11.	Jan 1 - June 30, 2020 6/	{{[redacted]}}	{{[redacted]}}	{{[redacted]}}	{{[redacted]}}	{{[redacted]}}

Source: e-workpapers "Coal Volume Forecast Matrix.xlsx"; "Non-Coal Volume Forecast Matrix.xlsx".
1/ Other Merchandise is broken out into 26 additional groups.
2/ No traffic growth rates because traffic volumes are based on actual historical volumes for 2010 through June 30, 2013.
3/ Based on CSXT's actual volumes by business unit found in its 2012 10-K Reports and 2013 forecasted volumes.
4/ Based on CSXT's internal forecast "2013-2017STRATPLAN.xlsx"
5/ Based on the "Compound Annual Growth Rate (CAGR)" for the CSX 2013-2017 internal forecast.
6/ Represents 6 months of growth in the developed CAGR.

TPIRR traffic for each year of the Discounted Cash Flow ("DCF") model is shown in Exhibit III-A-4.

a. Peak Year Traffic

The peak traffic year for the TPIRR will be 3Q19 through 2Q20, the final year of the ten year DCF model evaluation. A summary of this traffic is shown in Table III-A-5 below.

Table III-A-5
Summary of TPIRR Peak-Year Traffic – 3Q19-2Q20

Train Type	Carloads/ Containers	Tons	Percent of Col (2) Total
(1)	(2)	(3)	(4)
1. General Freight	2,850,685	316,053,736	38%
2. Coal	853,994	111,548,945	11%
3. Intermodal	3,801,157	106,197,049	51%
4. Total	7,505,836	533,799,730	100%

Source: "Revenue Summary Final.xlsx."

3. Revenues (Historical and Projected)

TPI developed total revenue for each traffic type (i.e., general freight, coal, intermodal) for each year in the ten year DCF model period using the revenue data provided by CSXT in discovery. These revenues reflected either single-line movements, interline movements, or cross-over movements handled by the TPIRR. A description of the general process used to develop total historical and projected revenues by traffic type is outlined below.

a. Historical Revenues

CSXT net revenues, (exclusive of fuel surcharges) were used to develop the historical (July 1, 2010 – June 30, 2013) rate per carload or container/trailer for each unique movement included in the TPIRR traffic group. A unique movement is defined by ultimate origin and destination pair, CSXT origin and destination pair, STCC, and contract (if available). As discussed below, the historic rates per carload/container/trailer are used to develop forecasted revenues for the TPIRR traffic. In addition, historic fuel surcharges, if any, were identified for each shipment

The total TPIRR revenue (including fuel surcharges) equals ${[redacted]} in the First Year as shown in Table III-A-6 below by traffic type.

Table III-A-6
Summary of TPIRR First Year
Revenue -- 3Q10-2Q11
($ in millions)

Traffic Type (1)	Revenue (2)
1.General Freight	{[redacted]}
2.Coal	{[redacted]}
3.Intermodal	{[redacted]}
4.Total	{[redacted]}

Source: "Revenue Summary Final.xlsx."

b. Projected Revenues

TPI forecasted TPIRR revenue for the time period from July 1, 2013 through June 30, 2020 using CSXT's traffic and revenue data, CSXT publicly available data, CSXT contracts and pricing authorities, CSXT internal forecasts provided in discovery, and publicly available forecasts of key economic indices. As summarized in Table 7 below, TPI adjusted the "revenue less fuel surcharge" portion of revenues based on CSXT's internal forecasts.[18] For coal and non-coal movements where contract data was made available by CSXT, contract adjustment mechanisms were used to forecast TPIRR revenues for the duration of the contract term.

For non-coal contracts that expired between 2013 and 2017, rates were adjusted based on the forecasted change in revenue per unit[19] from the CSXT-provided carload or container forecasts. This is similar to the traffic volume growth procedures described above. If the 2-digit STCC was not included in CSXT's forecast, a system-average growth rate from CSXT's forecast was used. For coal contracts that expired between 2013 and 2017, or for coal movements that

[18] CSXT's internal revenue forecasts did not include fuel surcharges.

[19] The forecasted revenue per unit change aggregated by the 2-digit STCC code.

were not subject to contracts or other common-carrier pricing authorities, revenue projections through the 2017 time period were based on CSXT's internal forecasts aggregated by EIA production region.

For the period from January 1, 2018 through June 30, 2020, TPIRR revenues for all traffic were determined by adjusting the prior year revenue per unit by the 2-digit STCC CAGR developed utilizing the five (5) years of CSXT internal forecast data for 2013 to 2017. As indicated above, a forecasting approach that relies upon CAGR has been repeatedly used by shippers and railroads, and accepted by the Board.[20]

Table III-A-7 below summarizes the TPIRR revenue forecast procedures described above that TPI used during the forecast time period.

Table III-A-7
Summary of Revenue Forecast Procedures

Study Period (1)	**Forecast Basis** (2)
A. All Commodities	
1. July 1, 2013 – December 31, 2017	CSXT Internal Forecast or forecasted contract adjustment mechanism (if available).
2. January 2, 2018 – June 30, 2020	CAGR [1/] or forecasted contract adjustment mechanism (if available).

[1/] CAGR based on change in CSXT internal forecast for 2013-2017. Full year 2013 (the base year for future forecasts) was developed using the 2012-2013 annual change from system-wide revenue data reported in CSXT's 10-K reports.

The TPIRR traffic revenues for each year in the DCF model period are summarized in Exhibit III-A-5.

[20] In addition, CSXT uses CAGR concepts and metrics in its normal course of business. A recent example is the presentation by CSXT Chief Financial Officer Fredrik Eliasson at the 2013 Deutsche Bank Global Industrials & Basic Materials Conference. Mr. Eliasson used CAGR comparisons numerous times throughout his presentation, including a discussion of CAGR in terms of earnings and traffic growth. A copy of Mr. Eliasson's presentation is included in TPI's e-workpapers at "2013 CSX Corporation - Deutsche Bank Presentation.pdf."

c. Fuel Surcharges

For coal and general-freight traffic, CSXT imposes a car-mile based fuel surcharge on each carload based on the price of On-Highway Diesel Fuel ("HDF") two calendar months prior to the movement. The TPIRR uses the same fuel-surcharge program and formula that CSXT uses, and thus collects a per car-mile fuel surcharge on each carload based on the TPIRR movement miles, while CSXT will continue to collect its per-car-mile fuel surcharge on its portion of the movement.

For intermodal traffic, CSXT imposes a fuel surcharge calculated as a percentage of the base rate, again based on HDF prices two calendar months prior to the movement. The TPIRR uses this CSXT fuel-surcharge program to calculate total CSXT fuel-surcharge revenues and allocates a share of the total CSXT fuel-surcharge revenues to the TPIRR using the revenue-division percentage calculated under the ATC methodology.

For contract movements subject to CSXT fuel surcharges, the fuel surcharges are calculated based on the relevant contract terms. Where the contract specifies the use of HDF prices, TPI has applied the EIA forecast of HDF prices included in the January 2014 Short Term Energy Outlook ("STEO") through 2015 and the forecast in the 2014 Early Release AEO for 2016 through 2Q20. For contracts specifying a surcharge based on West Texas Intermediate Crude Oil ("WTI") prices, the WTI forecasts were also based on the EIA STEO and the AEO forecasts. After contract expiration and through 2Q20, fuel-surcharge rates are assumed to follow CSXT's HDF surcharge programs.

d. Revenue By Movement Type

The TPIRR handles single-line movements, interline movements, cross-over movements and internally rerouted movements. Single-line movements originate and terminate on the TPIRR, and are carried by the TPIRR for the entire length of the movement. Interline movements are movements where the TPIRR either receives or delivers the railcar, container, or trailer ("unit") to a railroad other than CSXT, and carries the unit completely along its own system from receipt or to delivery. Cross-over movements traverse over a portion of CSXT system that is not a portion that the TPIRR replicates, and are interlined between the TPIRR and CSXT. Internally rerouted movements move over a different route than historically used by CSXT but do so more economically and efficiently on the TPIRR.[21] Single-line, interline, and cross-over movements may be internally rerouted over portions of the TPIRR.

The procedures used to calculate the revenues associated with each movement type are detailed below and are based on data made available by CSXT during discovery.

i. Single-Line Movements

In 2012, the last full calendar year of actual traffic data available, the TPIRR will handle approximately 234,026 carloads of general freight, 184,775 carloads of coal, and 351,079 intermodal containers/trailers in single-line service, i.e., service in which the TPIRR carries the unit completely from origin to destination.[22] TPIRR revenue from single-line movements was developed assuming that 100 percent of the CSXT revenue will accrue to the TPIRR.

ii. Interline Movements

In 2012, the TPIRR will handle approximately 368,361 carloads of general freight, 90,146 carloads of coal traffic, and 450,805 containers in interline service, i.e., a movement that involves at least one interchange with a railroad other than CSXT and where TPIRR handles the entire movement between the same two stations as CSXT.[23] TPIRR revenue from these interline

[21] It must be remembered that the most efficient way to transport a unit does not necessarily invoke the shortest route given the economies of density inherent in the railroad industry.
[22] *See* e-workpaper "Revenue Summary Final.xlsx."
[23] *Id.*

movements was developed assuming that 100 percent of the CSXT revenue will accrue to the TPIRR.

iii. Cross-Over Movements

TPI has included cross-over traffic in the SARR traffic group consistent with the underlying objectives for which cross-over traffic has become an "indispensable" part of the SAC test.[24] Specifically, TPI's use of cross-over traffic keeps the SAC analysis focused on the portion of the CSXT system that is needed to transport the issue traffic, while permitting the TPIRR to achieve the same economies of scale, scope, and density as the real-world CSXT without expanding the SARR to an ever larger and more complex system. In the following subparts, TPI reviews the reasons why the Board has concluded that cross-over traffic is indispensable, explains how TPI's use of cross-over traffic is consistent with those reasons, and explains why the Board's concerns in *Ex Parte 715* do not warrant any restrictions upon cross-over traffic in this case.

(1) Cross-over Traffic is an Indispensable and Well-established Device for Simplifying What the Board Itself has Described as a "dauntingly" Complex, Long and Expensive SAC Analysis

The SAC methodology is a "dauntingly large and detailed task" due to its complexity, length, and expense.[25] When the Board's *Coal Rate Guidelines* decision was affirmed on appeal, these concerns were clearly on the mind of the Court. In a concurring opinion, Judge Becker cautioned:

> Although I join the majority in upholding the Commission's adoption of Stand Alone Cost modeling within its guidelines, I also write separately to identify the serious problems that I see developing if the Commission does not effectively minimize the costs incurred by shippers in challenging the carrier's rates (either through a Stand Alone Cost model or through any

[24] *See WFA/Basin I*, slip op. at 11.
[25] *See PSCo/Xcel I* at 603.

> other Constrained Market Pricing constraint) and maximize the discovery available to them when doing so. The shippers argue forcefully that rate challenges will be frustrated by the complexity of the Commission's inhospitable rules and procedures. Because I agree that rules and regulation that produce such futility would violate the shipper's statutory right to challenge rates, I write to note my belief that future courts may have to set aside the rules if the Commission does not resolve these problems.[26]

The SAC process has only become more complex since Judge Becker expressed those concerns. Cross-over traffic is one of the most important tools that the Board has adopted to make the SAC process more manageable and less costly.

The use of cross-over traffic in the SAC analysis has been well-established precedent for nearly 20 years. It was founded upon basic SAC principles and the need to ensure effective access to regulatory remedies through a manageable SAC process. The Board first approved the use of cross-over traffic in *Nevada Power II*, because excluding cross-over traffic "would weaken the SAC test" by "depriv[ing] the SARR of the ability to take advantage of the same economies of scale, scope and density that the incumbents enjoy over the identical route of movement." [27] The SAC analysis attempts to replicate a contestable market,[28] which is one of two economic theories that are central to the principle of constrained market pricing that is at the core of the SAC analysis.[29] "A contestable market is one into which entry is absolutely free and exit absolutely costless where the new entrant suffers no disadvantage relative to the incumbent."[30] If the SARR may not select from the same traffic that is available to the incumbent, including cross-over traffic, then the SAC analysis cannot truly replicate a contestable market because the SARR suffers a disadvantage relative to the incumbent.

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[26] *Consol. Rail Corp. v. U.S.*, 812 F.2d 1444, 1457-58 (3d Cir. 1987) (Becker, J. concurring in part and dissenting in part).
[27] *See Nevada Power II* at 265, n. 12.
[28] *Id.* at 266.
[29] *See Coal Rate Guidelines* at 525 and 528-529.
[30] *See Nevada Power II* at 266, citing *Guidelines* at 528.

Moreover, the SARR may replace a subset of the incumbent's products or services, including a subset of the incumbent's service for the traffic that the SARR selects, *i.e.*, cross-over traffic, because contestable market theory holds that an entrant into a market need not replace the incumbent in its entirety.[31]

In 2004, ten years after *Nevada Power II*, the STB observed that "[t]he use of cross-over traffic to simplify the SAC presentation is a well-established practice."[32] The STB identified multiple reasons why cross-over traffic is both necessary and desirable, all of which remain true today.

First, the Board observed that "[p]ermitting [the complainant] to use cross-over traffic in its SAC presentation...keeps the SAC analysis properly focused on the core inquiry—whether the defendant railroad is earning adequate revenues on the portion of its rail system that serves the complaining shipper."[33] "Creating a SARR to serve the same traffic group without using the cross-over traffic device would dramatically enlarge the geographic scope of a SARR" by requiring a complainant to build a SARR capable of handling the cross-over traffic from its origin to its destination, thus including far more facilities than those needed to handle the issue movement.[34] Instead of focusing upon the portion of the defendant's rail system that handles the issue traffic, a SARR would become many multiples larger by broadening its size and scope to accommodate traffic other than the issue movements.[35]

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[31] That subset of services can take two forms. The SARR may choose to carry any subset of traffic on a particular line segment and it may choose to provide only a portion of the total service for the traffic it selects. In both cases, the SARR is choosing to serve a subset of the incumbent's relevant market, as contemplated by contestable market theory. The latter form specifically includes cross-over traffic. Thus, restricting cross-over traffic would violate the tenants of sustainability required for a contestable market. *See* Baumol, William J., John C. Panzar, and Robert D. Willig, "*Contestable Markets and the Theory of Industry Structure*," New York, Harcourt Brace Jovanovich (1982) ("Baumol, Panzar and Willig") at page 197.

[32] *See PSCo/Xcel I* at 601 (citations omitted) (underline added).

[33] *Id.*

[34] *Id.*

[35] *See*, e.g., *PSCo/Xcel I* at 601 (the 400 mile *PSCo/Xcel* SARR would need to be 10 times larger to serve the

Second, the Board correctly observed that expanding a SARR will not eliminate cross-over traffic, but simply create new groups of cross-over traffic.[36] Because each extension of a SARR to originate and/or terminate one group of cross-over traffic would create a new group of cross-over traffic over the added line segments, a shipper would have to extend its SARR even further "to generate the same economies of density" that the defendant railroad enjoys over the newly-extended SARR. This would quickly become a "cascading analysis [that] could result eventually in a complainant having to replicate almost all of [the defendant's] system. The scope and complexity of the proceeding would expand exponentially."[37]

Third, as an extension of the preceding two principles, the Board concluded that:

> The use of cross-over traffic thus provides a reasonable measure of simplification that allows SAC presentations to be more manageable. Curtailing the geographic scope of the SARR greatly simplifies the operating plans that must be developed, thus limiting the complexity of what is nevertheless still a dauntingly large and detailed task. Without cross-over traffic, captive shippers might be deprived of a practicable means by which to present their rate complaints to the agency.[38]

In *PSCo/Xcel I*, the Board observed the following consequences from expanding a SARR to originate and/or terminate cross-over traffic:

> While the WCC is a relatively small and straight-forward SARR, the parties had to produce, and the Board analyze, dozens of volumes of evidence on the costs associated with acquiring the land, designing, building, and operating this short SARR (approximately 400 route-miles). It is difficult to imagine the amount of materials that would have to be produced and analyzed to put together the evidence needed to design a railroad 10 times larger. The number of disputed issues would also escalate, and the operating plans and computer simulation models would become so complicated as to risk being intractable.[39]

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destinations); *Nevada Power II* at 263 (the 1,400 mile SARR would double to 2,800 miles).

[36] *See PSCo/Xcel I* at 602.

[37] *Id.*

[38] *Id.* at 603.

[39] *Id.* at 602-603.

Based upon these prior Board observations, any restrictions upon the use of cross-over traffic either would increase SARRs exponentially or deny a shipper any regulatory remedy at all because the cost and complexity of the SAC analysis will have become so overwhelming that it would not be practical for a shipper to pursue its remedies.

The Board very recently held that both of these consequences (*e.g.*, an expanded SAC analysis or an impractical rate-review process) are unacceptable, and reaffirmed its rationale for using cross-over traffic as a modeling device:

> [T]his device has become an indispensable part of administering a workable test. Without cross-over traffic, the SARR would need to replicate the entire service provided by the defendant railroad for all of the traffic included in the SAC analysis.... Such an expanded SAC analysis, however, could be impracticable and would not allow us to meet our regulatory objectives, and we must guard against the SAC process becoming so complex and expensive as to deny captive shippers meaningful access to the rate review provided for under Guidelines.[40]

The Board adopted the cross-over traffic device within the context of unit train coal SAC cases that, although very complex and expensive in their own right, pale when compared with the cost and complexity of carload SAC cases such as TPI's. Thus, if anything, the justifications for cross-over traffic in the foregoing Board precedent apply to an even greater magnitude in this proceeding.

(2) TPI Has Used Cross-over Traffic Consistent With Board Precedent

TPI's use of cross-over traffic in this proceeding is consistent with each of the three foregoing reasons why the Board consistently has held that cross-over traffic is both necessary and desirable.

[40] *See WFA/Basin I*, slip op. at 11 (emphasis added) (footnote omitted); *see* also, *PSCo/Xcel I* at 603 ("Without cross-over traffic, captive shippers might be deprived of a practicable means by which to present their rate complaints to the agency...[which] would be contrary to the policy directives set by Congress....").

First, TPI has designed its SARR to focus on the core inquiry of whether CSXT is earning adequate revenues on the portion of its rail system that is required to serve the issue traffic. This means that the TPIRR is comprised almost entirely of the main line and branch line segments required to transport the issue traffic, and little more. On those lines, TPI has built only the facilities necessary to provide the service required by the SARR's chosen traffic group that moves over those line segments. Yet, even with this limited focus, the TPIRR still is the second largest SARR ever presented in a SAC case, at 7,357 route miles.[41] But, if the TPIRR were required to build the line segments needed to provide complete end-to-end service for its cross-over traffic, the TPIRR would more than double in size and would quickly become the size of CSXT's entire system. Two separate exhibits illustrate this fact.

Exhibit III-A-6 shows the TPIRR system overlaid on top of the real-world CSXT system. There are many mainline gaps in the CSXT system that the TPIRR does not replicate, but that are part of the route for cross-over traffic. For example, although the TPIRR does not replicate the CSXT line between Cincinnati, OH and Richmond, VA, it handles cross-over traffic beyond one or both of those points. The same is true for traffic between Orangeburg, NY and Baltimore, MD; Montgomery, AL and Waycross, GA; Marion, OH and Laurens, SC; Grafton, WV and Cumberland, MD; and Pembroke, NC and Waycross, GA, among others. Without cross-over traffic, TPI would have to expand the SARR thousands of miles across those segments, and others, to achieve the same economies of scale, scope and density as the real-world CSXT on the SARR lines required to serve the issue traffic. TPI's use of cross-over traffic, therefore, keeps the SAC analysis properly focused on the portions of the CSXT system that are needed to serve the issue traffic.

[41] The largest SARR has been presented by DuPont in STB Docket No. NOR 42125, *E.I. du Pont de Nemours and Company v. Norfolk Southern Railway Company*, which currently is pending before the Board.

Exhibit III-C-5 also shows the TPIRR system overlaid on top of the real-world CSXT system, and shows the additional line segments that would be required to provide only the local-train service for cross-over traffic, *i.e.*, this analysis does not consider the segments that would be required to provide line-haul service from end-to-end. The TPIRR operates all local trains that are required to provide end-to-end service for the issue traffic, as well as all other local trains that handle non-issue traffic and operate entirely within the geographic footprint of the TPIRR, for a total of 42,208 trains in the base year. However, there are an additional 27,829 local trains whose real-world routes would take them on- and off-SARR (often multiple times) to provide terminal service for non-issue traffic. It would be impractical and inefficient for the TPIRR to interchange those local trains with the residual CSXT as they move on- and off-SARR.[42] But, if the TPIRR were to provide complete local-train service for the traffic moving on those 27,829 trains, it would have to add more than 6,000 route miles to the TPIRR, which would increase the SARR's route miles by more than 80 percent. Those additional segments are shown in green on Exhibit III-C-5. Therefore, to keep the SAC analysis focused on the portions of the CSXT system that are required to serve the issue traffic, while also providing the most efficient local service for non-issue traffic, the TPIRR handles this non-issue traffic as cross-over traffic that it interchanges with the residual CSXT at the same yards where CSXT itself switches that traffic between line-haul trains and local trains.[43] This enables the residual CSXT to provide the same single-line local-train service that this non-issue traffic receives today.

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[42] {{ [redacted] }}

[43] For a small group of 122 local trains in the base year that handle issue traffic, the TPIRR will provide all of the local service up to a SARR end-point near the issue traffic destination, where it will interchange the train with

Second, if TPI were to expand the TPIRR to handle the local trains that originate and terminate the current group of cross-over traffic, that would not eliminate either the line-haul or local train cross-over traffic, but merely create new groups of line-haul and local cross-over traffic that the TPIRR would need to interchange with the residual CSXT en route. To achieve the same economies of scale, scope, and density as CSXT on the added line segments, the TPIRR would need to handle cross-over traffic that moves in trains that traverse other lines that would not be part of the SARR. To eliminate this second group of trains moving cross-over traffic, even more extensions of the SARR would be required. Each extension would create an entirely new group of cross-over traffic that would require even more extensions, until the SARR replicated the entire CSXT system. For example, Exhibit III-C-5 shows that just the first step in this cascading effect for just local trains would expand the TPIRR by over 6,000 route miles. Similar cascading extensions of the TPIRR would be required for line-haul trains. Consequently, it is impossible to eliminate cross-over traffic and still permit the TPIRR to achieve the same economies as CSXT without replicating the entire CSXT system. This is yet another reason why the Board has found cross-over traffic to be essential to the SAC analysis.

Third, TPI's use of cross-over traffic provides a reasonable measure of simplification that allows its SAC presentation to be more manageable by limiting the complexity of this already dauntingly large and detailed TPIRR operating plan. Presenting a SAC analysis for carload traffic, even with the cross-over traffic device, is far more daunting and detailed than the coal unit-train SAC presentations that the Board found so complex when it first adopted the cross-over traffic device. The operating plan is more complex and the size of the SARR must be so much greater just to accommodate the multiple origins and destinations of the issue traffic.

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the residual CSXT to complete the local service at more distant locations.

Moreover, carload shippers, like TPI, have been unable to pursue large rate case regulatory remedies for nearly 30 years because the time, cost, and complexity of the SAC standard has placed the economics of litigation out of reach due to the unique characteristics of carload traffic, including lower traffic volumes, constantly shifting customers, and an exponentially greater number of origin-destination pairs. Only the abuse of market power by railroads to impose enormous rate increases on carload traffic in recent years has brought those economics within reach of carload shippers, while simultaneously rendering the need for rate relief that much greater.[44] However, if the Board were to restrict the use of cross-over traffic in these cases, TPI would be deprived of a practical means by which to present its rate complaint to the agency because the SAC process will have become so impracticable, complex, and expensive that the pursuit of regulatory rate remedies would be futile.[45] Such a result would be contrary to Congressional intent and would implicate the concerns raised by Judge Becker, in the judicial affirmance of *Guidelines*, that future courts may have to set aside the SAC standard if its complexity and cost render regulatory remedies futile in violation of a shipper's statutory right to challenge rates.

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[44] *See* "Opening Market Dominance Evidence of Total Petrochemicals USA, Inc.," Ex. II-B-7 (filed May 5, 2011) (showing the enormous CSXT rate increases for the issue traffic over the three (3) years prior to TPI filing its Complaint).

[45] That process already has become far longer and more costly than TPI reasonably anticipated at the start of this case due to the Board's decision to bifurcate market dominance and rate reasonableness just four weeks before TPI was scheduled to submit its opening evidence. As a consequence of the decision itself and its timing, TPI has incurred the cost of preparing SAC evidence twice and suffered the costs of paying a tariff premium to CSXT during the ensuing two years that was required for the submission of bifurcated market dominance evidence and for the Board to issue its market dominance decision.

(3) The Board's Reservations With The Use of Carload and Multi-carload Cross-over Traffic are Both Misplaced and Inapplicable to the TPIRR

In *Ex Parte 715 Decision*, the Board recently expressed "reservations about the growing use of carload and multi-carload cross-over traffic in Full-SAC cases."[46] These reservations are predicated upon the following observations:

> There is a disconnect between the hypothetical cost of providing service to these movements over the segments replicated by the SARR and the revenue allocated to those facilities. When 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. As such, the "cost" to the SARR of handling this traffic would be very low. In recent cases, litigants have proposed SARRs that would simply hook up locomotives to the train, would haul it a few hundred miles without breaking the train apart, and then would deliver the train back to the residual defendant. All of the costs of handling that kind of traffic (meaning the costs of originating, terminating, and gathering the single cars into a single train heading in the same direction) would be borne by the residual railroad. 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. As a result, the SAC analysis appears to allocate more revenue to the facilities replicated by the SARR than is warranted.[47]

Despite its reservations, the Board declined to adopt proposed restrictions on such cross-over traffic because of its utility in SAC cases. The Board's reservations, however, are both misplaced and inapplicable to the TPIRR.

The above expression of concern by the Board is misplaced for two principal reasons.

First, the fundamental premise of the Board's reservations as expressed in the underlined sentence above—that there may be a "disconnect" between the SARR's "hypothetical cost" of handling such cross-over traffic and "the revenue allocated to those facilities" by the ATC methodology—is flawed. The Board never intended any connection between cross-over revenue

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[46] *See Ex Parte 715 Decision* at 27.
[47] *See Ex Parte 715 Notice* at 16 (italics in original; underline added).

allocations and the SARR's operations, because revenue divisions are calibrated based on the incumbent railroad's relative cost to provide service over segments traversed by the cross-over traffic. The Board clearly explained this in *Major Issues* and *WFA/Basin II.* In *Major Issues,* the Board explained that ATC estimates the incumbent's cost of service over each line segment, and allocates revenues to those segments based on the incumbent's relative costs for each segment.[48] The Board clarified that ATC should use the incumbent's traffic density over each line segment, not the SARR's density and that "the objective of ATC is to reflect the defendant carrier's relative costs of providing service over the relevant segments of its network."[49] Thus, ATC revenue allocations are intended to reflect the incumbent railroad's cost of operating over the line segments replicated by the SARR, and any attempt to create a connection with the SARR's operating costs would be a departure from both precedent and the theory upon which ATC is based.[50]

Second, ATC's allocation of cross-over revenue based upon the incumbent's costs produces fair and compensatory revenue allocations, as the Board intended in *Major Issues*. In *Ex Parte 715 Notice*, however, the Board incorrectly assumes that the "disconnect" between ATC and the SARR's costs creates a shipper bias in the cross-over revenue allocation. This alleged bias appears to relate to two separate activities: origin/termination switching and intra- and inter-terminal ("I&I") switching. But, because ATC is designed to reflect the incumbent's cost of service over the on-SARR and off-SARR segments, it allocates additional revenue to

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48 *See Major Issues,* slip op. at 34.

49 *See WFA/Basin II*, slip op at 13. (underline added).

50 The Board's attempt to align the ATC revenue divisions with the SARR's operations also is at odds with the long-held view that the SARR does not need to be another railroad. *See Guidelines* at 543. This understanding was one of three explanations that the Board provided in *WFA II* for using the incumbent's densities rather than the SARR's. *See WFA/Basin II* at 14. Because the SARR does not need to be another railroad, how the SARR runs its operations is immaterial to the division of cross-over revenue under the ATC methodology.

whichever entity (*e.g.*, the SARR or the residual incumbent) performs those services. Thus, in neither scenario is there a shipper bias.

There is no bias with respect to origin/termination switching because the purpose of ATC is to reflect the incumbent's relative average costs of providing service over the on-SARR and off-SARR segments, including all "costs of originating, terminating, and gathering the single cars into a single train heading in the same direction." Therefore, if the incumbent performs more costly origin and termination switching of cross-over traffic on the off-SARR segment, URCS assigns additional costs to those segments, which means that ATC assigns additional cross-over revenue to the residual incumbent. Conversely, if the SARR performs more costly origin and termination switching of cross-over traffic on the on-SARR segment, URCS assigns appropriate costs to those segments, which means that ATC assigns additional cross-over revenue to the SARR in that case. ATC is designed to be revenue neutral, regardless of which segments are replicated by the SARR. Thus, contrary to the Board's assumption in *Ex Parte 715 Notice*, ATC allocates revenue to both the SARR and the residual incumbent based on the origin and termination services each performs, and the costs the residual incumbent incurs to do so in the real world.

There also is no bias with respect to I&I switching. URCS assigns I&I switching costs on a system-average basis in 200-mile increments, rather than to actual movements where such switching occurs, based upon the assumption that I&I switching occurs on average every 200 miles for non-trainload traffic. While this assumption creates imprecision, it does not create bias, because this imprecision can work equally in favor of the SARR or the residual incumbent. Thus, there is no basis to conclude that the ATC methodology systematically fails to allocate sufficient revenue to the residual incumbent for the I&I switching that it performs.

Finally, and most importantly, the Board's reservations expressed in *Ex Parte 715 Notice* simply are not present in this proceeding. The TPIRR is not a predominantly "hook-and-haul" railroad that leaves all of the origin/termination and I&I switching to the residual incumbent. The TPIRR provides I&I switching at numerous points throughout its system, including at 11 hump yards, and those costs are reflected in the SAC analysis. The TPIRR also provides origin/termination services for much of its carload traffic via 42,208 local trains that it operates in the base year. Even for those local trains that the residual CSXT operates, the TPIRR provides the services and facilities needed to switch cars between the local and line-haul trains.[51] Thus, the Board's reservations with carload and multi-carload cross-over traffic are not applicable to the TPIRR.

(4) ATC Calculations

Using CSXT's 2012 URCS variable and fixed costs, and the density and miles of each segment, TPI calculated CSXT's average total cost per segment for movements in 2012, the last full calendar year of traffic and density data provided by CSXT. The development of the variable- and fixed-cost components are discussed below.

(a) Variable Costs

Variable costs were calculated for both the TPIRR segment ("on-SARR") and the residual CSXT segment ("off-SARR") of each cross-over movement in the TPIRR traffic group based on 2012 statistics, the most current full calendar year of data made available by CSXT. The Board has historically released its URCS costing models for a particular year approximately 11 to 12 months after the close of the year. For example, documentation on the Board's website shows the 2009, 2010, and 2011 URCS models were released in November of the following

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[51] As noted in the preceding section, the carload cross-over traffic that the TPIRR does not originate and/or terminate would require an enormous expansion of the TPIRR beyond the facilities needed by the issue traffic and its operations would be far more complex to model. *See also* TPI Op. Ex. III-C-5.

year.[52] However, because of the adjustments made to the BNSF's 2012 Annual Report Form R-1 due to its acquisition by Berkshire Hathaway, the Board has delayed the issuance of its 2012 URCS costing models for all railroads until early February 2014. Because the STB has delayed the issuance, TPI developed the CSXT 2012 URCS variable costs using an URCS model based upon the STB's programs and procedures.

TPI used this model to develop the URCS Phase III variable costs for both the on-SARR and off-SARR segments. TPI began the process by developing the variable costs for the entire CSXT movement. TPI next developed the variable costs for the TPIRR portion of the movement. TPI then subtracted the variable costs for the TPIRR portion of the movement from the variable costs for the entire CSXT movement to develop the variable costs for the residual CSXT.[53]

Variable costs for individual movements for both the entire CSXT movement and the TPIRR segment were developed using the nine URCS Phase III inputs identified in *Major Issues* (a tenth input, intermodal plan code, was developed for container and trailer traffic) and were extracted from a combination of waybill and car-event data (and related information) provided in discovery. Each input value, and its derivation, is discussed below.

(1) **Railroad** -- Consistent with STB precedent, TPI used the 2012 CSXT Phase III URCS model to develop variable costs for the entire CSXT movement and the TPIRR portion of each cross-over movement.[54]

(2) **Commodity Code** -- TPI identified each shipment's 2-digit Standard Transportation Commodity Code ("STCC") from waybill data provided in discovery. Where the waybill data did not identify a STCC for a particular movement, a proxy STCC 46, "All Other Mixed Shipments" was used.

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52 *See* URCS Uniform Rail Costing System, http://www.stb.dot.gov/stb/industry/urcs.html (follow URCS Substitutions document hyperlinks) (last visited Feb. 14, 2014).

53 Such an approach is feasible because Board precedent requires the removal of interchange related costs when developing ATC percentages.

54 *See Major Issues* at 26.

(3) **Railcar Ownership** -- Railcar ownership was developed from waybill and equipment data provided in discovery. Where a railcar's ownership information was not included in CSXT equipment data, TPI assumed a shipper supplied railcar. TPI believes this is a logical assumption as CSXT should know whether it provided one of its own railcars for a movement.

(4) **Railcar Type** -- Railcar type was developed from waybill and equipment data provided in discovery. Where a railcar's AAR car type was not included in the CSXT equipment data, a railcar type of "17," or "All Other Freight Cars," was used as a proxy if the shipment was a carload shipment, and railcar type "11," or "Intermodal Flat Car," was used for all proxy intermodal movements.

(5) **Shipment Size** -- The number of units per shipment was identified from the car and container waybill data provided in discovery.

(6) **Shipment Type** -- The shipment type was based on the number of units per shipment included in the waybill data provided in discovery, and followed standard STB variable-costing procedures. Shipments with 5 units or less were costed as single carload shipments. Shipments with 6 to 49 units were costs as multi carload shipments, and movements with more than 50 carloads were costed as trainload shipments.

(7) **Movement Type** -- Movement type, or whether the railroad originated or received, and delivered or terminated a shipment, was developed from waybill and car event data produced in discovery. Specifically, for the CSXT portions of the movement, CSXT was assumed to originate and/or terminate the movement if the AAR Rule 260 code included in waybill data equaled "712."[55] A Rule 260 Code not equaling "712" indicates CSXT was not the originating and/or terminating railroad and the movement was designated received and/or delivered, respectively.[56]

For the TPIRR portion of the movement, TPI used the same movement type category as the CSXT movement where the TPIRR replaced the CSXT at the origin and/or destination. Where the TPIRR received the shipment from or delivered the shipment to CSXT as part of a cross-over movement, TPI assigned a movement type of received and delivered, respectively. TPI also removed the interchange costs from the URCS variable costs when TPIRR

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[55] Data provided in discovery by CSXT stated that the Ultimate Origin FSAC and Ultimate Destination FSAC included in the CSXT waybill data consisted of a combination of 3-digit Railroad Rule 260 code and 6-digit freight station accounting code.

[56] The waybill data provided in discovery included a field named "Traffic Class," which indicated the type of movement. However, there were numerous instances where data was missing from this field, or this field had codes not decoded by CSXT. Since all waybill data included the Rule 260 information, TPI chose to use the more consistent data to develop this input.

received and/or delivered a shipment to the CSXT consistent with Board precedent.[57]

(8) **Movement Miles** -- TPI developed mileage statistics from waybill and car event data provided in discovery. For the entire CSXT railcar movement, car/container/trailer miles were developed by summing the car-miles included in the car event data along the actual route of each movement.[58]

Where railcar event data was not available for the shipment or the railcar event data did not provide mileage statistics, proxy miles were developed from similar traffic. Specifically, where railcar/containers/trailers moved under the same waybill as other railcar/containers/trailers, the average miles for the other units moving on the same waybill were used. If the shipment did not move on the same waybill as other movements, proxy miles were developed based on the average miles for other railcar/containers/trailers moving between the same CSXT origin and CSXT destination as indicated on the railcar's waybill. Finally, if use of the CSXT origin and CSXT destination did not produce a feasible mileage proxy, proxy miles were developed based on the shipments ultimate origin and ultimate destination as indicated in the waybill data.

TPIRR miles were developed using a similar methodology of summing the car-miles over TPIRR routes identified in the railcar event data. However, as explained in greater detail in Part III-C, there were numerous instances where TPI chose to not move a particular piece of traffic over a CSXT route replicated by the SARR, and instead chose to let CSXT handle the local portion of the movement. In all cases, this was done to maximize the efficiency of the TPIRR and CSXT portions of crossover-traffic movements and ensure high levels of service for TPIRR shippers. Therefore, TPIRR miles were developed by summing the car mileage data from the car-event data for segments that were identified as traversing the SARR and moving on SARR trains. Where SARR-miles could not be identified from the car-event data, proxies were developed using the same approaches used to develop the proxy miles for the full CSXT movement, i.e., proxies based on railcars moving on the same waybill, between the same CSXT origins and destinations, or the same ultimate origins and destinations.

(9) **Tons Per Shipment** -- TPI developed tonnage statistics from waybill data provided in discovery. For both the CSXT and TPIRR movements in railcars, average tons per car were extracted from the car waybill data. Where tonnage data was not included in the waybill data, proxy tons were developed from similar movements. Where railcars moved under the same waybill as other railcars, the average tons per car for the other railcars moving on the same

[57] *See AEP Texas II* at 13.
[58] To ensure only loaded miles were captured, TPI only summed miles when the lading miles were greater than zero (0).

waybill were used. If the shipment did not move on the same waybill as other movements, proxy tons were developed based on the average tons per car for other railcars moving between the same CSXT origin and CSXT destination as indicated on the railcar's waybill. Finally, if use of the CSXT origin and CSXT destination did not produce a feasible tonnage estimate, proxy tons were developed based on the shipments ultimate origin and ultimate destination as indicated in the shipment's waybill data.

Tonnage for intermodal movements was developed by summing the gross tonnage for each container or trailer included in the intermodal waybill shipment data and moving on the same railcar. Such a combination is consistent because in costing intermodal movements, it is the cost per railcar that is being developed in the URCS model. The resultant cost is then divided by the number of units on the railcar to develop the variable cost per unit. Therefore, the sum of the gross tons of the units on a railcar equals the railcar's lading tons. TPI did not need to develop proxy tons for intermodal traffic since intermodal waybill data listed valid weight statistics in all cases.

(10) **__Intermodal Plan__** -- TPI also developed the intermodal plan for container shipments to go along with the standard nine (9) URCS inputs. TPI developed its intermodal plan code from CSXT plan code information included in the container waybill data.

(b) Fixed Costs

The fixed cost component of ATC requires the development of the following metrics for both the on-SARR and the off-SARR portion of each movement: 1) route density, and 2) fixed costs per route mile. Each metric is discussed below.

(1) **__Route Density__** -- The route densities for each movement included in the TPIRR traffic group, both on-SARR and off-SARR, were developed using the density data produced by CSXT in discovery. TPI requested that CSXT update the density data originally provided in the case so that TPI could reflect the most current data available. On October 17, 2013, CSXT updated the gross tonnage density statistics it develops in the normal course of its business, but also included net tonnage density data it developed as part of an unrequested special study.[59] CSXT alleges that use of the gross tonnage data could lead to overstatements of gross tonnages on individual segments because the tons may reflect traffic that traverse only a small portion of the segment and not the full segment, especially around terminal areas. CSXT claims that given the alleged limitations of the gross tonnage density data, it performed its own special study to develop net tonnage calculation for each segment. This special study went well beyond the

[59] A copy of the letter included with the discovery production is included in TPI's e-workpapers at "October 17, 2013 Sidley Letter.pdf."

scope of the parties' agreement for updating discovery responses. Rather than merely updating its prior discovery response with the most current versions of the same density data previously produced, CSXT created all new data through a special study. For that reason alone, CSXT's special study should be rejected.[60] TPI, however, analyzed the special study and determined that it could provide more accurate density information provided that certain flaws are corrected.

TPI reviewed CSXT's special study of net density data, and found that it suffers from a similar flaw to the normal course of business gross density data originally provided in the case. While use of the gross tonnage data may lead to an overstatement of tonnage on a particular segment, CSXT's special study can lead to an extreme understatement of net tons on segments, especially long segments, where traffic only moves a short distance on the segment. {{[redacted]}}. The disconnect in tonnage statistics is due to the length of haul each shipment has on the segment and the overall length of the segment.

The subject segment terminates in CSXT's Grand Rapids, MI yard at MP CGE 0.0. {{[redacted]}}. This density calculation is clearly erroneous and is wholly due to traffic nicking a small portion of the segment as it passes through a yard.

CSXT's special study is also flawed because it takes into consideration only CSXT traffic moving on the line and disregards foreign traffic entirely. {{[redacted]}}. CSXT's exclusion of the foreign traffic leads to a severe understatement of the segment density. In addition, while CSXT's gross tonnage density charts take into consideration all the lines over a certain route segment (first main, second main, etc.), it appears CSXT's special study density only takes into consideration certain line segments between mileposts and not all rail lines on the route segment.

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[60] A special study that CSXT did not previously perform is a new discovery response, rather than an updated response. Even if the special study contained more accurate data, it would be procedurally unfair for CSXT to selectively choose which discovery requests to supplement with new information in this manner, because CSXT arbitrarily could choose to do so only for information it deems helpful to its case while ignoring information that would benefit TPI.

[61] *See* e-workpaper "CSXT Segment Ton-Miles from Car Event Data.xlsx," which was produced in discovery by CSXT on October 17, 2013.

To rectify the understatement of tonnage on certain line segments, TPI used a combination of the net and gross tonnage data provided by CSXT in discovery to develop its tonnage statistics. Where CSXT's net tonnage statistics severely understated the net tons moving over a line segment due to failing to take into foreign traffic moving on a segment, or did not consider other lines, TPI adjusted the gross tonnage data to reflect the actual net tons operating on the line segment.[62] This produced a reasonable estimate of the average net tons per line segment.

(2) **<u>Fixed Cost Per Route Mile</u>** -- TPI calculated the CSXT fixed cost per route mile by subtracting CSXT's 2012 total system variable costs from CSXT's 2012 total costs as developed in URCS. Specifically, TPI developed average fixed cost per route mile for track which CSXT owns, and for track which CSXT operates over via trackage rights.

TPI calculated fixed cost per route mile for CSXT owned track by first calculating the "above the wheel," and "below the wheel" fixed cost from CSXT's 2012 URCS variable costs.[63] Next, TPI divided the fixed costs by the total CSXT route miles to develop the average fixed cost per mile. In prior cases, system route miles were developed from Schedule 700 data included in the incumbent railroad's Annual Report Form R-1. However, in this proceeding TPI found that the route miles included in CSXT's net ton density data were significantly different than the route miles reported in CSXT's 2012 Annual Report.[64] Since CSXT's net tonnage statistics were developed based on the miles included in the net density table, TPI used the route miles included in the CSXT density data to develop the fixed cost per mile to maintain a consistent cost basis.

TPI also developed different route mileage statistics depending upon whether it was used to develop "above the wheel" or "below the wheel" fixed cost per mile. Specifically, "below the wheel" costs were divided by the miles of CSXT owned track to develop a cost consistent with CSXT's fixed cost of track ownership. "Above the wheel" fixed costs were divided by total CSXT miles operated to develop a cost consistent with the fixed cost of CSXT train and overhead operations.

TPI developed the average fixed cost of operating over CSXT owned track by adding together the "above the wheel" and "below the wheel" fixed cost per mile. TPI used the "above the wheel" fixed cost per mile on segments where CSXT operates via trackage rights. In this way, TPI ensured CSXT's fixed cost of operations were covered, but not the cost associated with track ownership.

(3) **<u>Fixed Cost Per Unit</u>** -- TPI developed the fixed cost per unit using the following process. First, TPI developed the average fixed cost per route mile for the TPIRR

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62 *See* e-workpaper "2012 Fixed Cost Per Mile By Segmentv4.0.xlsx."

63 *Id.*

64 CSXT's density data indicates 21,848 operating route miles while CSXT's Schedule 700 shows 20,470 operating route miles.

and CSXT portions of each movement by calculating the average fixed cost per net ton for each line segment. TPI began this process by classifying each line segment as either CSXT owned or CSXT operated based on data provided in discovery and on publicly available sources. Next, TPI multiplied the route miles for each segment as indicated in the CSXT density data by the appropriate fixed cost per route mile to develop each segment's total allocated fixed costs. TPI then divided the segment's allocated fixed costs by the net tons operating on the segment to develop an average fixed cost per ton for each segment.

Second, to calculate the average fixed costs per unit, TPI used 2012 CSXT car event data provided in discovery to identify the on-SARR and off-SARR line segments each unit traversed. TPI then summed the average fixed cost per ton for each line segment on which the unit operated to develop a total fixed cost per ton for each movement.

As with the variable cost component, fixed cost for the residual CSXT on cross-over movements was developed by subtracting the fixed cost per unit for the TPIRR portion of the movement from the fixed cost per unit for the entire CSXT movement. The difference represented the fixed cost per unit for the residual CSXT.[65]

(5) ATC Allocations

The total CSXT revenues for each movement (including fuel surcharges) were then allocated in proportion to the average total cost of the movement on-SARR and off-SARR using the procedures adopted by the Board in *Ex Parte 715.* [66]

The ATC procedures require that the revenue allocated to both the TPIRR the residual CSXT do not fall below the CSXT's URCS variable costs for the movement over those segments. If the revenue allocation to either the on-SARR or off-SARR segment resulted in revenues falling below CSXT's URCS variable costs for that segment, the revenue allocation to the on-SARR or off-SARR segment was then raised to equal 100 percent of the CSXT's URCS variable costs of providing service over that segment. If the total revenue from the cross-over movement was below the total CSXT variable cost for the entire movement, revenue was

[65] As with the development of CSXT and TPIRR tons and car miles, there were instances where TPI could not develop fixed cost for a unit due to issues with the underlying data. In those instances, TPI developed proxy fixed costs by calculating the average fixed cost per ton for movements moving between the same origins and destinations.

[66] *See* e-workpaper "TPIRR ATC Divisions.xlsx."

allocated between the two cross-over segments to maintain the existing total R/VC ratio on both segments.[67]

In performing the calculations described above, TPI relied upon CSXT traffic data produced in discovery and on its train list and operating plan to identify the points on the TPIRR where cross-over traffic received on the TPIRR from CSXT would enter the TPIRR system, and where traffic destined for off-SARR delivery would leave the system.

The TPIRR revenue division ratios, developed as described above, were based on the 2012 traffic, i.e., final calendar year of actual data, and were applied to traffic moving in each year of the DCF model life, regardless of when the movement over the TPIRR starts or terminates.[68] A complete technical summary of TPI's ATC development process is included in TPI's workpapers.[69]

iv. Re-routes

TPIRR movements that were internally rerouted required a special procedure. Specifically, TPI identified the portion of CSXT revenue attributable to the actual on-SARR route of movement for these shipments and assigned that portion of total revenue to the TPIRR. Stated differently, the ATC calculations were based on real-world routes of movement, not the SARR reroutes. This was accomplished by calculating ATC divisions primarily using CSXT car movement records, which show the actual route of movement.

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67 *Id.*
68 *See AEP Texas II* at 13.
69 *See* e-workpaper "Development of Data For ATC Calculations.wpd."

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III. STAND-ALONE COST

B. STAND-ALONE RAILROAD SYSTEM

The evidence in this Part is sponsored by Richard H. McDonald, President of RHM Consulting, Inc., and Charles A. Stedman of L.E. Peabody & Associates, Inc. Their credentials are detailed in Part IV and summarized herein. Mr. McDonald has over 40 years of experience in the railroad engineering and operations fields, primarily at the former Chicago and NorthWestern ("CNW") which is now part of the Union Pacific Railroad Company ("UP"). Mr. McDonald began his railroad career in 1958 at the New York Central Railroad, where he held positions as Assistant Engineer, Roadmaster and Division Engineer (for both the New York Central and Penn Central). In 1974, Mr. McDonald left Penn Central and joined CNW, where he held several positions of increasing responsibility in the Engineering and Operating Departments including Assistant Division Manager-Engineering and later Division Manager at St. Paul, MN, Vice President-WRPI, Vice President-Operating Administration, Vice President-Transportation, Vice President-Operations, and Vice President-Planning & Acquisitions.

Mr. Stedman has over thirty (30) years of experience in solving economic, marketing, transportation, and fuel supply problems. He has directed and performed extensive analyses in the area of stand-alone costing, including route layout, design, and construction costs, as well as the development of detailed operating plans for various stand-alone railroads.

1. Route and Mileage

The TPIRR is an extensive system travelling through seventeen (17) states[1] (and the District of Columbia) that mimics much of the CSXT including:

1. Chicago, IL south to New Orleans, LA;
2. Chicago, IL southeast to Indianapolis, IN;

[1] Alabama, Florida, Georgia, Illinois, Indiana, Kentucky, Louisiana, Maryland, Mississippi, New York, North Carolina, Ohio, Pennsylvania, South Carolina, Tennessee, Virginia and West Virginia.

3. Chicago, IL east to Selkirk Jct., NY;
4. Selkirk Jct., NY south to Orangeburg, NY;
5. Fostoria, OH south to Marion, OH;
6. East St. Louis, IL east to Washington, DC;
7. Deshler, OH southwest to Nashville, TN;
8. Cincinnati, OH south to Stilesboro, GA;
9. Montgomery, AL north to Baltimore, MD
10. Nashville, TN southwest to Memphis, TN;
11. Parkwood Jct., AL east to Manchester, GA;
12. Nashville, TN south to Orlando, FL; and
13. Callahan, FL south to Oneco, FL.

The TPIRR includes 50 branch lines across its system. The TPIRR constructs all or part of 42 of these branch lines and eight (8) are operated utilizing trackage rights and joint facility agreements. These branch lines serve TPI issue locations, power plants and other industrial destinations, water/rail transfer terminals, and interchange locations. The TPIRR will operate a total of 7,356.91 route miles. Of this amount, the TPIRR will construct 6,865.94 miles and utilize trackage rights and joint facilities agreements for the remaining 490.97 miles. Exhibit III-A-1 is a schematic showing the TPIRR route including an identification of the TPI issue origins, destinations and interchange points. A complete listing of the TPIRR interchange locations, and the applicable carriers is included in TPI's yard matrix.[2]

The constructed route mileages for the TPIRR's main and branch line segments are summarized in Table III-B-1 below.[3] CSXT operating timetables and track charts, which were produced by CSXT in discovery, are the primary source documents used to identify the TPIRR route mileages.[4] Additional material used to develop the TPIRR route miles is also included in TPI's workpapers.[5]

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2 *See* e-workpaper "TPIRR Yard Matrix Opening Grading.xlsx."
3 *See* e-workpaper "TPIRR Route Miles Opening Grading.xlsx."
4 The track chart pdf files provided by CSXT in discovery, along with scanned versions of the hard-copy timetables provided in discovery, are included in TPI's electronic workpapers.
5 *See* the sub-directory "Additional Mileage Support" included in TPI's workpapers.

Table III-B-1
TPIRR Constructed Route Mileage

Segment (1)	Constructed Miles (2)
A. Main Line Segment Miles	
1. Chicago, IL to Buffalo, NY	532.90
2. Buffalo, NY to Selkirk, NY	299.84
3. Greenwich, OH to Alexandria Jct, MD	479.60
4. E. St. Louis, IL to W. Haley, IN	161.49
5. E. Haley, IN to Greenwich, OH	297.76
6. Chicago, IL to Nashville, TN	362.02
7. Deshler, OH to Nashville, TN	447.36
8. Baltimore, MD to Pembroke, NC	407.03
9. Nashville, TN to Memphis, TN	229.98
10. Nashville, TN to New Orleans, LA	614.38
11. Nashville, TN to Atlanta, GA	283.62
12. Montgomery, AL to Pembroke, NC	522.05
13. N. Union City, GA to Jacksonville, FL	331.19
14. Baldwin, FL to Orlando, FL	123.35
15. Callahan, FL to Oneco, FL	247.46
16. Chicago / Thornton Jct., IL - N. Hunt, IN	159.86
17. Parkwood Jct., AL - Manchester, GA	177.80
18. Howell Tower, GA - Belt Jct., GA	8.29
19. Marion, OH - Fostoria, OH	42.08
20. Latonia, KY - Junta, GA	433.87
21. Total Main Line Segment Miles	6,161.93
B. Main Line/Branch Line Miles	
1. Total Main Line Miles	6,161.93
2. Total Branch Line Miles	704.01
3. Total Constructed Route Miles	6,865.94

Source: e-workpaper "TPIRR Route Miles Opening Grading.xlsx."

The constructed route mileages shown in Table III-B-1 (and the additional trackage rights miles described above) include mileage only for the lines over which the TPIRR operates its own trains with its own locomotives and crews. The TPIRR's rail lines are shown in the stick diagrams for the TPIRR included in TPI's electronic workpapers.[6] The stick diagrams are the track charts for the TPIRR.

6 *See* e-workpaper "TPIRR Opening Stick Diagrams.pdf."

The TPIRR interchanges traffic with six (6) Class I railroads (UP, BNSF, CN, CP, CSXT, and NS) along with over 75 regional and short-line railroads with which CSXT actually interchanges today.[7]

2. Track Miles and Weight of Track

The TPIRR's track and yard configuration was developed by TPI's expert operating witnesses, Richard McDonald and Charles Stedman.[8] The system configuration was developed to accommodate the TPIRR's traffic group using several tools, including: (1) information provided by TPI Witness Lillis (and supported by data produced by CSXT) concerning the TPIRR's peak-year traffic volumes and flows, and the trains that will move over the TPIRR system in the peak week of the peak traffic year; (2) the detailed TPIRR operating plan developed by Mr. McDonald (assisted by Mr. Burris); (3) CSXT's operating timetables and track charts for the divisions and subdivisions involved; and (4) a simulation of the TPIRR's operations executed by Messrs. Fapp, Crowley, and Humphrey using the Rail Traffic Controller ("RTC") model, which has been accepted by the Board as an appropriate operational modeling tool in several previous rail rate cases.[9] The TPIRR stick diagrams contain detailed track diagrams for the entire TPIRR system.

The TPIRR's track miles are shown in Table III-B-2 below.[10]

[7] *See* e-workpapers "TPIRR Yard Matrix Opening Grading.xlsx" and "TPIRR Opening RR interchanges.xlsx."
[8] These witnesses' qualifications are detailed in Part IV.
[9] *See, e.g.*, *PSCo/Xcel I* at 613-614; *WFA/Basin I* at 15. A detailed explanation of the RTC Model simulation that was conducted in developing the TPIRR system configuration is set forth in Part III-C-2.
[10] *See* e-workpapers "TPIRR Route Miles Opening Grading.xlsx" and "TPIRR Yard Matrix Opening Grading.xlsx."

Table III-B-2
TPIRR Constructed Track Miles

Type of Track (1)	Constructed Miles (2)
1. Main line track	
a. Single first main track[1/]	6,865.94
b. Other main track[2/]	3,353.29
c. Total main line track	10,219.23
2. Helper pocket and setout tracks	136.10
3. Yard tracks (including interchange tracks)[3/]	1,467.19
4. Total track miles	11,822.52

[1/] Single first main track miles equal total constructed route miles including branch lines, but excluding yard tracks and the 490.97 route miles of trackage rights that are operating miles that the TPIRR does not construct.
[2/] Other main track equals total miles for constructed second and third main tracks and passing sidings.
[3/] Includes all tracks in yards, such as locomotive fueling tracks and car classification tracks.

a. Main Line

As shown in the TPIRR stick diagrams, the TPIRR's main line consists of sections of single main track and sections of multiple main track (including signaled passing sidings) sufficient to enable the TPIRR to move its peak period trains efficiently and without delay. The TPIRR has a total of 10,219.23 track miles of multiple main track/passing sidings.

All constructed main track and passing sidings in line segments carrying 20 million or more gross tons per year ("MGT") consist of new 136-pound continuous welded rail ("CWR"). Standard rail is used for all mainline track except that premium (head-hardened) rail is used on curves of three (3) degrees or more, where rail wear is heaviest. The main tracks in segments carrying less than 20 MGT (including all branch lines) consist of new 115-pound CWR.

All of the TPIRR's track and structures are designed to accommodate a gross weight on rail ("GWR") of 286,000 pounds per car and maximum train speeds of 60 mph, conditions permitting.

b. Branch Lines

As described above, the TPIRR will construct and/or operate fifty (50) branch lines. These branch lines are used to serve industrial facilities, origin coal mines, destination power plants, water/rail transfer terminals, and interchange points. The track configurations for these branches are shown in the TPIRR's stick diagrams.[11]

c. Sidings

The TPIRR's passing sidings are considered part of its main tracks in both main lines and branch lines and are discussed in Subparts a. and b. above.

d. Other Tracks

Other tracks include pocket tracks for helper locomotives and set-out tracks for bad order cars. Yard tracks (including interchange tracks) are discussed in the next section.[12]

i. Helper Pocket and Other Setout Tracks

The TPIRR has thirteen (13) helper districts as described in detail in Part III-C. Trains are helped in the specified direction and each helper district has helper pocket tracks at both ends of the district if no yard exists. These tracks are double-ended tracks, 850 feet in length (including turnouts).

In addition, one setout track is placed on each side of each of the TPIRR's Failed-Equipment Detectors ("FED"), as described in Parts III-C and III-F, with one FED on each track in areas with two main tracks. All of these setout tracks are single-ended tracks, 735 feet in length (including the turnout). This provides 600 feet in the clear to accommodate both the occasional bad-order car and the temporary storage of maintenance-of-way ("MOW") equipment.

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[11] *See* e-workpaper "TPIRR Opening Stick Diagrams.pdf."
[12] *See* e-workpaper "TPIRR Yard Matrix Opening Grading.xlsx."

The locations of the helper pocket and setout tracks are shown on the TPIRR stick diagrams.[13] They consist of 115-pound new CWR. The TPIRR has a total of 136.10 track miles for these tracks.

3. Yards

The TPIRR has a total of two hundred twenty-nine (229) yards. This total includes twelve (12) major yards (eleven of which are hump yards), sixty-eight (68) other yards (where some of the various activities identified below occur), nineteen (19) intermodal facilities, twenty (20) automotive facilities, twenty-three (23) bulk transfer facilities, and eighty-seven (87) additional interchange yards.[14] These yards are used for train staging, 1000/1500-mile car inspections, crew changes, locomotive servicing and fueling, car classification, interchanges, local train operation, and originating/terminating traffic. A listing of all of the TPIRR yards is included in TPI's workpapers.[15] Table III-B-3 below shows the TPIRR's major yard locations.

Table III-B-3
<u>TPIRR Major Yard Locations</u>

1. Chicago, IL (Barr Yard)
2. Willard, OH (Willard Yard)
3. Selkirk, NY (Selkirk Yard)
4. Cumberland, MD (Cumberland Yard)
5. Indianapolis, IN (Avon Yard)
6. Cincinnati, OH (Queensgate Yard)
7. Louisville, KY (Osborn Yard)
8. Nashville, TN (Radnor Yard)
9. Birmingham, AL (Boyles Yard)
10. Atlanta, GA (Tilford Yard)
11. Hamlet, NC (Hamlet yard)
12. Waycross, GA (Rice Yard)

Source: e-workpaper "TPIRR Yard Matrix Opening Grading.xlsx"

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[13] *See* e-workpaper "TPIRR Opening Stick Diagrams.pdf."

[14] The additional interchange yards are different from the major and other yards on the TPIRR in that they are used only for interchanging traffic between the TPIRR and other railroads. They consist only of interchange tracks and do not have any of the facilities identified at the major and other yards, except for the occasional crew change facility, if necessary. They are present at interchange locations where there is no major or other yard.

[15] *See* e-workpaper "TPIRR Yard Matrix Opening Grading.xlsx."

a. Location and Purpose

As described above in Part III-B-2, TPI relied on data from a variety of sources in order to determine the number, type, location, size, use, and configuration of the various yards needed by the TPIRR. The operating plan developed by TPI witness McDonald was particularly important in determining the activities that need to occur at each yard on the TPIRR. The activities that occur at the yards include those specified above in the preceding paragraph. TPI has also identified the facilities at each yard including car inspection tracks, fixed fueling and servicing platforms, direct-to-locomotive ("DTL") fueling facilities, rip tracks, and yard buildings. Locomotive shops are located at Willard Yard (Willard, OH), Cumberland Yard (Cumberland, MD), Radnor Yard (Nashville, TN), and Rice Yard (Waycross, GA). Crew change facilities are located at many of the TPIRR's yards. Detailed characteristics of TPIRR's yards are described in TPI's workpapers.[16]

Much of the yard activity on the TPIRR occurs at the twelve (12) TPIRR major yards (identified in Table III-B-3 above). Each major yard has car classification tracks where large amounts of cars are classified and blocked for train movement each day. Barr Yard in Chicago is a large flat yard but the other eleven (11) major yards are hump yards. Train inspections are performed at each major yard. Yard crews are present at each major yard as well as transportation department field personnel. Each major yard has fixed fueling platforms and six (6) yards also have DTL fueling. As noted above, there are locomotive repair facilities at four (4) major yards and a contractor's car repair shop at three (3) major yards. Rip tracks for bad ordered cars are included at each major yard and the TPIRR provides repair tracks for each of the contractor's car shops. Each major yard has a large crew change facility and a large yard building. Traffic is interchanged with other railroads at eight (8) of the major yards. The

[16] *See* e-workpaper "TPIRR Yard Matrix Opening Grading.xlsx."

characteristics of the TPIRR's major yards, as well as all TPIRR yards, are detailed in TPI's workpapers.[17]

b. Miles and Weight of Yard Track

The TPIRR's two hundred twenty-nine (229) yards contain a total of 1,467.19 miles of track.[18] The yard tracks are 115-pound new CWR.

The development of the yard track miles on the TPIRR was based on a combination of various sources. TPI's operating plan identified the location of major and other yards where activities such as train staging, car inspection, crew changes, locomotive fueling and servicing, car classifications, local train operations, and originating/terminating traffic would take place. Traffic is interchanged with other railroads at many of these yards, as well. These activities require trains to wait in yards for various lengths of time. The number and length of the "running tracks" in each yard (the tracks necessary to handle the peak period trains moving through the yards of the TPIRR) were based on the results of the RTC Model.[19]

Intermodal, automotive, and bulk transfer facilities located on the lines of the TPIRR were added manually to the TPIRR yard list. The number of tracks and track miles for the intermodal and automotive facilities were taken from material provided by CSXT in discovery.[20] For the bulk transfer facilities, the track miles were taken from material provided by CSXT in discovery while the number of tracks were identified based on a review of the facility using either schematics provided by CSXT or Google Earth. Additional interchange locations, i.e., interchanges that take place in locations other than previously identified yards, were identified based on information provided by CSXT in discovery and a review of traffic data.

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[17] *See* e-workpaper "TPIRR Yard Matrix Opening Grading.xlsx"
[18] *Id.*
[19] *See* e-workpaper "TPIRR Yard Matrix Opening Grading.xlsx," tab "TPIRR Yards," footnotes 1 through 3.
[20] CSXT did not provide track miles for some of the automotive facilities. For those facilities, the track miles were estimated using Google Earth. *See* e-workpaper "TPIRR IM AUTO BULK Terminals.xlsx."

The location, number, and length of classification tracks were developed based on the classification car counts at each yard.[21] The number and length of tracks needed for locomotive repair facilities, locomotive fueling and servicing facilities, and car repair (rip tracks) were determined based on the traffic movements on the TPIRR and the activities taking place in the various yards.[22]

4. Other

a. Joint Facilities

The TPIRR operates over 490.97 miles of joint facilities/trackage rights owned by other carriers. A complete description of these facilities is included in Part III-C.

b. Signal/Communications System

Current federal law mandates that the TPIRR be equipped with Positive Train Control ("PTC") by December 31, 2015. Rather than construct a Central Traffic Control ("CTC") system at the outset of TPIRR operations (July 1, 2010) and then convert it to PTC, the TPIRR will install PTC at the beginning of TPIRR operations. The PTC system is discussed in more detail in Part III-F-6. Power switches are used for the connections between the main line segments and the TPIRR's branch lines, the helper pocket tracks, the yard lead and relay tracks, and the spurs at local origins and destinations. Interior yard switches and set-out track switches are hand-thrown switches.

Communications are conducted using a microwave system, with microwave towers at appropriately-spaced intervals as described in Part III-F-6. All locomotive engineers, dispatchers, and field supervisory personnel are equipped with radios connected to the microwave system. Certain employees also will be equipped with cellular telephones for

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[21] *See* e-workpaper "TPIRR Yard Matrix Opening Grading.xlsx," tab "Class Track Length." This process is discussed in Part III-C.

[22] *See* e-workpaper "TPIRR Yard Matrix Opening Grading.xlsx," tab "Additional Track."

emergency railroad use, as a back-up to the radios. Further details on the TPIRR's signal and communications system are provided in Part III-F-6.

c. Turnouts, FEDs, and AEI Scanners

All turnouts between the TPIRR's main tracks are No. 20 turnouts. This permits trains to operate through the turnouts at speeds of up to 40 miles per hour (conditions permitting). No. 20 turnouts are used between the main line and branch lines, as well as for the yard leads and the main running tracks at both ends of each of the TPIRR's yards. No. 14 turnouts are used between main tracks and all other tracks, including interchange tracks, the connections with the origin and destination spurs, and helper pocket tracks, where trains move at slower speeds. Trains can operate through these turnouts at a speed of up to 25 miles per hour. No. 10 turnouts are used within yards and for setout and MOW equipment storage tracks.

FEDs, which include hot-bearing, dragging-equipment, cracked-wheel, and wide/shifted load detection systems, have been spaced approximately every 10 to 25 miles along the TPIRR's route. FED placement is based on actual placement of FEDs along the CSXT lines being replicated by the TPIRR with some modifications made where actual CSXT FEDs are placed close together.[23] Multiple-track FEDs are provided at each location that has multiple main tracks (one for each track). Each FED is accompanied by two (2) setout tracks, each located within two (2) miles on either side of the FED.[24] As discussed above, each such track is a 735-foot single-ended track (with 600 feet in the clear) to facilitate the setout of bad-order cars after a train has passed an FED. These tracks are used primarily for temporary storage of bad-order cars detected by the FEDs but can also be used for temporary storage of work equipment.

[23] *See* e-workpaper "FED Locations on the TPIRR.xlsx."

[24] In locations with three (3) main tracks, setout tracks are provided on only the two outside tracks. Trains in the middle track can travel to the setout tracks for the next FED if necessary.

Automatic Equipment Identification ("AEI") scanners are located at or near many of the locations where the TPIRR interchanges trains with other railroads. A total of 105 AEI scanners have been provided.[25] The AEI scanners have been placed so as to enable them to capture all train movements that occur on the TPIRR, including both local and interline movements.

[25] *See* e-workpaper "TPI AEI Readers.xlsx."

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III. STAND-ALONE COST

C. STAND-ALONE RAILROAD OPERATING PLAN

The operating plan for the TPIRR was designed by Richard H. McDonald, one of the nation's leading rail operations and management experts, with assistance from Mr. Philip H. Burris, Robert D. Mulholland, Timothy D. Crowley, and William H. Humphrey, all of L. E. Peabody & Associates, Inc., who developed the TPIRR train lists and operating specifications. Mr. Burris also analyzed and incorporated the joint facilities with the assistance of Brian A. Despard, also of L.E. Peabody & Associates, Inc. Daniel L. Fapp, also of L. E. Peabody & Associates, Inc., along with Mr. Crowley and Mr. Humphrey, performed a simulation of the TPIRR's peak-period operations using the Rail Traffic Controller ("RTC") model with operating inputs provided by Mr. McDonald.

The detailed operating plan is designed to enable the TPIRR to transport its peak-year traffic volume, and the trains moving on the system during the peak week of the peak year, in a manner that meets the transportation needs of its traffic group, and in full compliance with all applicable CSXT transportation and service commitments to the customer group involved. The operating plan and the RTC model are used to optimize the TPIRR's track configuration, as described in Part III-B, and provide the basis for many of the TPIRR's annual operating expenses shown in Part III-D.

The TPIRR operating plan is explained in this part of TPI's opening evidence plus the following six (6) supporting exhibits:

Exhibit III-C-1 – TPIRR train list development

Exhibit III-C-2 – CSXT's October 11, 2013 letter explaining how to evaluate the data it provided

Exhibit III-C-3 – A technical outline of the TPIRR train list development procedures

Exhibit III-C-4 – A flow chart demonstrating how the train lists were developed
Exhibit III-C-5 – A map demonstrating the first round of local train cascading
Exhibit III-C-6 – TPIRR RTC modeling procedures and results

1. General Parameters

The TPIRR's configuration and operating plan have been designed to provide service to all of the TPIRR traffic (including issue traffic) and to accommodate its peak seven-day traffic volume and train frequencies during the 10-year DCF period. The peak traffic volume and train movements were developed by TPI Witnesses Mulholland and Crowley using the full-year 2012 and January through June 2013 traffic data[1] provided by CSXT in discovery and the traffic forecast procedures described in Part III-A.

The TPIRR system and operating plan were developed through a series of steps. First, Mr. McDonald reviewed the CSXT operating timetables and track charts for the lines being replicated.[2] Mr. McDonald also reviewed maps of various facilities, joint-facility/joint-use agreements between CSXT and other railroads for the lines being replicated, and CSXT interrogatory responses describing the operation of TPI issue traffic and other trains, including items such as CSXT train profiles, CSXT actual helper service and CSXT crew districts. Next, Mr. McDonald reviewed the TPIRR Base Year trains moving over the TPIRR system by segment and direction of movement. Mr. McDonald also reviewed the TPIRR cars to be classified per day and the trains to be inspected per day at locations on the TPIRR. A preliminary track configuration for the TPIRR was developed, starting with CSXT's present main-track/passing siding configuration for all of the lines being replicated. Then, the operating plan elements to be input into the RTC Model were developed.

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[1] As discussed in greater detail in Exhibit III-C-1, the term "Traffic data" collectively refers to CSXT car waybill data, container waybill data, car shipment data, car event data, and train sheets data.

[2] The CSXT operating timetables and track charts for all of the lines involved are reproduced in the e-workpapers for Part III-B.

TPI has relied upon CSXT's own operations as the template for the TPIRR's operating plan. The STB has made it abundantly clear in prior SAC decisions that SARR operating plans that stray too far from the incumbent's real-world operations run the risk of being rejected for being infeasible. In *Duke/NS*, although the complainant posited a more efficient operating plan for the SARR, the Board observed that:

> A core SAC principle is that the SARR must meet the transportation needs of the traffic it would serve. Thus, as discussed in prior cases, the proponent of a SARR may not assume a changed level of service to suit its proposed configuration unless it also presents evidence showing that the affected shippers, connecting carriers, and receivers would not object.[3]

The Board rejected the complainant's operating plan in favor of the defendant's plan because the complainant's plan violated the foregoing principle,[4] whereas the defendant's plan "would provide the same service to all of the shippers and mines as they currently receive from NS."[5]

Similarly, in *FMC*, the Board rejected the complainant's operating plan in favor of the defendant's plan because "UP's operating plan . . . is based on actual customer service requirements and supportable operating assumptions—actual number of trains, locomotives and car consists reflecting customer requirements and peak period demands and car requirements based on actual historical cycle times—that appear to cover all aspects of estimating the equipment and personnel requirements to move the ORR traffic group."[6] The Board criticized FMC for developing its grain-train requirements by consolidating its multiple-car shipments into

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3 *See Duke/NS* at 117.

4 *Id.* at 118.

5 *Id.* at 121. *See also, CP&L* at 259 (same); *Duke/CSXT* at 426-27; *PSCo/Xcel* at 610 ("Thus, as a general matter, the proponent of a SARR may not assume changed levels of service from those currently offered merely to minimize the costs of the SARR's physical plant and operations, unless it presents evidence showing that the affected shippers, connecting carriers, and receivers would not object."); *McCarty Farms* at 478 ("we use BN's operating plan, which is based on BN's own experience handling the traffic that would move over the FRR line segments, as the best evidence of record."); *West Texas* at 665 (adopting defendants operating plan which "uses BN's actual or planned cycle time and BN's actual, shipper-specific train sizes").

6 *See FMC* at 738.

unit-train shipments, while ignoring the actual number of cars on the trains operated by UP.[7] The Board rejected FMC's operating plan because it did not reflect the actual number of trains UP operated nor did it reflect the actual number of cars UP operated on those trains.[8]

The Board rejected the shipper's operating plan in the *Duke/CSXT* decision as well for failing to conduct operations in a similar fashion to the defendant. As stated by the Board:

> To limit operating expenses, Duke selected an operating plan for the ACW [the SARR in the case] that is different from how CSXT conducts its coal-hauling operations in the Central Appalachian Region.[9]

As with the operating plan presented by the shipper in *FMC*, the STB rejected Duke's operating plan because it would not provide the same level of service as that provided by the incumbent railroad.[10]

Based on the Board's decisions in each of the foregoing proceedings, shippers in more recent SAC cases have developed their operating plans to mimic the operations of the incumbent railroad. This has taken the form of operating the SARR trains in a similar manner as the incumbent, including using train consist sizes consistent with the incumbent's operations, and using virtually the same main-line track infrastructure. In this way, shippers in SAC cases can best ensure that their operating plans meet the needs of the incumbent's customers. This is the approach taken by the shipper in *AEPCO*, the most recent SAC case decided by the Board, and one in which the Board found the shipper's SARR operating plan feasible. As stated by *AEPCO*:

> The ANR's train sizes are the same as those for comparable BNSF and UP trains operated in the most recent twelve-month period (2Q08 through 1Q09, also referred to as the "Base Year") for which the defendants produced usable train and car movement data. Non-coal trains move exclusively in overhead service so they use the same cars (or mix of cars)

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[7] *Id.* at 737.
[8] *Id.*
[9] *See Duke/CSXT* at 426
[10] *Id* at 430.

> as the comparable BNSF and UP trains that moved between the same points in the base year.[11]

This also is the approach TPI used in developing its operating plan. Mr. McDonald developed the TPIRR configuration based on CSXT's present main-track/passing-siding configuration for all the CSXT lines being replicated by the TPIRR. In a similar fashion, Messrs. Mulholland and Crowley identified the trains operating over the TPIRR system based on the trains operated by the CSXT in the base year (July 2012 through June 2013). This includes identifying the number of loaded and empty railcars moving on these trains, the route of movement, and the pickup and setout locations. Mr. McDonald then used the list of real-world CSXT trains to develop the specific parameters of the TPIRR operating plan.

Unlike the shippers in the *FMC* and *Duke/CSXT* cases, TPI's operating plan does not attempt to stray too far from CSXT's own operations by developing train sizes and consists different from those used by the incumbent carrier. Instead, TPI used train sizes and consists comparable to those used by CSXT as identified in CSXT supplied data. CSXT cannot realistically claim that TPI's operating plan is not feasible, because in many important ways, it is CSXT's own real-world operating plan.

As noted above, base year TPIRR trains and cars essentially mirror the movement of the corresponding CSXT traffic for that time period. Peak-period trains and cars also reflect the real-world CSXT base-year operations. Although certain peak-period trains are longer and heavier than their base-year counterparts on specific dates, peak-period train sizes were limited based on commodity group and lane-specific analysis of base-year trains. For example, unit coal trains moving between a specific mine and plant were not allowed to grow beyond the maximum

[11] *See* Opening Evidence of Complainant Arizona Electric Power Cooperative, Inc. (Public Version) filed January 25, 2010, at III-C-7-8.

train size reported for that origin-destination combination in the base year (and were often held well below the maximum train size).[12]

In addition, the base-year traffic mix for individual trains was retained in the peak year to ensure adequate equipment repositioning and seasonal traffic flows. For example, if a given manifest train moved with 60 percent loaded cars and 40 percent empty cars in the base year, the corresponding train moving on that date in the peak year also moved with 60 percent loaded and 40 percent empty cars. Exhibit III-C-1 documents those procedures in detail.

The TPIRR operating plan was developed to accommodate the railroad's peak-year traffic group including all car-classification and blocking requirements. As indicated in Part III-A, the TPIRR's peak traffic year is 3Q19 to 2Q20, which is also the final twelve months in the 10-year DCF. As described in Part III-A-1, the TPIRR's traffic group consists of general freight, coal, and intermodal traffic. The traffic moves in various flows over different parts of the system. The TPIRR peak-year total traffic volumes are shown in Table III-C-1 below.

Table III-C-1
TPIRR Peak Year Traffic Volume – 3Q19-2Q20

Train Type	**Cars/ Containers**	**Tons**
(1)	(2)	(3)
1. General Freight	2,850,685	316,053,736
2. Coal	853,994	111,548,945
3. Intermodal	3,801,157	106,197,049
4. Total	7,505,836	533,799,730

Source: "Revenue Summary Final.xlsx."

12 By way of example, if a coal train moved 100 cars of coal from Dotiki, KY to Big Bend, FL on December 15, 2012, and another coal train moved 110 cars of coal from Dotiki, KY to Big Bend, FL on December 30, 2012, TPI may have elected to move a 110-car coal train from Dotiki, KY to Big Bend, FL on December 15, 2019. In keeping with the purpose of a SAC analysis—to develop a least-cost, most-efficient railroad—peak period trains were developed based on overall base-year operations, not based on date-specific base-year operations.

The TPIRR's operating plan reflects the different commodities it handles and the types of service they require. The TPIRR serves various local origins and destinations, including industrial facilities, coal mines, power plants, intermodal ramps, and water/rail transfer terminals. The TPIRR also serves interchange points with other railroads including BNSF, CSXT, CN, CP, NS, and UP and more than 75 regional and short line railroads. The TPIRR operating plan includes requirements associated with all reciprocal agreements, e.g., reciprocal blocking.

As described in Part III-B, the TPIRR has been divided into 20 main-line segments[13] and 50 branch lines. A schematic of the TPIRR's route is included as Exhibit III-A-1.

a. Traffic Flow and Interchange Points

As shown in Table III-C-1 above, the TPIRR's peak-year (3Q19-2Q20) traffic volume consists of 316 million tons of general freight traffic, 112 million tons of coal traffic, and 106 million tons of intermodal traffic.

The TPIRR handles general freight and intermodal traffic in interline and local service. Significant ports and intermodal facilities served by the TPIRR include Baltimore, Mobile, Atlanta, Jacksonville, Memphis, and Chicago, among others. The TPIRR also directly serves six (6) coal-mine origins or coal loadout facilities in Indiana, Kentucky, West Virginia, and Pennsylvania, and 18 coal destinations (15 power plants and three rail/water transload facilities). The TPIRR also handles coal originated and terminated by other railroads. The TPIRR's operating plan takes into account its total traffic volume and the traffic flows described in Part III-A and summarized above.

In addition, the operating plan reflects the TPIRR's interchange relationships with the other Class I carriers and various regional and short-line railroads. This includes pre-blocking cars forwarded to connecting carriers, handling run-through power with other railroads, fueling

[13] *See* Table III-B-1.

and inspecting locomotives interchanged with other carriers, and running repairs for foreign railcars in its system in the Base Year.

TPI has included in its operating plan the facilities and equipment necessary to account for required classification switching in yards. TPI did this by developing classification car counts from the car-event data provided by CSXT in discovery and identifying the cars originating (either from industry or in interchange from other carriers) and moving through yards requiring classification.[14] In this way, the loaded and empty cars included in TPI's classification car counts correspond to CSXT's *actual* trains that move on the lines that comprise the TPIRR system.

TPI also took into consideration the interchanging of locomotives, or run-through power, with other railroads. It has become a common industry practice to run through power when interchanging trains between railroads as it eliminates inefficiencies between the forwarding and receiving carrier. TPI uses run-through power, when possible, in its operations. However, TPI has identified numerous agreements with connecting railroads that do not allow for run-through power.[15] TPI has adjusted its operating plan and RTC model to reflect the removal of TPIRR locomotives from trains interchanged to the specified connecting carriers at these locations and the adding of TPIRR locomotives to trains received from the specified connecting carriers at these locations.

TPI has also taken into consideration the need to inspect and fuel locomotives used in interline service to fulfill the common reciprocity with connecting carriers. TPI ensures all TPIRR's locomotives on originating trains are fully fueled and serviced prior to departure from the originating yard. Further, because the ES44AC locomotives used by the TPIRR have a

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[14] *See* e-workpaper "Base Year Car Class L and E w O-IR Class Sw V5.xlsx".

[15] A summary of the locations and connecting carriers that do not allow run-through power is included in e-workpaper "Run Through Power.xlsx".

fueling capacity of 5,000 gallons and the average fuel consumption on the TPIRR is {{[redacted]}} gallons per mile, a fully fueled locomotive has a range of approximately {{[redacted]}}. This, combined with the fact that the average TPIRR length of haul is 359.4 miles and that TPIRR trains are fully fueled and serviced before departing an origin, means that virtually every train that the TPIRR provides in interchange will have a minimum range of {{[redacted]}} miles before it must be refueled ({{[redacted]}} less 359.4 miles). Further, TPIRR trains that are to be interchanged to connecting carriers and move a long distance on the TPIRR network are re-inspected and fueled at an intermediate point prior to being delivered to the connecting carrier.

Finally, TPI has incorporated the need to make running repairs to foreign cars operating on its rail lines. AAR Interchange Rules require participating carriers to make minor or running repairs to foreign equipment operating over their rail lines. TPI has provided 281 railcar-equipment inspectors, part of whose task is to make minor (running) repairs to railcars during the inspection process.

b. Joint Use and Interchange Agreements

The TPIRR steps into the shoes of CSXT and utilizes existing joint-use and trackage agreements at 21 locations.[16]

c. Track and Yard Facilities

The TPIRR's track and yard facilities are described in Part III-B.[17] The TPIRR's main lines consist of single track with appropriately-spaced sections of second main track (essentially signaled passing sidings with power switches). The branch lines consist of a single main track, with passing sidings as needed to efficiently move the traffic. The siding configuration and

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[16] *See* e-workpaper "JF Descriptions.doc" for a brief description of each of these agreements.

[17] *See* e-workpapers "TPIRR Route Miles Opening Grading.xlsx" and "TPIRR Yard Matrix Opening Grading.xlsx".

spacing were developed by TPI Witness McDonald with assistance from Witnesses Fapp, Crowley, and Humphrey's RTC Model simulation of the TPIRR's peak-period operations.

All of the TPIRR's main tracks are constructed to a standard that allows for maximum train speeds of 70 mph,[18] conditions (including gradient and curvature) permitting. As discussed in greater detail below, the TPIRR restricts the speeds of TIH and other key trains to 50 mph. Trains on all branch lines are limited to a maximum speed of 40 mph, except where existing CSXT speed limits are higher. All tracks are being constructed to permit a maximum GWR of 286,000 pounds per car.

All of the TPIRR's main lines are equipped with PTC and main-track power switches.

Wood crossties are being used on all TPIRR tracks. The tie and other track and subgrade specifications (including rail section, turnouts, other track material, ballast, and side slopes) are described in Part III-F and the associated e-workpapers. The track and subgrade specifications enable the TPIRR to handle its expected peak-period traffic volume efficiently, consistent with the lowest feasible cost, while enabling all customer-service requirements to be met.

d. Crew-Change Locations

i. Road Crews

Many of the TPIRR's crew changes take place at origins, yards, interchange points, or destinations. The TPIRR follows the efficient modern railroad practice of calling train crews sufficiently in advance of a train's arrival at the designated crew-change point so that the crew is ready to board the train when it arrives and the in-coming crew has de-trained. The crews in each district are qualified to operate to and from other intermediate origins, destinations, and interchange points within the district.

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[18] The maximum train speed of 70 mph is used only by intermodal trains. The maximum speed for non-intermodal trains is 60 mph.

Mr. McDonald's operating plan for the TPIRR provides for straight-away and turn-crew assignments at 111 crew-district home-terminal locations.[19] Based on a review of materials provided by CSXT in discovery, many of the TPIRR crew assignments mirror those currently used by CSXT.

These crew districts and assignments reflect a least-cost SARR's flexibility to maximize the efficiency of its crew assignments within the constraints of the federal "12-hour" (hours of service) law, including the amendments thereto made by the Rail Safety Improvement Act of 2008 ("RSIA") (Public Law No. 110-432). Since the TPIRR is a new, start-up, non-unionized operation, its crew districts can be, and have been, designed for maximum efficiency. TPIRR road crews are not limited to operating over a single route, but instead are flexible enough to operate over several different routes on which they are certified. For example, crews stationed in Waycross, GA area can operate trains over all routes between Waycross, GA and Tampa and Taft, FL as well as to Manchester, GA, as necessary. This facilitates flexibility in assigning crews to work where necessary and minimizes the need for deadheading crews to resolve train-flow imbalances. For example, a crew that regularly operates the line from Waycross, GA to Lakeland, FL, can also operate over the line from Waycross, GA to Taft, FL and Waycross, GA to Fitzgerald, GA or Manchester, GA.

ii. Helper crews

The helper crews are engineer-only crews. Helper service is provided at twelve (12) locations on the TPIRR. The helper service duplicates that provided by CSXT on each of the rail lines included in the TPIRR system. A total of 65 employees are needed to staff the helper service.[20]

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19 The TPIRR crew districts and assignments are listed in e-workpaper "Crew District Assignments.xlsx".

20 A detailed description of the TPIRR helper service is include in e-workpaper "Helper Crews per Day.xlsx".

e. Switching and Yard Activity

i. Car Classification and Blocking

TPI has designed its operating plan to meet the transportation needs of the TPIRR traffic group by operating the same trains with the same mix of traffic as CSXT. This includes stopping trains en route for spotting and pulling cars from trains and blocking cars in yards in the same manner as CSXT.

Because TPI has mirrored the critical aspects of CSXT's current train operations, there is no need to develop new individual-shipment plans or blocking plans for traffic moving over the TPIRR system under the assumption that CSXT's train and yard operations are operated in the most efficient way possible, given real-world constraints. The Board and its predecessor, the ICC, have long recognized that using the base operating characteristics of the incumbent railroad provides proof of the feasibility of a SARR system:

> Indicia of the required rail assets [of a SARR system] are given by the existing facilities. Furthermore, potential users of a stand-alone facility can be identified by referring to the railroad's existing customer list, and the feasibility of providing a service which meets the shipper's requirements is proven.[21]

Given TPI's modeling and use of blocks and trains consistent with CSXT's real-world blocks and trains, there is no need to develop new train-, shipment-, or yard-blocking plans as part of TPI's SAC presentation.

To that end, the TPIRR incorporates the same blocking plans that CSXT currently uses in its operations. Exhibit III-C-1 specifies the manner in which the current blocking and switching activities conducted by CSXT are reflected in the TPIRR blocking, switching, and train operations.

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[21] *See Coal Rate Guidelines* at 543.

Because TPIRR operates a subset of the same trains as CSXT and with the same mix of traffic CSXT moves on these trains and because TPIRR constructs yards in the same locations as CSXT, it also adopts CSXT's car classifications for cars included on the TPIRR system. The classification car counts at TPIRR yards include the following traffic: 1) all cars identified in the car-event data as having changed trains in a TPIRR yard and having a classification flag; 2) cars originating at yard locations; and 3) cars interchange received at yard locations.[22]

ii. Locomotive Inspections And Fueling

FRA-required 92-day locomotive inspections are performed at TPIRR's locomotive shops and TPIRR yards during the car-inspection process for all trains receiving a 1500-mile or 1,000-mile car inspection.[23] TPIRR locomotive shops are located at Willard, OH, Selkirk, NY, Nashville, TN, and Waycross, GA. Road locomotive(s) requiring inspection are removed from the train and moved to the locomotive shops. If a locomotive requires fueling, but not a scheduled inspection, it is fueled during the dwell time of the car inspection process. Fueling is accomplished at stanchions provided in yards where shops are located and at other points where traffic warrants. All other fueling is performed by tanker truck. If a locomotive requires fueling but not a 92-day inspection, it is fueled during the dwell time allotted for car inspections.

iii. Railcar Inspections

(1) Inspection Procedures

The TPIRR conducts 1,500-mile inspections of unit trains and 1,000-mile inspections of non-unit trains using state-of-the-art procedures, while complying at all times with FRA-

[22] *See* e-workpaper "Base Year Car Class L and E w)-IR Class Sw V5.xlsx" for a summary of cars requiring classification at each yard location. Based on interchange agreements, cars interchange received at Chicago, Saint Louis, New Orleans, and Buffalo are assumed to be pre-blocked. Mr. McDonald estimates that 25 percent of cars interchange received in Chicago and 10 percent of cars interchange received in Saint Louis, New Orleans, and Buffalo require classification at those locations, and the remaining cars received at these locations are pre-blocked.

[23] Inspection procedures are further detailed below.

mandated safety and inspection rules. TPIRR performs 1,500-mile and 1,000-mile inspections on through trains at Willard, OH, Nashville, TN, Atlanta, GA, Cincinnati, OH, and Buffalo, NY. TPIRR also performs inspections on originating trains by car-inspection crews at 26 yard locations. Road-train crews perform inspection functions at other yards as necessary.

TPIRR uses one, two, three, and four-person inspection crews, with one crew member on each crew serving as foreman. A summary of the car-inspection crews on duty at each of the 26 yards is included in TPI's workpapers.[24] Car inspections are also performed by two-man teams of "line of road' inspectors which are assigned to 13 of TPIRR's yards.

Roadways are provided between each of the yard relay tracks where inspections are performed. Each inspection crew stationed at a yard is equipped with a low-slung, four-wheel ATV-type vehicle. The vehicles carry spare parts, such as brake shoes and air hoses. Some parts are also placed periodically adjacent to the rails on the inspection tracks for ready availability. Coupler knuckles are rarely replaced during 1,500- or 1,000-mile inspections and can be transported to a specific car needing a knuckle by a company pick-up truck as needed. Two (2) trains are inspected simultaneously by a four-person crew.

(2) Trains Requiring Inspection

Each of the TPIRR's yards where trains originate is an inspection point and all trains are inspected either by a car inspection crew or by the train crew. In addition, trains that travel extended distances on the TPIRR and are being interchanged to a connecting carrier also receive an intermediate inspection at one of the through train inspection locations listed previously, in order to ensure that the train complies with the interchange and run-through agreements.

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[24] *See* e-workpaper "Trains to be Inspected.xlsx".

f. Trains and Equipment

i. Train Sizes

The TPIRR operates complete trains, including general-freight, coal, and intermodal trains, in local and interline (including overhead) service. The TPIRR's train sizes are no larger than those for the comparable CSXT trains operated between 3Q12 and 2Q13 for which CSXT produced car- and train-movement data. Non-unit trains that are interchanged with CSXT have the same mix of traffic as the comparable CSXT trains that moved between the same points in the Base Year.

All trains have sufficient locomotives to provide a horsepower to trailing-ton ratio that assures they are adequately powered to meet present contractual transit-time commitments and service requirements. This was confirmed by the RTC simulation.

The TPIRR operating plan assumes that the maximum train sizes (for a given train type within a specific lane) and locomotive consists will remain the same throughout the 10-year DCF period. Increased volumes are accounted for by adding cars to existing trains consistent with the TPIRR's (and CSXT's) ability to handle them with the same locomotive consist and track configuration (yards/sidings). If a train would be too long using this procedure, "growth" trains are added that are equivalent in size to the comparable trains CSXT operated between 3Q12 and 2Q13, as shown in the car event and train movement data it produced in discovery. All growth trains are limited based on the size and weight of comparable trains actually moved by CSXT in the base year. The specific procedures used to develop peak period trains are documented in Exhibit III-C-1, including workpaper references.

ii. Locomotives

The TPIRR requires a total of 1,057 locomotives to handle its First Year traffic volume. The railroad has three types of locomotives: GE ES44AC locomotives for road and helper service, SD40-2 locomotives for local train and work train service, and SD40-2 and EMD SW1500 locomotives for yard-switching service. SD40-2 locomotives are used in switching service to perform hump operations and SW1500 locomotives are used in flat-switching service. The number of locomotives required for each kind of service is shown in Table III-C-2 below. The TPIRR's road locomotive requirements take into account the need to equalize the locomotive power used in run-through service for the CSXT and other interchange trains, any intermediate setting out or picking up of blocks of cars, and a spare margin which is described below.

Table III-C-2
TPIRR First Year Locomotive Requirements

Type of Service (1)	Quantity (2)
1. Road – ES44AC	709
2. Local/Work Train– SD40-2	167
3. Switch – SW1500 and SD40-2	181
4. Total	1,057

Source: e-workpaper "TPIRR Operating Statistics_Open.xlsx".

(1) Road Locomotives

The TPIRR's "standard" road locomotive consist for all trains is two locomotives in a 1/1 distributed power ("DP") configuration, although some heavy-coal, general-freight, and intermodal trains require three or more road locomotives for all or part of their runs on the TPIRR system (not including helpers at certain locations). Where additional units are needed, they are placed at the front of the train. For example, all trains moving between Etowah, TN and Cincinnati, OH require an additional locomotive unit to traverse the grades in this area in both directions. This unit is in addition to the helper service used in this region. As both Etowah and

Cincinnati are crew change points for these trains, the additional locomotives are added and removed at these locations when the crews are changed.

The DP configuration involves positioning one locomotive on the front of the train and one locomotive on the rear of the train (hence the "1/1" designation). The rear (DP) locomotive has no engineer and is remotely controlled by radio signals from the lead locomotive. The use of a DP locomotive configuration reduces the drawbar tension between cars and enables the same number of locomotives to haul heavier trains or the same size trains at higher speeds. It also facilitates reversal of direction by a train, as locomotives do not have to be repositioned from one end of the train to the other. DP locomotive configurations are standard practice on the western Class I railroads, and DP is also being used by CSXT.[25]

As stated previously, local trains and work trains are powered by SD40-2 locomotives, using one locomotive per train where possible. When this is not possible due to train size or topography, the TPIRR adds a second SD40-2 locomotive, or in some instances uses an ES44AC locomotive on local trains. The count of road locomotives for the peak year includes a spare margin and a peaking factor, consistent with prior STB decisions.[26]

Spare Margin. The total number of road locomotives required includes a spare margin of {{[redacted]}} percent for ES44AC locomotives and {{[redacted]}} percent for SD40-2 locomotives. These spare margins are based on information provided by CSXT in response to TPI's discovery requests. The information provided includes locomotive bad-order time, transit time, and total equivalent units in service by locomotive type for the years 2007 through 2013. From this information, TPI developed the amount of time locomotive units were unavailable for service on

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25 *See*, e.g., http://www.progressiverailroading.com/pr/article/mechanical/article/Class-Is-employ-fuelsaving-practices-that-promise-stingier-diesel-usage--22736 and discovery e-workpaper "Helper Service Detail Update.xls".

26 *See WFA/Basin I* at 33-34.

a weighted average basis to yield the locomotive spare margin for both ES44AC locomotives and SD40-2 locomotives, respectively.[27]

Peaking Factor. In addition to using the spare margin, TPI's experts determined the TPIRR's locomotive peaking factor by dividing the average number of train starts per day in the peak week of the Peak Year by the average number of train starts per day moving in the Peak Year. This is the same process as that approved by the Board[28] and results in a peaking factor of 5.3 percent.[29]

(2) Helper Locomotives

The TPIRR uses ES44AC road locomotives for helper service to minimize the diversity of road locomotive types in TPIRR service. Where necessary, the TPIRR uses one or more units in helper service, with the locomotives coupled back-to-back. This enables the helper consist to operate in either direction with the cab end forward on the lead locomotive. The TPIRR has twelve (12) helper districts.[30]

The RTC Model simulation indicates that a total of 811 trains moving during the ten-day simulation period require helper assistance. The breakdown of these trains for the entire simulation period and for the peak day for each district, used to confirm the TPIRR's helper locomotive needs, is shown in Table III-C-3 below.

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[27] *See* e-workpapers "TPIRR Operating Statistics_Open.xlsx" and "Loco Stats Update_Spare Margin.xlsx".

[28] *See PSCo/Xcel II* at 13.

[29] Peak year trains = 192,425 (/365=527 trains per day). Peak week trains = 3,882 (/7=555 trains per day). Ratio = 555/527 = 1.053. *See* e-workpaper "Train List Unit V09 12162013 With Peak Calc v2.xlsx", level "BsYrPeakAll".

[30] The location of each helper district, distance trains helped, direction of helper service, and the number of units per consist at each location are shown in e-workpaper "Helper Crews per Day.xlsx".

Table III-C-3
TPIRR Peak Trains Requiring Helper Assistance

	Number of Trains	
Helper District	**Helper Service Miles**	**Peak Period Trains per Day**
(1)	(2)	(3)
1. Hancock-Shenandoah	34	13
2. Hyndman-Sand Patch	18	12
3. Connellsville-Sand Patch	59	12
4. Grafton-Bridgeport	19	1
5. Smithfield-Grafton	23	1
6. Livingston-No. Bourne	8	1
7. Livingston-Killsyth	73	6
8. Ford-No. Fort Estill	14	5
9. Ford-Sanderson	9	6
10. No. Holmes Gap-Middle Homes Gap	7	15
11. Cowan-Tandallon	8	12
12. Sherwood-So. Cowan	10	9

Source: e-workpaper "Helper Crews per Day.xlsx" and "TPI Open RTC Train Inputs.xlsx".

(3) Switch/Work Train Locomotives

The TPIRR uses EMD SW1500 and SD40-2 locomotives for switch service. SW1500 locomotives are used in flat switching service in both hump yards and flat yards. Switch locomotives are relatively low horsepower locomotives with high torque and typically four-axle locomotives which are specifically designed to be used in switching service. This type of locomotive is commonly used by Class I and other railroads (including CSXT) for such service. Switch locomotives are chiefly used to classify and block cars and move cars in yards. Two (2) SD40-2 locomotives are used by the TPIRR in all hump yards to push cuts of cars over the hump facility. SD40-2 locomotives are used for this service as they have greater horsepower than SW1500 locomotives and the higher horsepower requirement is needed to push cars over the hump. According to Mr. McDonald, this practice is consistent with that historically used on C&NW.

The TPIRR requires a total of 203 SW1500 locomotives and 22 SD40-2 locomotives for use in switch service. The number of locomotives assigned to each yard is dependent on the number of switch assignments, car classifications, and blocking requirements in each yard.

iii. Railcars

Car ownership for the TPIRR traffic group was determined from data produced by CSXT in discovery. This data shows that most of the TPIRR's general freight and coal traffic moves in shipper-provided equipment and that nearly all of its intermodal traffic moves in shipper-provided containers and trailers. TPI assumed that {{[redacted]}} percent of flatcars used to transport intermodal containers and trailers are system cars and {{[redacted]}} percent are foreign cars based on car event data provided by CSXT in discovery. Table III-C-4 below summarizes the ownership of railcars and intermodal units for each traffic type.

Table III-C-4
Percent Of Car Ownership By Traffic Type

Traffic Type (1)	System (2)	Foreign (3)	Private (4)
1. General Freight	{{[redacted]}}	{{[redacted]}}	{{[redacted]}}
2. Coal	{{[redacted]}}	{{[redacted]}}	{{[redacted]}}
3. Containers & Trailers	{{[redacted]}}	---	{{[redacted]}}
4. Intermodal Flats	{{[redacted]}}	---	{{[redacted]}}

Source: e-workpaper "TPIRR Car Costs_Open.xlsx".

The TPIRR car requirements for all of the movements in its traffic group were developed based on the Base Year traffic and the simulated transit time output from the RTC Model. The resulting TPIRR car requirements were increased by a {{[redacted]}} percent spare margin[31] and the

31 {{[redacted]

5.3 percent peaking factor described earlier. A complete description of the development of car-ownership costs for system, foreign, and private cars is set forth in Part III-D-2.

g. RTC Model Procedures And Results

The essential elements of the operating plan (described above), the main-track configuration, and the yard and interchange locations were provided to Messrs. Fapp, Crowley, and Humphrey for input into the RTC Model. Messrs. Fapp, Crowley, and Humphrey also input various physical characteristics for these lines, which were obtained from CSXT track charts, operating timetables, and other documents produced in discovery. These included train speed restrictions at various locations, grades, curves, topography, and turnouts (switches). The final steps were to populate the RTC Model with the TPIRR's trains during the simulation period, which includes the peak traffic week (in terms of train movements) in the TPIRR's 10-year DCF existence, and input random "outage" and maintenance events.

TPI Witnesses Mulholland and Crowley provided TPI Witnesses Fapp, Crowley, and Humphrey with the TPIRR's trains moving during the peak ten-day simulation period in the TPIRR's 10-year DCF life. These trains were based on the CSXT trains carrying traffic in the TPIRR's traffic group that moved during the peak simulation period in the 3Q12 to 2Q13 Base Year, forecast to the same period in the 3Q19 to 2Q20 Peak Year.

All TPIRR road trains and local trains moving on the TPIRR network were included in the RTC simulation. The simulation includes stops en route for crew changes, inspections, fueling, helper service, and spotting and pulling cars at customer locations for all road trains and local trains operating in straight-away service between two locations. Local trains in turn service, i.e., trains identified in CSXT's traffic data designated as local trains which originate and

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[redacted]}}

terminate at the same location, are also included in the RTC simulation. The procedures used to develop the list of peak period trains included in the RTC simulation are discussed in detail in Exhibit III-C-1.

The RTC simulation runs began after inputting the TPIRR's track and other relevant facilities, peak-period trains, and operating parameters (including random outages and maintenance outages). Changes were made on an iterative basis until the RTC Model ran to a successful conclusion. These changes included the relocation, addition or deletion of certain passing sidings and segments of second main track, refinement of the locations and configuration of yards and interchange tracks, and the addition of locomotives to certain trains.[32] A detailed description of the TPIRR modeling procedures and results is included in Exhibit III-C-6.

2. Transit Times

A SARR's operating plan must enable it "to meet the transportation needs of the traffic the SARR proposes to serve."[33] As the Board noted in *WFA/Basin I*, a SARR:

> [N]eed not match existing practices of the defendant railroad, as the objective of the SAC test is to determine what it would cost to provide the service with optimal efficiency. However, the assumptions used in the SAC analysis, including the operating plan, must be realistic, i.e., consistent with the underlying realities of real-world railroading.[34]

This means that the complainant shipper must demonstrate that its SARR can provide service to its customers (i.e., traffic group members) that meets their requirements. TPI has accomplished this by showing that the train transit times during the peak period in the Peak Year are similar to or lower than the CSXT's actual transit times during the comparable period of the most recent year for which data is available. The starting point for the analysis in this case is the

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[32] Track that remained unused or unoccupied throughout the peak period can be seen in the RTC model by loading the .HISTORY file and selecting Link Color Mode "train traversals – run time trains."

[33] *See WFA/Basin I* at 15 "the operating plan must be able to meet the transportation needs of the traffic the SARR proposes to serve."

[34] *Id.*

TPIRR's Peak Year traffic volume and its peak-period train counts, which were developed from CSXT's traffic data for the trains moving the TPIRR's traffic group between July 1, 2012 and June 30, 2013. The peak trains, TPIRR system configuration, and relevant aspects of the operating plan were then input into the RTC Model to verify that the configuration and operating plan are realistic and adequate to enable the TPIRR to operate its peak-period trains efficiently and in accordance with its customers' requirements as measured by train cycle/transit times.

The key outputs generated by the RTC Model for the transit-time analysis were elapsed train running times over each of the TPIRR's line segments, and train transit times (used to develop locomotive and car hours and train-crew counts) over the portion of the TPIRR system used by each train during the peak seven days of the ten-day period modeled by TPI's operating experts. The electronic files containing the RTC Model runs, output, and case files are included in TPI's Part III-C e-workpaper folder "RTC."[35]

As the Board has acknowledged, the SAC test must be equally workable in the eastern and western contexts.[36] The same holds true with regard to variances in the amount and usability of railroad traffic and operating data in a given proceeding. Accommodating both the nature of Class I rail operations in the east generally, and the CSXT traffic data produced in discovery in particular, the RTC simulation of the TPIRR's operations in the peak week of its peak traffic year confirm that the TPIRR's configuration and facilities can accommodate the peak-period volumes and that the TPIRR's operations in the peak period of the Peak Year meet its customers' requirements. Specifically, the average train transit times produced by the RTC simulation (including dwell time at the interchange yards, where appropriate) have been compared with

[35] TPI understands that the Board's staff is a licensee of, and has, the RTC Model, so the RTC Model itself is not being provided to the Board. Messrs. Fapp, Crowley and Humphrey used Version 69E of the RTC Model for the simulation of the TPIRR's peak-period operations presented in e-workpaper folder "RTC."

[36] *See CP&L* at 250.

CSXT's average train transit times (including dwell times) for the TPIRR's principal traffic flows during the First Year equivalent to the TPIRR's peak week, based on train-movement data produced in discovery. The CSXT and TPIRR transit-time comparisons for the TPIRR's principal traffic flows are shown in TPI's work papers.[37]

TPIRR's 2019 peak-week train transit times (and cycle times where available) for train movements over the various TPIRR line segments are equivalent to or faster than the real-world CSXT transit times for the comparable trains moved during the 2012 peak week.[38] This is a higher standard than that used by railroads in the real-world. In any event, the transit time comparisons demonstrate that the TPIRR can provide service commensurate with its customers' requirements.

3. Other

a. Rerouted Traffic

It is well established that, in stand-alone cost proceedings, Complainants are permitted the flexibility to design and route traffic differently than the actual operations of the defendant railroad.[39] In this proceeding, to rationalize CSXT's system and to create a more efficient railroad, TPI's experts have not constructed all of CSXT's parallel routes and instead have decided to include existing rail lines which best serve the TPIRR's customers while minimizing, if not eliminating, duplicate routes. As a result, some traffic is rerouted over a different route than used by CSXT for moving the traffic. The STB has categorized rerouted traffic as either an "internal reroute" or an "external reroute."

An internal reroute is where the movement is originated by the SARR (or interline received by the SARR) at a location on the actual route of movement and then terminated by the

[37] *See* e-workpaper "TPIRR Peak Week Transit Time Comparison.xlsx".
[38] *Id.*
[39] *See*, e.g., *AEPCO* at 15.

SARR (or interline forwarded back to the incumbent carrier) at a location on the actual route of movement. The SARR is free to move the traffic in any way it deems efficient between the two points on the actual route. Note, however, that, if the SARR moves the traffic over track that is not on the actual route of movement, the SARR must meet or exceed the service criteria (e.g., transit time) currently realized by the incumbent carrier between the two points on the actual route. Additionally, if the modeled interchange location is different than the actual interchange location, additional costs are included to compensate the receiving carrier for all costs associated with the new interchange location.

An external reroute is a reroute where the movement is originated by the SARR (or interline received by the SARR) at a location on the actual route of movement and then interline forwarded back to the incumbent carrier by the SARR at a location NOT on the actual route of movement. For an external reroute, the SARR is responsible for any costs incurred by the incumbent carrier as a result of having to move the rerouted traffic over track not normally used to handle the traffic. Examples of such costs would be capacity enhancements, e.g., passing sidings and enhanced signaling systems.

Although long-standing STB precedent allows a shipper to reroute issue and non-issue traffic (consistent with meeting real world service standards), TPI has elected to reroute only a limited amount of TPI issue and non-issue traffic in its SAC presentation. TPI does this in two ways.

First, as in prior SAC cases, TPI has occasionally rerouted entire trains over parallel or adjacent track in certain (generally urban) areas over very limited geographic scope. For example, TPIRR's network configuration around Atlanta requires it to route certain through trains over short segments of slightly different track than the corresponding real-world CSXT through trains.[40] These reroutes eliminate the need to introduce inefficient TPIRR-CSXT interchanges that would congest all yards in the Atlanta vicinity (and other similar places).

Second, TPI reroutes certain issue traffic movements by rerouting specific cars from the real-world CSXT trains on which they move to alternate TPIRR trains traversing alternative routes. Specifically, TPI rerouted TPI issue traffic moving between the following three areas in the base year:[41]

1. Florida Panhandle. Historically CSXT routed issue traffic moving between New Orleans and Florida destinations via {[redacted]}. The TPIRR does not include the segment between {[redacted]} over which this traffic moved in the real-world. Therefore, TPIRR will reroute this traffic in alternative manifest trains via Montgomery, AL, Atlanta, GA, and Waycross, GA.

2. Ohio to West Virginia. Historically CSXT routed issue traffic moving between Chicago and Clarksburg, WV via {[redacted]}. The TPIRR does not include the segment between {[redacted]} over which this traffic moved in the real-world. Therefore, TPIRR will reroute this traffic in alternative trains via Connellsville, PA, Newell, PA, and Grafton, WV.

3. Central Indiana. Historically CSXT routed issue traffic moving between Chicago and Ohio destinations via {[redacted]}. The TPIRR does not include the segment between {[redacted]} over which this traffic moved in the real-world. Therefore, TPIRR will reroute this traffic in alternative manifest trains via Deshler, OH or Fostoria, OH and Lima, OH.

Rerouting the issue traffic allows the TPIRR to operate more efficiently than CSXT because elimination of the alternative routes reduces the TPIRR network by a total of approximately 915 route miles[42] or approximately $3.84 billion[43] in road property assets, without

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40 More specifically, there are two CSXT rail lines running between Atlanta and Vaughn Connection, GA (near Union City). The TPIRR includes only one of the two parallel lines, and routes through trains over the segment it constructed.

41 A more detailed description of these three areas and their operations can be found in Exhibit III-C-1.

42 {[redacted]}: 393 miles, {[redacted]}: 420 miles and {[redacted]}: 102 miles.

43 915 miles x $4.2 million per route mile. *See* e-workpaper "III-F Total.xlsx".

any substantial change in service to the TPIRR's customers from that currently provided by CSXT.

b. Train Control And Communications

The TPIRR network employs a Positive Train Control ("PTC") system for all train control and communications. The Rail Safety Improvement Act of 2008 ("RSIA") (signed by the President on October 16, 2008, as Public Law 110-432) has mandated the widespread installation of PTC systems by December 2015.

As stated by the Federal Railroad Administration,

> PTC systems are integrated command, control, communications, and information systems for controlling train movements with safety, security, precision, and efficiency. PTC systems will improve railroad safety by significantly reducing the probability of collisions between trains, casualties to roadway workers and damage to their equipment, and over speed accidents.... PTC systems are comprised of digital data link communications networks, continuous and accurate positioning systems such as NDGPS, on-board computers with digitized maps on locomotives and maintenance-of-way equipment, in-cab displays, throttle-brake interfaces on locomotives, wayside interface units at switches and wayside detectors, and control center computers and displays.... PTC systems issue movement authorities to train and maintenance-of-way crews, track the location of the trains and maintenance-of-way vehicles, have the ability to automatically enforce movement authorities, and continually update operating data systems with information on the location of trains, locomotives, cars, and crews. The remote intervention capability of PTC will permit the control center to stop a train should the locomotive crew be incapacitated. In addition to providing a greater level of safety and security, PTC systems also enable a railroad to run scheduled operations and provide improved running time, greater running time reliability, higher asset utilization, and greater track capacity. They will assist railroads in measuring and managing costs and in improving energy efficiency.[44]

As discussed in Section III-F, unlike existing Class I carriers, the TPIRR is installing a PTC system from the outset of its construction and investment, rather than converting an existing train communications and control system to a PTC system. As a result, the investment

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[44] *See* http://www.fra.dot.gov/pages/PO152.

expenditures by the TPIRR are less than what an existing Class I carrier will incur to achieve the same level of infrastructure.

Moreover, based on discussions with the designer and developer of the RTC simulation model, the dispatch logic of the RTC most closely simulates the communications of a PTC system where there are no active signals within the model. Therefore, in all locations where PTC will be present on the TPIRR, TPI has disabled any signal logic.[45]

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[45] The developer of the RTC model has indicated that operating the model with the signal logic turned off closely mimics the expected operations assuming PTC system communications are employed.

PUBLIC VERSION

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III. STAND-ALONE COST

D. OPERATING EXPENSES

This Part of TPI's Opening Narrative summarizes the TPIRR's annual operating expenses for equipment, personnel, general and administrative ("G&A"), information technology ("IT"), and maintenance-of-way ("MOW") requirements, and the development of the related service units and costs. The expert witnesses responsible for the evidence in this Part include Richard H. McDonald (locomotive requirements and operating personnel and equipment); Gary V. Hunter (general and administrative personnel); Joseph A. Kruzich (information technology costs); Philip H. Burris (operating statistics, crew requirements, locomotive and freight car requirements, fuel costs, personnel compensation, equipment lease/maintenance costs, and operating units cost); and Harvey A. Crouch, P.E. (maintenance-of-way costs). Their detailed qualifications are included in Part IV.

TPI witnesses Fapp, Crowley, and Humphrey developed train transit/cycle times from the RTC Model simulation of the TPIRR's operations. The RTC Model output was used to calculate the TPIRR's transit times and locomotive requirements for the peak week of the Peak Year (3Q19-2Q20). Mr. Burris used this information to calculate locomotive hours and car hours for all trains moving in the Base Year (July 1, 2012 through June 30, 2013). Locomotive unit miles and car miles were also calculated for trains moving in the Base Year. The Base Year statistics were then indexed to the First Year (July 1, 2010 to June 30, 2011) in the DCF model.[1] The First Year statistics were utilized to determine overall locomotive requirements and car-ownership

[1] Development of the locomotive miles, car miles, locomotive hours, car hours, and train and enginemen ("T&E") requirements is shown in e-workpaper "TPIRR Operating Statistics_Open.xlsx."

requirements. T&E (train crew) personnel requirements were determined for all trains moving in the Base Year and indexed to First Year levels, as shown in the accompanying workpapers.[2]

The actual locomotive and car hours and associated expenses derived from train transit/cycle times for the First Year would be lower than those presented here because the average number of daily trains containing TPIRR traffic moved during the First Year is less than the daily trains moved by the TPIRR during the peak one-week period of the Peak Year. Thus, the TPIRR's transit/cycle times should be faster on a daily-average basis when compared to the peak week.

The TPIRR's First Year annual operating expenses developed using the statistics derived above are shown in Table III-D-1 below.[3]

Table III-D-1
TPIRR First Year Operating Expenses – (3Q10-2Q11)

	Expense Component	**Cost (in Millions)**
	(1)	(2)
1.	Locomotive Ownership	82.8
2.	Locomotive Maintenance	113.2
3.	Locomotive Operations	860.6
4.	Railcar Lease	217.4
5.	Materials & Supply Operating	4.8
6.	Train and Engine Personnel	394.9
7.	Operating Managers	96.0
8.	General & Administrative	91.6
9.	Loss & Damage	8.8
10.	Ad Valorem Tax	41.3
11.	Maintenance-of-Way	209.8
12.	Trackage Rights	23.6
13.	Intermodal Lift and Ramp	67.2
14.	Auto Handling	22.8
15.	Insurance	31.5
16.	Startup and Training	78.0
17.	Total[1/]	$2,344.4

[2] *Id.*

[3] Operating expenses for the TPIRR's First Year of operations are calculated at 3Q10 wage and price levels. The DCF model uses these expenses and indexes them to the appropriate time periods.

[1/] Total may differ slightly from the sum of the individual items due to rounding.

1. Locomotives

The TPIRR's First Year locomotive requirements are summarized in Table III-C-3 in Part III-C. The TPIRR uses three types of locomotives: GE ES44AC locomotives for road service (including helper service); SD40-2 locomotives for local train service and work trains; and SD40-2 and EMD SW1500 locomotives for yard switching. The TPIRR needs a total of 709 ES44AC locomotives and 145 SD40-2 locomotives to transport its First Year trains (including spares), and a total of 22 SD40-2 locomotives and 181 SW1500 locomotives for switch service.

a. Acquisition

TPI developed 2010 locomotive lease costs for ES44AC locomotives from information contained in the STB's decision in *AEPCO*[4] and the public version of defendants' reply statement in that proceeding. The annual lease expense developed from this data equals $97,881 per unit.[5] This amount is also supported by the public version of UP's Reply evidence in *IPA* which shows that UP's 2011 annual cost to lease ES44AC locomotives equals $95,851.[6] The total TPIRR lease cost in the First Year for ES44AC locomotives equals $69.4 million.[7]

4 *See AEPCO* at 40-41.

5 The STB's decision in *AEPCO* provides total investment in locomotives at page 40, and the number of units by type of unit at page 41. Defendants' Reply statement (public version) provides the lease price for switch locomotives at page III.D-3, thereby providing the information necessary to determine UP's average annual lease price for ES44-AC locomotive in 2009. *See* e-workpaper "III-D-1 Loco Cost.pdf."

6 *See* e-workpaper "III-D-1 Loco Cost.pdf."

7 In addition, to these locomotive lease amounts, capital costs to install required PTC equipment on all ES44AC and SD40-2 locomotives are included with the signals & communications investment expense in the DCF model. The amount included per locomotive is developed from information provided by CSXT in discovery.

The TPIRR also leases its SD40-2 locomotives at an annual lease price of ${{[redacted]}} per unit. This lease price is developed from information provided by CSXT in discovery.[8] The total TPIRR lease cost in the First Year for SD40-2 locomotives equals ${{[redacted]}} million.

The TPIRR also leases its SW1500 locomotives at an annual lease price of $36,970 per unit. This lease price is developed from an article in the June 2008 issue of *Railway Age* titled "2008 Guide to Equipment Leasing."[9] Application of this annual lease payment to the 181 SW1500 locomotives results in an annual lease payment of $6.7 million.

As explained in Part III-C-1, TPI used a road locomotive spare margin of {{[redacted]}} percent and {{[redacted]}} percent for ES44AC and SD40-2 locomotives, respectively, based on CSXT's actual experience as shown in materials it produced in discovery. TPI also applied a peaking factor, as mandated by the Board in *WFA/Basin*, to identify TPIRR's total annual road locomotive requirements. The peaking factor equals 5.3 percent and is equal to the average number of train starts per day in the peak week of the Peak Year divided by the average number of train starts per day in the Peak Year.[10] This is the same procedure as that used by the STB to calculate the peaking factor in *PSCo/Xcel II.*[11]

b. Maintenance

The TPIRR's locomotives undergo FRA-required 92-day inspections and minor repairs at each designated TPIRR yard. The locomotives are maintained primarily at Willard, Cumberland, Nashville, and Waycross yards, where the TPIRR has provided locomotive-maintenance

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[8] The lease price for SD40-2 locomotives ranges from {{[redacted]}} per day, indexed to 3Q10 using the AAR equipment rents index produces an annual lease rate of ${{[redacted]}}.

[9] *See* e-workpaper "III-D-1 Loco Cost.pdf." The lease price for SW1500 locomotives ranges from $75 to $125 per day. Using the average price of $100 per day, indexed to 3Q10 using the AAR equipment rents index, produces an annual lease payment of $36,970 per unit.

[10] Peak year trains = (192,425÷365=527 trains per day). Peak week trains = (3,882÷7=555 trains per day). Ratio = 555÷527 = 1.053. *See* e-workpaper "Train List Unit V09 12162013 With Peak Calc v2.xlsx," level "BsYrPeakAll."

[11] *See PSCo/Xcel II* at 13.

facilities to be used by its locomotive-maintenance contractor. Locomotives used for trains that do not operate through one of these locations or any other locomotive-inspection/maintenance point on CSXT (in the case of cross-over traffic) are routed on trains that do operate through one of the yards with a locomotive-maintenance facility, as necessary, to enable them to receive required maintenance, including periodic overhauls.

The locomotive-maintenance costs for ES44AC and SD40-2 locomotives are based on a locomotive-maintenance agreement between CSXT and {{[redacted]}} that CSXT provided in discovery. The locomotive costs per day that are used for ES44AC locomotives are specific for that locomotive. Because the agreement does not specify SD40-2 locomotive costs, the maintenance costs included in the agreement for other units similar to SD40s are used.[12] {{[redacted]}} no cost for overhauls of road locomotives is included in TPI's calculations.

CSXT's 2010 average locomotive-maintenance cost per locomotive unit mile is used for SW1500 locomotives. The CSXT cost per locomotive unit mile of $1.849 per locomotive unit mile was developed from CSXT's 2010 Annual Report Form R-1 filed with the STB.[13] The total locomotive-maintenance cost for the TPIRR equals $113.2 million in the First Year.[14]

The TPIRR also provides an End-of-Train Device ("EOTD") for each of its road locomotives.[15]

[12] *See* e-workpaper "III-D-1 Loco Cost.pdf."
[13] *Id.*
[14] *See* e-workpaper "TPIRR Operating Expense_Open.xlsx."
[15] *Id.*

c. Servicing (Fuel, Sand and Lubrication)

Contractors based at the TPIRR's yards fuel, sand, and lubricate locomotives. Locomotives are fueled and serviced using two different procedures. First, inspections of through trains moving extended distances on the TPIRR occur at Willard, Buffalo, Nashville, Cincinnati, Birmingham, and Atlanta. Fixed fueling platforms are located at each of TPIRR's major yards for fueling and servicing locomotives. Locomotives on through trains that are being inspected are removed and replaced with freshly fueled and serviced locomotives. Locomotives on trains originating at these locations are also fueled and serviced at the fueling platforms. Locomotives originating at locations other than those listed above are fueled by contractors using tanker trucks (known as direct-to-locomotive or "DTL" fueling).

i. Fuel Cost

The TPIRR's fuel cost is based on the price CSXT paid for fuel in 3Q10 of $2.17 per gallon as reported in CSXT's Quarterly Report to the Securities and Exchange Commission for Third Quarter 2010.[16]

ii. Fuel Consumption

The average fuel-consumption rate for the ES44AC locomotives was developed from fuel-consumption data provided by CSXT in discovery for 2010 through 2Q13 for ES44AC locomotives. TPI used CSXT's system average fuel consumption, which it developed from CSXT's 2010 R-1 Annual Report, for SD40-2 and switch locomotives, because the fuel-consumption data for SD40-2 locomotives provided by CSXT in discovery was unrealistically

[16] *See* e-workpaper "III-D-1 Loco Cost.pdf."

low. The CSXT system average fuel consumption for road and switch locomotives equals 2.40 and 3.58 gallons per locomotive unit mile, respectively.[17]

iii. Locomotive Servicing

Other TPIRR locomotive-servicing costs (primarily sand, lubrication, and lube oil) are based on a cost of $0.3263 per diesel unit-mile for ES44AC and SD40-2 locomotives and $0.2295 for SW1500 locomotives. The amounts for sand and lubrication are calculated using CSXT's 2010 R-1, and the amount for lube oil is developed from information provided in discovery.[18]

2. Railcars

a. Acquisition

The TPIRR uses a mixture of railroad-provided cars and private cars. For railroad-provided cars, TPI developed car costs using three different approaches. First, for non-coal traffic moving in cars owned by foreign roads, TPI based the car costs on time and mileage by car type, which it developed from CSXT's 2010 R-1.

Second, for non-coal traffic moving in CSXT equipment, TPI developed annual full-service lease costs for each car type from information CSXT provided in discovery or from publicly-available sources.[19]

The cars provided by the TPIRR for non-coal traffic include boxcars, covered hoppers, gondolas, open-top hoppers, and flat cars. The annual full-service lease cost per car for each car type is as follows:

Boxcars	$3,039
Covered Hoppers	$3,593

[17] *Id.*

[18] *See* e-workpaper "Loco Servicing Cost.xls."

[19] *See* e-workpapers "TPIRR Car Costs_Open.xlsx" and "III-D-2 Car Costs.pdf."

Gondolas	$5,267
Open-top Hoppers	$5,267
Flat Cars	$5,368

The car-hour requirements for TPIRR provided cars are based on RTC transit times, plus free time at shipper origin and destination and dwell times in TPIRR yards. The free time included is based on CSXT Tariff 8100.[20] This tariff specifies that CSXT demurrage charges are $105 per car per day, or fraction thereof, and provides for a one-day credit (free day) for loading and a two-day credit (free days) for unloading. These credit days are included in the calculation of car days for the purpose of determining TPIRR system car requirements. Time beyond the credit days at origin and destination are not included because CSXT collects $105 per car per day for that time. Given that the typical car lease cost is between $8.00 and $36.00 per day,[21] the $105 charge per day received by CSXT, and which would be received by TPIRR, more than offsets any additional car costs the TPIRR would incur for system cars at origin or destination.

Dwell time in yards of 15.9 hours per car is included based on the average dwell time experienced by the most efficient Class I carriers as reported by the AAR and summarized by Oliver Wyman for each quarter from 1Q10 through 3Q13.[22]

Third, for TPIRR-provided coal cars, car lease payments are based on annual full-service lease costs developed from information provided by CSXT in discovery or the *Railway Age* Article. The annual full-service lease for coal cars is $2,940 for gondolas and $3,000 for hoppers.[23]

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[20] A copy of CSXT Tariff 8100 is included as e-workpaper "CSX Demurrage.pdf."
[21] Annual lease cost of $2,940 and $13,200 divided by 365 days, respectively.
[22] *See* e-workpaper "Most Efficient Dwell Times.xlsx."
[23] *See* e-workpaper "TPIRR Car Costs_Open.xls."

The TPIRR's freight-car requirements include a spare margin of {{[redacted]}} percent. This spare margin is based on a review of 22 transportation contracts provided by CSXT in discovery, which specify spare margins for shipper-provided cars and show spare margins that range from {{[redacted]}} percent. Of the 22 contracts, 11 provide for spare margins of {{[redacted]}}.[24]

b. Maintenance

As described above, the TPIRR uses full-service car leases for the railcars it provides. Because full-service lease payments include maintenance costs, no other maintenance costs are included.

Shippers who supply railcars for their TPIRR movements make their own separate arrangements for maintenance of their cars at existing car-repair facilities on or near the route of movement. Minor repairs are made to all cars on the TPIRR as necessary and required by AAR interchange rules. No expense is included for repairs made to shipper or foreign-carrier equipment as shippers and foreign carriers would be billed for any such repairs and the revenue from these services are assumed to more than offset the cost of the repairs.

c. Private Car Allowances

For private cars used for non-coal traffic, TPI's experts have included a private-car charge per car-mile by car type, which is applied to all private car-miles on the TPIRR. The private-car mileage charge by car type was developed from data contained in CSXT's 2010 Annual Report Form R-1.[25]

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[24] {{[redacted]}}.

[25] *See* e-workpapers "TPIRR Car Costs_Open.xlsx" and "III-D-2 Car Costs.pdf."

For TPIRR coal movements that occur in private cars, the cars are provided per diem and mileage free under the terms of the relevant CSXT transportation contracts and other pricing authorities (that is, the cars are provided free of charge to CSXT and the freight rates reflect the fact that CSXT is not incurring car costs). Because the TPIRR is replacing CSXT with respect to its coal traffic, the TPIRR also pays no per diem or mileage allowances for coal movements in private cars.

For flat cars used in intermodal shipments, {[redacted]} percent will be railroad-provided equipment and {[redacted]} percent will be shipper equipment, based on data developed from data provided by CSXT in discovery.[26]

3. Operating Personnel

Consistent with the stand-alone concept of identifying the least-cost, most-efficient, feasible hypothetical alternative to the incumbent, the TPIRR is a non-union railroad that is built from the ground up to handle a defined traffic group.[27]

TPI has developed a staffing plan and associated personnel for the TPIRR to handle its projected peak traffic volume safely and efficiently by taking full advantage of modern technology. This staffing plan also permits the railroad to maintain its facilities in good condition while minimizing cost.

The TPIRR's operating personnel include train-crew, line-supervisory, and field employees in Transportation, Engineering/Maintenance-of-Way, and Mechanical departments. The senior Operations staff (headquartered at Atlanta, GA) report directly to the Vice Presidents of Transportation, Engineering, and Mechanical, who report to the Vice President–Operations.

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[26] *See* e-workpapers "TPIRR Car Costs_Open.xlsx" and "TPI ATC URCS Inputs_Containers V42.1.xlsx."
[27] The Board has accepted the concept of a non-unionized SARR. *See PSCo/Xcel I* at 651; *TMPA* at 687.

The TPIRR's operating-personnel requirements are summarized below and fully discussed in Exhibit III-D-1.

a. Train/Switch Crew Personnel

The TPIRR requires a total of 3,108 Train & Engine ("T&E") crew members to transport its First Year trains. This count, which includes helper crews and switch crews based at the TPIRR's yards, is based on the number of trains moving over the various parts of the TPIRR system during the first 12 months of operation, the crew assignments developed by Mr. McDonald (as described in Part III-C), and the switch assignments (including classification and blocking) at the TPIRR's yards. The RTC Model simulation performed by Messrs. Fapp, Crowley, and Humphrey was used to confirm that train crews operating in these crew districts generally could complete each tour of duty within 12 hours and otherwise comply with the federal Hours of Service law, as amended.[28]

Consistent with Board precedent, T&E crews were developed using the total number of crew starts as determined by the actual train counts over an entire year.[29] In this instance, crews were determined for all trains moving in the First Year. The total crew starts were then increased to reflect the 0.68 percent re-crewing requirements based on the results of the RTC simulation indicating the number of crews whose on-duty time expired under the Hours-of-Service law. As discussed in Exhibit III-D-1, the number of road crews was also adjusted to reflect crew deadheading that results from train-flow imbalances. The adjusted crew count was then used to determine the total number of T&E crews required using the standard formula employed by the

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[28] *See* e-workpaper "TPI Open.DELAY."

[29] *See PSCo/Xcel I* at 645.

Board to determine how many crews are required to cover the number of crew starts, assuming that each crew member is available 270 days a year.[30]

b. Non-Train Operating Personnel

The TPIRR's staffing requirements for operating personnel other than train and switch crews and MOW personnel are organized into two departments, all reporting to the Vice President–Operations.[31] The 874 non-train operating TPIRR personnel are summarized by department in Table III-D-2 below and fully discussed in Exhibit III-D-1. MOW personnel are discussed separately in Part III-D-5 and Exhibit III-D-3.

Table III-D-2
TPIRR Non-Train Operating Personnel

Operations Department Position (1)	No. of Employees (2)
1. Vice President Operations Office	36
a. Transportation Department	529
b. Mechanical Department	309
2. Total Non-Train Operating Personnel	874

Source: Exhibit III-D-1

c. Compensation

Compensation for the T&E personnel and other non-train operating personnel is derived from CSXT's 2010 Wage Forms A&B and is established at the same levels as those paid by CSXT for comparable positions.

As stated previously, T&E personnel are assumed to work 270 shifts per year. Based on information provided by CSXT in discovery, T&E wages are determined using wages paid to

[30] *Id.* This number is not affected by the hours-of-service provisions of RSIA.
[31] Engineering Department staff also report to the Vice President – Operations. The staffing of the Engineering Department is discussed in Exhibit III-D-3, Maintenance of Way.

T&E personnel who worked 270 or more shifts per year in 2010.[32] The T&E wages include all constructive allowances paid by CSXT to its train and enginemen. The total compensation for T&E personnel equals ${{[redacted]}}. Total compensation (including fringe benefits) for TPIRR's non-train operating personnel equals $96.0 million. Salaries and total compensation for the TPIRR's T&E personnel and for the non-train operating personnel are detailed in Exhibit III-D-1.

Fringe benefits for all TPIRR employees are based on 43.5 percent of wages. This number is based on the average ratio of fringe benefits to total wages paid in 2010 to employees of all Class I carriers, as reported by the Association of American Railroads. This method of determining the fringe benefit ratio has been approved by the Board.[33] In addition, it is the same method used by Complainants and accepted by both Defendants and the Board in *AEPCO*.[34]

d. Taxi and Hotel Expense

The TPIRR also incurs taxi and overnight expenses for train crews. The number of taxi trips required, the cost per trip, the number of overnight stays and the cost per stay were identified for each crew.[35] The cost of hotels is based on "rack rates" identified through a review of available hotel rates at specific locations near the TPIRR on the internet. As with any Class I railroad the TPIRR would be able to negotiate hotel rates lower than rack rates based on the high volume of overnight stays its T&E employees would require. It is assumed that the difference between the rack rate included in TPI's analysis and the hotel rates the TPIRR would be able to

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[32] *See* e-workpaper "T&E Salary Roster Update_Revised.xlsx."

[33] *See WFA/Basin I* at 66.

[34] The Public Version of AEPCO's Opening Evidence shows the derivation of the fringe benefit ratio in that proceeding. *See* AEPCO's January 25, 2010 Opening Evidence, Public Version, page III-D-25. Review of Defendants Reply evidence shows that they did not object to this fringe benefit ratio. *See* Defendants Reply Evidence dated May 7, 2010, pp. III.D-29 to 30. Moreover the STB accepted this evidence without comment in *AEPCO*.

[35] *See* e-workpaper "TPIRR Hotels Taxis_Open.xlsx."

negotiate would be more than sufficient to pay for meals for T&E employees in overnight service.

Consistent with Board precedent, taxi trips and overnight stays were developed using the actual train counts (and the crews' related taxi and hotel requirements) over an entire year.[36]

The TPIRR's unit cost for taxi trips is estimated based on current rates for taxi service at each location where available. Where specific taxi rates were not developed, the average taxi rate by state was used. The cost per overnight stay ranges from $30 to $95 and is based on hotel-room rates throughout the TPIRR system.[37]

e. Materials, Supplies and Equipment

Materials, supplies, and equipment for operating personnel (other than MOW personnel) include office furniture and equipment, office supplies, safety equipment, EOTDs, motor vehicles (including railcar inspection vehicles), and tools and supplies. The total annual operating expense for these items equals $4.8 million in the First Year.[38]

4. G&A Expense

The TPIRR personnel have all been designated as operating personnel or as G&A personnel. Those employees who might be considered non-operating personnel on a Class I railroad are all included in the TPIRR G&A staff discussed below.

The G&A expenses for the TPIRR include its headquarters (corporate), management and administrative staff, buildings and equipment, and other expenses, including IT requirements. These expenses have been developed on the basis of the experience of TPI's Witnesses Hunter, McDonald, Burris, and Kruzich. Mr. Hunter and Mr. McDonald, in particular, have held a

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[36] *See WFA/Basin I* at 48; *PSCo/Xcel I* at 651-652.
[37] *See* e-workpaper "TPIRR Hotels Taxis_Open.xlsx."
[38] *See* e-workpapers "TPIRR Operating Expense_Open.xlsx" and "III-D-3 Material and Supplies.pdf."

number of senior management positions at Class I railroads. Mr. Burris developed G&A personnel salaries based on salaries paid to comparable CSXT or (where appropriate) other railroad personnel. TPI's IT expert, Joseph Kruzich, developed the TPIRR's IT requirements and costs, including computer hardware, systems, software, support personnel, and outsourcing needs.

The TPIRR's engineering staff was developed by TPI's engineering witness, Harvey Crouch, in consultation with Mr. McDonald. Because the engineering function principally involves MOW, the TPIRR's engineering personnel are discussed below in Part III-D-5.

a. Staffing Requirements

TPI used the following methodology to develop the G&A staff needed for the TPIRR. First, TPI considered the needs of the TPIRR traffic base, the size and scope of the TPIRR design, and the commodities handled by the TPIRR. TPI also utilized its witnesses' many years of experience in the rail industry, public information about other railroads, and information obtained from CSXT in discovery. Finally, TPI evaluated Board precedent. Based on all these sources of information, TPI determined the most efficient way for the G&A needs of the TPIRR to be fulfilled.

TPI designed its G&A department from the ground up so that the TPIRR could operate in the most efficient manner possible. For example, where a necessary task is sporadic or could be more appropriately completed by a third-party contractor, TPI included funds for such contracting rather than designating additional TPIRR employees to handle the task. The TPIRR is one of the largest SARRs considered by the Board. Where possible, the G&A staffing of the TPIRR was designed to take advantage of these economies of scale because many G&A functions do not vary with the number of route miles or the traffic volume. The nature of most

G&A functions means that a railroad the size of the TPIRR can achieve greater staffing economies of scale than a small railroad.

The G&A staff are based at Atlanta, GA, where the TPIRR's corporate headquarters building is located. This staff covers all executive and administrative functions, including sales and marketing, legal services, accounting, financial reporting, payroll, information systems, human resources, administrative and clerical services, and supervising contractors in the performance of some outsourced functions.

The TPIRR's G&A staff is summarized in Table III-D-3 below by department. This table does not include the operating and MOW employees located at the Atlanta, GA headquarters, who are discussed elsewhere in this Part. The G&A personnel requirements by department are fully discussed in Exhibit III-D-2.

Table III-D-3
TPIRR G&A Personnel Requirements

Position (1)	No. of Employees (2)
1. Executive Department Total	30
2. Sales and Marketing Department Total	56
3. Finance and Accounting Department Total	100
4. Law Total	45
5. Information Technology Department	73
6. Total General & Administrative Personnel	304

Source: Exhibit III-D-2

From a staffing perspective, TPIRR is unique because it is a startup railroad and has the benefit of designing the personnel structure to match its specific needs with current technology. Most railroads today are well established and the products of several consolidations and mergers. Today's real-world railroads tend to have layers of personnel from previous structures, carried over due to contracts, convenience, and labor liabilities, rather than the minimum necessary under newer, more efficient structures. Because of this fact, there are no existing railroads today from which to make a reasonable comparison to TPIRR from a staffing standpoint, especially when size, miles, and revenues are also considered. Nevertheless, TPI was able to compare the TPIRR to a previously-existing railroad, the Chicago and North Western Railway ("C&NW"), of similar route mileage. For this comparison, we used the C&NW as it existed in 1994 due to its similar size to TPIRR and because TPI's witness McDonald has intimate insights on the C&NW's staffing, having served as its VP of Operations in 1994. Table III-D-4 below compares non-train and engineering staffing (i.e., G&A personnel as well as Operations-management personnel) for TPIRR to C&NW from 1994.

Table III-D-4
Comparison of TPIRR Non-T&E
Staffing To CNW 1994 Staffing

	Organization	TPI Opening	1994 C&NW
	(1)	(2)	(3)
1.	Non-road Operations 1/	593	450
2.	General & Administrative	304	533
3.	Total	897	983
4.	Route Miles	7,357	5,211
5.	Employees / Route mile	0.122	0.189

1/ Excludes Car Inspectors.
Source: Exhibits III-D-1 and III-D-2.

As can be seen in Table III-D-4 above, the TPIRR compares reasonably with the 1994 C&NW, especially when the startup nature of the TPIRR and technology improvements since 1994 are considered.[39] --This comparison of staffing is even more compelling when one considers that the configuration of C&NW was exceptionally different than that of the TPIRR in

[39] Examples of technology improvements that have occurred since 1994 include processing capability and speed, information-storage and retrieval capabilities, information sharing capabilities, interface and automation improvements, communications, and computer-based training.

that C&NW had many more branch lines than the TPIRR. Each branch line in a rail system requires a separate operation with its own associated costs, carries different traffic and resulting gross ton miles, and has its own maintenance requirements separate from the main line. Each branch line is continuously rationalized based on these costs and traffic to ensure the significant costs are justified by the traffic. Every branch line on a rail system adds to this complexity, affecting maintenance, equipment, labor, and liability costs. The same amount of traffic handled on a single main line requires more attention, planning, and resource allocation when it is divided onto several branch lines. Therefore, a railroad with fewer branch lines is less complex than a railroad with more branch lines, even if handling overall similar traffic volumes. This results in fewer personnel needed for operations, maintenance, and capital planning.

Summary descriptions of each of the TPIRR's major G&A components are provided below. More specific descriptions of G&A components can be found in Exhibit III-D-2.

i. Executive Department

The TPIRR's Executive Department consists of the President's Office and the TPIRR's Board of Directors. The President's office consists of 30 people including the President, the Board of Directors, a Corporate Secretary, Corporate Communications and Government Affairs staff, Human Resources staff, Corporate Quality Improvement/Assurance staff, and a Manager–Planning.

ii. Marketing Department

The TPIRR Marketing Department consists of 56 people and is headed by the VP–Sales and Marketing, who is assisted by eight (8) Assistant VP's ("AVP"). The Sales and Marketing Department is responsible for managing sales to TPIRR's existing customers and marketing transportation services to potential customers.

iii. Finance and Accounting Department

The Finance and Accounting Department is responsible for the TPIRR's basic financial and accounting functions, including treasury, taxation, revenue collection, disbursements for accounts payable, financial reporting, and budgeting and analysis. It comprises 100 employees and is headed by the VP–Finance and Accounting who has an Administrative Assistant (like the other vice presidents). The department has AVP's for Finance, Accounting, and Tax and Directors for Planning and Analysis and Internal Auditing. The VP–Finance and Accounting is also the TPIRR's Chief Financial Officer.

iv. Law Department

The Law Department comprises 45 employees. It is headed by the VP–Law (with assistance from an Administrative Assistant) who is responsible for the TPIRR's legal affairs as well as real estate, claims, and security.

v. Information Technology Department

The TPIRR's IT systems and associated personnel were developed by TPI Witness Kruzich, who has considerable experience with the IT function at Class I and other railroads. The IT system (described in Section III-D-4-d below) is administered by a staff consisting of a VP–Information Technology, three (3) Directors–Information Technology, 68 IT Specialists, and an Administrative Assistant. As discussed in more detail in Exhibit III-D-2, the TPIRR does not have a main-frame environment, but rather an NT/PC-based system. This means far less IT effort is required than a typical Class I railroad due to the relative simplicity of an NT/PC-based system and the fact that many of the IT requirements are outsourced to RMI (i.e., Transportation, Revenue, Intermodal, and Car Hire functions).

b. Compensation

The salaries and benefits for the TPIRR's G&A personnel described above and detailed in Exhibit III-D-2 are based on comparable and competitive compensation packages presently available in the railroad industry (and in other service industries).

Specifically, annual salaries for the G&A personnel are based on data contained in CSXT's Wage Forms A and B, with several exceptions. Salaries for the President and the Vice Presidents included in the G&A staff are based on the salaries, including bonuses and Non-Equity Incentive Plan compensation, paid for similar positions by the Kansas City Southern Lines ("KCS"), a holding company that owns and operates the Kansas City Southern Railway, the Kansas City Southern de Mexico, and the Texas Mexican Railway Company. According to the KCS's website, the three major lines comprising the KCS operate 7,075 route miles of railroad, which is similar to the 7,357 route miles operated by the TPIRR. This is far smaller than CSXT which operates nearly 21,000 route miles and substantially smaller than the other Class I railroads.

As stated previously in the discussion of Train and Engine Crew compensation, fringe benefits for all employees are 43.5 percent of wages based on information available from the AAR. The fringe benefit ratio includes expenses related to health and welfare benefits, railroad retirement, supplemental annuities, unemployment insurance, and other programs.

The total compensation for the TPIRR G&A employees in the First Year is $27.0 million. This compensation by employee is addressed in Exhibit III-D-2.

c. Materials, Supplies and Equipment

Consistent with the stand-alone principles of unlimited resources and barrier-free entry, the ready availability of materials and equipment is assumed.

The TPIRR owns or leases various types of vehicles and equipment used by its Operating and G&A staffs as discussed in Exhibits III-D-1 and III-D-2. TPI has also included costs for miscellaneous office equipment, office supplies, desks, tools, safety equipment, and other items.[40] The cost for this equipment is $653,786 in the First Year and is included in the calculation of the TPIRR's annual operating expenses.[41]

d. Other G&A Expense

i. IT Systems

The TPIRR's information-technology systems have been developed by TPI Witness Joseph Kruzich, an experienced railroad IT expert. Mr. Kruzich has worked for Class I railroads reviewing various work procedures and providing recommendations on how the work processes could be improved to achieve a high degree of efficiency. This position provided him an opportunity to become very familiar with various work processes involved in running a railroad. Mr. Kruzich also served as IT Vice President of the Kansas City Southern Railroad and was instrumental in directing the development of new KCS computer systems in the late 1990's. A more detailed description of Mr. Kruzich's qualifications is contained in Part IV.

Mr. Kruzich reviewed the TPIRR's operating plan and G&A requirements to determine the railroad's basic computer and communications needs and the kind of support needed by its staff. The IT systems described below and detailed in Exhibit III-D-2 enable the TPIRR to operate safely and efficiently and to perform all administrative functions.

The TPIRR has an average of 555 train movements per day in the peak week. Whenever possible the TPIRR has multiple-car billing (using the RMI Revenue System to allocate revenues), rather than billing for individual railcars. This reduces the complexity of the

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40 *See* e-workpaper "TPIRR Operating Expense_Open.xlsx."

41 *See* e-workpapers "TPIRR Operating Expense_Open.xlsx" and "III-D-3 Material and Supplies.pdf."

computer and communication systems required to support operations, rendering the expensive mainframe systems used by large carriers unnecessary. Based on the TPIRR operating plan and G&A staff departments, the capital requirements for IT and communications systems are $29.0 million.[42] The annual operating cost for IT and related communications equals $33.8 million at 3Q10 price levels.[43] Table III-D-5 below shows the capital and annual operating expenses separately for information technology and related communications systems.

Table III-D-5
Capital And Operating Costs For
TPIRR IT And Communications Systems

Item	Capital Cost	Operating Expense
(1)	(2)	(3)
1. Information Technology	$28,736,110	$32,628,553
2. Communications	280,111	1,189,927
3. Total	$29,016,221	$33,818,480

Source: e-workpapers "TPIRR - Capital Budget.xls" and "TPIRR - Operating Budget.xls."

The TPIRR's computer and IT communications systems have been designed to meet the company's mission-critical technology needs to achieve operating efficiencies, customer satisfaction, optimum staffing,[44] maximum productivity, and safe train operations. The costs shown in the workpapers are based on the TPIRR's highest daily train counts and number of annual carload transactions.

In addition to the amounts shown above for IT capital, costs for IT hardware and software are included in the signals and communications investment account that are required for the TPIRR's PTC signaling system. The amount included is based on values provided by CSXT in

[42] *See* e-workpaper "TPIRR - Capital Budget.xls."
[43] *See* e-workpaper "TPIRR - Operating Budget.xls."
[44] The TPIRR's IT personnel requirements are described in the discussion of G&A personnel in Exhibit III-D-2. The IT staff size is largely a function of the systems described in this section.

discovery for additional IT systems and prorated to the TPIRR based on a route mile basis. The amount provided was reduced to eliminate duplication of the dispatching system already included in the IT capital cost reflected above.

ii. Other Outsourced Functions

As described earlier, several functions customarily provided in-house by large Class I railroads can be efficiently outsourced by the TPIRR. Consistent with the stand-alone concept of an efficient, least-cost railroad, outsourcing is used wherever the economics so justify without sacrificing the SARR's feasibility or service quality.

Outsourced functions include several finance and accounting functions, including payroll processing, financial/account auditing, and certain legal services.[45]

A number of independent-accounting, payroll-service, and other firms have the experience and systems to perform these functions. For example, the payroll service firm Paychex has experience in complying with Railroad Retirement and other railroad-specific tax and regulatory reporting requirements. Other outsourced G&A functions are described in Exhibit III-D-2.

Estimated annual costs of $11.7 million have been developed for outsourcing all of the functions described above.[46]

iii. Start-Up and Training Costs

The TPIRR's start-up and training costs have been calculated based on information provided by CSXT in discovery at a cost of $78.0 million. Consistent with *WFA/Basin I*, start-

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45 *See* e-workpaper "TPIRR G&A Outsourcing_Opening.xlsx."
46 *Id.*

up training and recruitment costs are treated as an operating expense in the TPIRR's First Year of operations.[47] Training and recruiting costs are fully discussed, by position, in Exhibit III-D-2.

iv. Travel Expense

Travel expenses have been included for all TPIRR employees at the Director level and higher (except for the Assistant Controllers, as these positions do not require travel) and for the five (5) outside members of the Board of Directors. Annual travel expenses of $10,475 per employee are included. This amount is based on the 2010 annual survey of corporate travel managers performed by Runzheimer International, which estimates the annual cost of corporate business travel.[48]

5. Maintenance-of-Way

The MOW plan for the TPIRR was developed by TPI's expert railroad engineering witness, Harvey Crouch.[49] It was also reviewed and approved by Richard McDonald, TPI's rail operations expert, who has engineering and operating experience.

Mr. Crouch served in the Southern Railway's and then NS's Engineering Department from 1977 to 1987, including service as a Project Engineer and Track Supervisor in the Maintenance of Way & Structures Department. His experience is fully detailed in his Statement of Qualifications in Part IV.

Mr. Crouch considered the kinds of terrain and climate in which the various portions of the TPIRR are located in developing the TPIRR's MOW plan and incorporated the significant aspects of the variations in terrain and climate into the MOW plan and staffing.

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47 *See WFA/Basin I* at 51-54.

48 *See* e-workpaper "III-D-3 Travel.pdf."

49 Mr. Crouch is also sponsoring TPI's evidence on the TPIRR's construction costs in Part III-F below. The staffing for the TPIRR's MOW Communications & Signals Department is also sponsored by TPI's communications and signals experts, Victor Grappone, PE and James Hoelscher.

Consistent with *WFA/Basin I*, Mr. Crouch's MOW plan has a substantial field staff to perform day-to-day inspection and maintenance activities, supported by a managerial/office engineering and support staff that reports to the TPIRR's VP–Engineering and Mechanical. The plan also includes capital-maintenance programs during the 10-year DCF period to renew/replace the fixed facilities and, in particular, the principal elements of the track structure. The TPIRR's MOW staff has been structured to include planning, budgeting, and contracting related to annual capital programs.

As fully described in Exhibit III-D-3, when developing the TPIRR's MOW plan, Mr. Crouch started by considering the maintenance functions that need to be performed, and then developed an appropriate field organization and supervisory/support staff for each function, given the railroad's geographic scope, terrain, number of trains, and gross tonnages. The basic functions include track inspection and routine maintenance, communication and signal inspections, testing and maintenance, bridge inspection, minor building maintenance, and budgeting and administrative support. Mr. Crouch also considered the equipment needs for each function, as well as the maintenance work (other than capital program maintenance) that appropriately could be contracted out. The total MOW expense in the First Year equals $209.8 million.

Each of the categories of MOW expense is discussed at length in Exhibit III-D-3. This Exhibit also addresses program maintenance and maintenance scheduling. Detailed calculations of the costs are provided in Mr. Crouch's supporting e-workpapers.

6. Leased Facilities

The TPIRR's 21 joint-facility and trackage-rights agreements cover 491 route miles throughout its system. The development of the annual payments to CSXT and other carriers for use of these trackage rights is shown in the workpapers included with this opening evidence.[50]

7. Loss and Damage

The TPIRR's annual loss and damage cost equals $8.8 million. This cost was developed by multiplying CSXT's actual 2010 loss and damage per ton for the commodities moving on the TPIRR by the number of tons of each commodity moved on the TPIRR in 2010.[51] In other SAC proceedings, complainants and defendants have used, and the Board has accepted, this same methodology to calculate loss and damage costs.[52]

8. Insurance

The standard practice of large railroads is to self-insure against potential liability, except for catastrophic risks. The TPIRR also self-insures for most types of claims and obtains insurance at competitive rates to cover catastrophic loss and Federal Employers Liability Act exposure.

Insurance expenses for the TPIRR were calculated using CSXT's average insurance ratio of 1.35 percent of operating expenses for the period 2010 through 2012.[53] NS advocated using this methodology in a recent case of similar scope.[54]

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[50] A summary of the Joint Use and Trackage Rights agreements utilized by the TPIRR is included in e-workpaper "Open TPI Joint Facility charges 2010.xlsx."

[51] For cross-over traffic, TPI calculated the TPIRR's share of the loss and damage payments on the percentage of the TPIRR's car-miles to CSXT's total car-miles by two-digit STCC code. *See* e-workpaper "TPIRR FDCI by STCC-2010.xls."

[52] Review of the public record shows that most recently, the Complainant used this method in the *AEPCO* proceeding and it was accepted by Defendants in that proceeding, without comment by the Board.

[53] *See* e-workpaper "TPIRR Ad Valorem 2010_Open.xls."

[54] *See* NS Reply at III-D-278, *DuPont* (filed Nov. 30, 2012).

9. Ad Valorem Taxes

The TPIRR operates in the states of Alabama, Florida, Georgia, Illinois, Indiana, Kentucky, Louisiana, Maryland, Mississippi, New York, North Carolina, Ohio, Pennsylvania, South Carolina, Tennessee, Virginia and West Virginia as well as the District of Columbia. To develop ad valorem taxes, the amount of tax that CSXT paid per route mile was calculated for CSXT's route miles in each state. These amounts were then applied to the TPIRR's route miles in each state and summed to arrive at TPIRR's total Ad Valorem Tax burden of $41.3 million in the First Year. This approach for developing ad valorem taxes allows for the consideration of the differences between how each state actually determines final assessed values. These differences can occur between valuation approach weightings, allocation factors, exemptions, assessment percentages as well as opportunities for appeals, litigation, or settlements.

10. Other

a. Intermodal Lift and Ramp Cost

In addition to the line-haul costs associated with intermodal traffic related to locomotives, fuel, crews, and maintenance-of-way, the TPIRR incurs lift and ramp costs. These costs have been included for all containers and trailers originating or terminating on the TPIRR based on the amount CSXT incurs for providing lift and ramp services at intermodal terminals located on the CSXT lines included in the TPIRR network.[55] The costs were calculated at each CSXT facility and applied on a facility-by-facility basis to the containers and trailers handled at each facility by the TPIRR.

55 *See* e-workpaper "Intermodal Terminal Cost and Volume Update lift 2010.xlsx."

The lift and ramp services include costs for contract services, equipment repair, rail operations, government fees, terminal security, and other items. The total intermodal-lift and ramp expenses incurred by the TPIRR equal $67.2 million in the First Year.[56]

b. Automotive Handling Cost

Automotive handling costs are included for loading and unloading automobiles to and from railcars. The costs were calculated based on information provided by CSXT in discovery for automobile handling at each CSXT facility and applied on a location-specific basis to the number of vehicles being loaded or unloaded. The total cost of automobile handling for the TPIRR equals ${{[redacted]}}.[57]

c. Calculation of Annual Operating Expenses

As noted at the beginning of this Part, the statistical inputs used to develop the TPIRR's annual operating expenses (equipment and operating-personnel needs, locomotive unit miles, crew starts, etc.) were developed by TPI's expert operating, IT, and engineering/MOW witnesses, with assistance from TPI's witness Burris. Mr. Burris also developed the annual salaries, equipment, and operating unit costs. Mr. Burris used all of these inputs to develop the TPIRR's First Year operating expenses.[58]

The procedures used to develop the TPIRR's annual operating expenses for the First Year—applying transit times calculated for the peak period of the Peak Year to a full year of train data to calculate operating statistics, rather than calculate statistics for the peak week and

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56 *See* e-workpapers "SARR Containers Orig Term Locations V42 07 03 02082014.xlsx" and "Intermodal Terminal Cost and Volume Update lift 2010.xlsx."

57 *See* e-workpapers "SARR Car Type 12 Orig Term Locations V42 07 01 02072014(2).xlsx" and "Automobile full year 2010 TPI.xlsx."

58 *See* e-workpaper "TPIRR Operating Expense_Open.xlsx."

expanding those statistics to reflect a full year of data—were approved by the Board in *WFA/Basin I*.[59]

The First Year operating expenses were then provided to Messrs. Crowley and Fapp who developed operating expenses for each period in the DCF model.

[59] *See WFA/Basin I* at 33.

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E. NON-ROAD PROPERTY INVESTMENT III-E-1

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III. STAND-ALONE COST

E. NON-ROAD PROPERTY INVESTMENT

The testimony in this Part is being sponsored by Timothy D. Crowley, a Vice President of L.E. Peabody & Associates, Inc. His credentials are detailed in Part IV.

1. Locomotives

As previously described, the TPIRR leases ES44AC and SD40-2 road locomotives and SW1500 switching/work-train locomotives. The annual lease cost is included as an operating expense. The acquisition of all locomotives is described in Part III-D-1.

2. Railcars

The TPIRR also leases all of the railcars needed to serve the traffic group that are not supplied by shippers or foreign railroads. The annual lease cost is also included as an operating expense and is described in Part III-D-2.

3. Other

As explained in Part III-D, most of TPIRR's other equipment, including company vehicles, maintenance-of-way equipment (e.g. hi-rail trucks), radios, and telephones will be leased or purchased. The annual lease cost for this equipment is included as an operating expense. To the extent any of this equipment is purchased, the purchase price is annuitized and included with operating expenses.

Some items of equipment will be purchased, in particular computers and related hardware. The TPIRR's computer system needs, and the associated capital investment, are described in Part III-D(4)(d).

The TPIRR operates over 491 miles of track through trackage-rights or joint-facilities agreements in the same capacity as CSXT does today. The TPIRR steps into the shoes of CSXT and utilizes existing joint-use and trackage agreements at 21 locations. These agreements and their locations are discussed in Part III-C(1)(b). Payments to these carriers for the operating rights are on a usage basis and are included in the TPIRR's operating expenses, as explained in Part III-D(6).

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III. STAND-ALONE COST

F. ROAD PROPERTY INVESTMENT

The TPIRR replicates approximately 6,866 route miles of existing CSXT-owned track in 17 states (Alabama, Florida, Georgia, Illinois, Indiana, Kentucky, Louisiana, Maryland, Mississippi, New York, North Carolina, Ohio, Pennsylvania, South Carolina, Tennessee, Virginia, and West Virginia) as well as the District of Columbia.[1] The areas through which the track runs include rural undeveloped areas as well as major metropolitan areas.

The TPIRR's road property investment costs are summarized in Table III-F-1 below and in Exhibit III-F-1.

Table III-F-1
TPIRR Road Property Investment Costs
(in millions)

Item (1)	Investment (2)
1. Land	$3,956
2. Roadbed Preparation	3,746
3. Track Construction	8,494
4. Tunnels	1,596
5. Bridges	3,438
6. Signals & Communications	1,554
7. Buildings & Facilities	985
8. Public Improvements	226
9. Subtotal	$23,996
10. Mobilization	541
11. Engineering	2,004
12. Contingencies	2,258
13. Total Road Property Investment Costs	$28,799

Source: Exhibit III-F-1.

This evidence is sponsored by Richard R. Harps, MAI, CRE, John G. Pinto, CRE, Elizabeth W. Vandermause, MAI, and Daniel C. Vandermause (land acquisition costs); Philip H.

[1] The TPIRR also runs over 491 miles of trackage rights for a total of 7,357 miles of operations.

Burris (easements); Harvey A. Crouch (construction costs and bridge designs and costs); Kevin N. Lindsey (bridge designs and costs); Jerry H. Harris, Jr. (track construction costs); Charles A. Stedman (grading/roadbed preparation costs); and Victor F. Grappone and James Hoelscher (signals and communications system costs). These Witnesses' qualifications are included in Part IV.

1. Land

Land acquisition costs for the TPIRR were developed by Richard R. Harps, MAI, CRE, John G. Pinto, CRE, Elizabeth W. Vandermause, MAI, Daniel C. Vandermause, and their project team. Mr. Harps has over 35 years of experience as an appraiser and consultant. He holds the Member of the Appraisal Institute ("MAI") designation from the Counselors of Real Estate. In addition, he was President of the Washington, D.C. Association of Realtors in 1985. The team he has put together for this assignment brings an extensive background in real estate appraisal and experience in appraisal of transportation rights of way including valuation of rail properties throughout the United States and Canada.

In this appraisal, the Across-the-Fence ("ATF") methodology was used. This method estimates the value of the right-of-way ("ROW") by establishing the value of adjacent lands and parcels of land in proximity to the ROW with the same zoning as lands abutting the ROW.

A summary of the results of Mr. Harps' analysis (as of July 1, 2010) is shown in Table III-F-2 below.

Table III-F-2
TPIRR Land Acquisition Acreage And Costs

Property Type	Acreage	Cost (in millions)
(1)	(2)	(3)
1. ROW		
a. Fee-Simple	73,030.6	$3,019.3
b. Easement	8,113.1	$0.1
2. Yard	7,328.8	$905.1
3. Other		
a. Microwave Towers	568.0	$31.9
4. Total	89,040.5	$3,956.4

Sources: Exhibit III-F-2, and e-workpapers "TPIRR Easements_Open.xlsx" and "TPIRR Easement Fees_Open.xlsx."

Detailed discussions of each of these property types follow.

a. Right-of-Way Acreage

The majority of the ROW is based upon an average width of 100 feet.[2] In urban locations an average width of 75 feet was used.[3] In each location where additional trackage or space is required, acreage has been added.

The TPIRR will acquire 73,030.6 acres in fee simple and 8,113.1 acres via easement for its right-of-way.[4]

b. Yard Acreage

The TPIRR has twelve (12) major yards (eleven (11) of which are hump yards) and several other yards whose locations are fully discussed in Parts III-B and III-C. The TPIRR headquarters building is located at Tilford Yard in Atlanta, GA. Locomotive shops are located at Willard Yard (Willard, OH), Cumberland Yard (Cumberland, MD), Radnor Yard (Nashville, TN), and Rice Yard (Waycross, GA). Yards throughout the TPIRR system are primarily used

[2] The 100 foot right-of-way has been utilized consistently by both parties in prior SAC cases and accepted by the Board. *See, e.g., PSCo/Xcel I* at 667.
[3] *See, e.g.*, *Duke/CSXT* at 472-473; *Wisconsin P&L* at 1018; *West Texas Utilities* at 702.
[4] *See* Exhibit III-F-2 and e-workpaper "TPIRR Easement_Open.xlsx."

for interchange, classification, fueling, and car and locomotive inspections. TPIRR will acquire 7,328.8 acres for its yards.[5]

c. Other Acreage

The TPIRR will place 284 microwave towers along its right-of-way. The TPIRR will acquire two acres per microwave tower site for a total of 568 acres for microwave towers.[6]

d. Property Values

Based on the inspections and analyses undertaken by Mr. Harps and his team, and the easement costs developed by Mr. Burris, TPI has determined that the total cost for the land (including yards and acreage required for microwave towers) needed for the TPIRR's lines as of July 1, 2010 is $3,956.4 million as summarized in Table III-F-2 above. A detailed description of Mr. Harps' approach to developing these land acquisition costs is included in Exhibit III-F-2.

Property values were determined by evaluating the value of land adjacent to or in the proximity of the ROW consistent with recent Board decisions.[7] The acquisition price for land is assumed to be equal to the market value of the ATF properties.

Mr. Harps and his team utilized aerial imagery from Google Earth Pro to trace the path of the TPIRR. Adjacent land uses were noted along the way and used to define the land use type on both sides of the ROW. The ROW is split down the centerline with the adjacent land use defined for half of the ROW width on each side of the centerline. A new segment was defined when the ATF land use changed on either side of the ROW. Using this approach, 5,394 line segments were created.

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5 *See* Exhibit III-F-2.

6 *Id.*

7 *See Duke/CSXT* at 473 ("The land along the ROW is a prime indicator of a ROW's value and has been used in all prior SAC cases.").

The size of the TPIRR made a detailed physical inspection of the entire ROW impractical. However, Mr. Harps and his team did perform detailed physical inspections of the ROW in seventeen (17) urban areas, covering 474 miles of ROW to determine the Highest and Best use and Classification. These inspections took place between September 2010 and June 2011 and were utilized, in conjunction with review of aerial imagery, to determine the relevant land use along the ROW. Mr. Harps and his team relied upon their review of the aerial imagery for land classification and identification of valuation units for the remainder of the TPIRR system.

This process identified six types of land use along the ROW that were used to determine comparable sales. Table III-F-3 below summarizes the percent and acres of each type of land use along the TPIRR ROW.

Table III-F-3
TPIRR Distribution Of Land Use

Land Use Type	**Percent of Total**	**Acreage** 1/
(1)	(2)	(3)
1. Agriculture	56%	45,216
2. Residential	14%	11,724
3. Industrial	14%	11,008
4. Restricted	7%	5,634
5. Rural	7%	5,531
6. Commercial	3%	2,091
7. Total Acreage	100%	81,204

1/ Before system mileage adjustment of 60 acres and includes easement acreage.
Source: Exhibit III-F-2.

The most appropriate method of estimating the value of the land for this purpose is the sales comparison approach. Land is valued as if vacant and unimproved regardless of its current state. Because there were only a limited number of sales in the recent past from which to determine values, Mr. Harps expanded the timeframe for comparable sales and broadened the area of proximity to encompass a greater number of sales. Mr. Harps details his valuation approach in his Report.[8]

Finally, and consistent with the principle that a SARR is not required to purchase a greater interest than the incumbent railroad possesses,[9] TPI's Witness Burris conducted an extensive review of CSXT valuation maps and easement documents provided in discovery. This review identified many easements and other transfers of property ownership along the TPIRR ROW. The TPIRR easement acreage was developed by multiplying the length of the easement along the ROW times the width of the ROW at each location. The average cost per easement acre for each state was then applied to the acreage for each easement in the individual state. The total cost for TPIRR acreage acquired through easements is $99,437.[10]

The total land acquisition costs for the TPIRR are $3,956.4 million; comprised of $3,956.3 million for fee simple acquisitions and $99,437 for easements.

2. Roadbed Preparation

TPI's roadbed preparation evidence is sponsored by Witnesses Harvey Crouch and Charles Stedman. Their qualifications are detailed in Part IV. Mr. Crouch served in the Engineering Departments of Southern Railway and Norfolk Southern (after the merger) from 1977 to 1987, including service as an Industrial Development designer, a Project Engineer, and a Track Supervisor in the Maintenance of Way & Structures Department. He has worked on many railroad design and construction projects in the eastern U.S., and has been involved with track and bridge inspection and maintenance programs over the past 22 years. His experience with

8 *See* Exhibit III-F-2.
9 *See CP&L* at 308 and *Duke/CSXT* at 474.
10 *See* e-workpaper "TPIRR Easement Fees_Open.xlsx."

Norfolk Southern included supervision of the construction of numerous track construction projects, various railroad facilities, and railroad buildings.

Mr. Stedman has over 30 years of experience with L. E. Peabody & Associates, Inc. He has developed and presented evidence pertaining to roadbed preparation in numerous proceedings before the ICC and the Board. Mr. Stedman has also researched ICC records including the ICC's Engineering Reports.[11]

In this evidence, the ICC Engineering Reports were used to develop the TPIRR quantities for clearing, grubbing, earthwork, rip rap, retaining walls, and lateral drainage. As noted below, the information extracted from the ICC Engineering Reports was adjusted to reflect current engineering and design specifications.

The roadbed preparation unit costs utilized herein are a combination of actual costs and Means Handbook[12] costs. The Means Handbook costs are very conservative for this application because the prices are based on an average of costs for projects of all sizes from around the country and assume a unionized workforce. There is no way to adjust the Means Handbook unit costs to reflect the economies of scale inherent in a project with the vast size of the TPIRR or to accurately estimate the impact of using non-union labor.

A summary of the TPIRR's roadbed preparation quantities and costs are summarized in Table III-F-4 below.

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[11] ICC Bureau of Valuation B.V. Form No. 561.
[12] RS Means 2010 Site Work & Landscape Cost Data ("Means Handbook").

Table III-F-4
TPIRR Roadbed Preparation Costs

Item (1)	Cost (in thousands) (2)
1. Clearing and Grubbing	$97,568
2. Earthwork	
a. Common	679,312
b. Loose Rock	405,257
c. Solid Rock	1,053,457
d. Borrow	792,769
e. Land for Waste Excavation	215,642
3. Drainage 1/	
a. Lateral Drainage	69,355
4. Culverts 2/	124,892
5. Retaining Walls	223,901
6. Rip Rap	76,796
7. Relocation of Utilities	738
8. Topsoil Placement / Seeding	1,476
9. Surfacing for Detour Roads	4,333
10. Environmental Compliance	890
11. Total	$3,746,386

Source: *See* e-workpaper "TPIRR Open Grading.xlsx."
1/ Yard drainage is included in building site development costs.
2/ *See* e-workpaper "TPIRR Culvert Construction.xlsx."

a. Clearing and Grubbing

TPI reviewed the valuation section index maps accompanying the ICC Engineering Reports for the railroads traversed by the TPIRR[13] and identified the valuation sections applicable to the TPIRR. A listing of the valuation sections used in the development of the roadbed preparation construction costs for the TPIRR is included in TPI's workpapers.[14]

[13] The ICC Engineering Reports were compiled in the first quarter of the 20th century. At that time, the current lines of CSXT were owned by many different railroads.
[14] *See* e-workpaper "TPIRR Open Grading.xlsx," tab "Eng Reports."

Based on this selection of valuation sections, the clearing and grubbing quantities required for the original construction of the TPIRR lines were taken from the ICC Engineering Reports. These quantities were then modified to reflect current construction specifications.[15]

Historically, clearing and grubbing costs have been developed and applied separately depending on the acreage requiring the grubbing of tree stumps. In this case, however, TPI's engineers based the clearing and grubbing costs on a recent railroad realignment project in Tennessee, the Trestle Hollow Project, and applied this cost to all TPIRR acreage to be cleared. The project took place in 2007 and involved re-routing and building a new rail line near Centerville, TN, an area close to the TPIRR route of movement.[16] The cost for clearing and grubbing was $2,000 per acre and included "clearing and grubbing of all trees, stumps, undergrowth, brush, trash, grass, weeds, roots, debris, or other deleterious or objectionable materials…."[17] Stumps, roots and other debris were to be removed to a minimum depth of 18 inches below the surface and/or subgrade, whichever was lower and also included removal and stockpile of topsoil. TPI indexed the 2007 unit costs to 3Q10, the start date of the TPIRR. The indexed unit cost for clearing and grubbing is $2,155.46 per acre.

Applying this combined unit cost to the total acres requiring clearing conservatively overstates the total costs as not all acres have trees or require grubbing. 45,035 acres will be

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[15] The clearing and grubbing quantities (acres per track mile) were increased by the ratio of the current roadbed specifications to the original roadbed specifications and applied to the track miles (including yards and sidings) of the TPIRR's line segments to develop current clearing and grubbing quantities. *See* e-workpaper "TPIRR Open Grading.xlsx," tab "Other Items."

[16] *See* the pictures of the Trestle Hollow Project included in the sub-directory "Trestle Hollow Pictures" in TPI's electronic workpapers. These pictures show the significant density of vegetation growth in the area where the Trestle Hollow Project took place. Additional description of the Trestle Hollow Project is provided in the Common Earthwork sub-section of this Part III-F.

[17] *See* e-workpaper "Trestle Hollow Specifications.pdf," Section 3.2.1, page 147.

cleared and grubbed for the construction of the TPIRR at a total cost of $97.6 million at 3Q10 levels.[18]

TPI has not included any additional costs for stripping or undercutting as these are included in the Trestle Hollow unit costs.[19]

b. Earthwork

The ICC Engineering Reports were utilized to develop the earthwork quantities for each valuation section covering the line segments of the TPIRR. These quantities were adjusted to reflect current roadbed specifications. The adjusted earthwork quantities were then used to develop the earthwork requirements and costs for the TPIRR. As described below, a combination of actual unit costs from the Trestle Hollow Project (indexed to 3Q10) and the Means Handbook average costs were used to develop the earthwork costs.

Table III-F-5 summarizes the earthwork quantities and costs associated with construction of the TPIRR.

[18] TPI notes that, in recent stand-alone cost proceedings, complainants have used two different costs for clearing and one cost for grubbing, all from the Means Handbook. For the acres that were grubbed (according to the ICC Engineering Reports), complainants assumed that trees were also cleared and applied both the cost per acre for clearing and the cost per acre for grubbing from the Means Handbook. For the remaining acres of clearing (i.e., those acres not requiring grubbing), complainants applied a cost for brush clearing. This approach has been accepted by the STB. *See AEP Texas II* at 78-79, *AEPCO* at 83-84. While TPI believes the use of actual clearing costs (as shown in the Trestle Hollow Project) is superior to the costs from the Means Handbook, TPI has included these alternate calculations in its workpapers. *See* e-workpaper "TPIRR Open Grading.xlsx," tab "Other Items."

[19] *See* e-workpaper "Trestle Hollow Specifications.pdf," pages 147 and 156. Additionally, prior decisions from the Board support exclusion of these costs. *See PSCO/Xcel I* at 671, *WFA/Basin I* at 83, *AEP Texas II* at 79, *Duke/CSXT* at 479-480, *AEPCO* at 84.

Table III-F-5
TPIRR Earthwork Quantities And Costs

Item	Cubic Yards (000)	Cost (000)
(1)	(2)	(3)
1. Common Excavation	362,495	$679,312
2. Loose Rock Excavation	34,177	405,257
3. Solid Rock Excavation	68,206	1,053,457
4. Borrow	47,132	792,769
5. Total	512,010	$2,930,795

Source: *See* e-workpaper "TPIRR Open Grading.xlsx," tab "EW Cost."

i. ROW Quantities

TPI engineers pulled the miles of main-line track, other main track, and all other track from the applicable ICC Engineering Reports. They also extracted the cubic yards ("CY") of excavation and embankment material by type – common, loose rock, solid rock, and embankment (borrow) from the ICC Engineering Reports.[20] The grading quantities from the ICC Engineering Reports were then used to develop distribution percentages for the four types.[21] Based on a review of railroad construction literature prevailing at the time the ICC Engineering Reports were compiled, TPI's engineers estimated that the ICC Engineering Report quantities for the rail lines comprising the TPIRR reflect average roadbed widths of 19 feet for fills and 22 feet for cuts (including ditches).[22] The earthwork quantities obtained from the ICC Engineering Reports were adjusted to reflect the roadbed widths required for today's heavier trains. Table III-F-6 shows the more modern roadbed widths utilized in the construction of the TPIRR.

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20 *See* e-workpaper "TPIRR Open Grading.xlsx," tab "Eng Rep Input."

21 *See* e-workpaper "TPIRR Open Grading.xlsx," tab "Distribution."

22 *See* William C. Willard, *Maintenance of Way & Structures*, McGraw-Hill Book Company, 1915, pp. 29-31 included in e-workpaper "Original Roadbed Widths.pdf."

Table III-F-6
Roadbed Widths For Construction Of The TPIRR

Track Type	Roadbed Width 1/ Fills	Cuts
(1)	(2)	(3)
1. Single Track	24 feet	40 feet
2. Double Track	39 feet	55 feet

1/ Based upon 15 foot track centers and a side slope of 1.5 to 1.

TPI's engineers used the specifications in Table III-F-6 to adjust the earthwork quantities from the ICC Engineering Reports for the valuation sections covering the TPIRR.[23] Relying on these adjusted quantities, TPI's engineers then calculated the earthwork quantities for the TPIRR's line segments.[24] In particular, TPI first matched the TPIRR line segments with the applicable valuation section. Next, the track miles for each segment were categorized as first main (route miles), other main (multiple track and passing sidings), and other track (such as set out tracks) based on the TPIRR's track configuration shown in the TPIRR stick diagrams. Finally, the number of track miles was multiplied by the applicable cubic yards per mile for the appropriate valuation section.

ii. Yard Quantities

As discussed in Part III-B, the TPIRR has twelve (12) major yards (including eleven (11) hump yards) and numerous lesser yards (including interchange yards).[25] For each yard, TPI calculated the grading requirements based on an assumed average fill height of one foot and 25 foot track centers.[26]

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23 *See* e-workpaper "TPIRR Open Grading.xlsx," tab "Earthwork by val sec."
24 *See* e-workpaper "TPIRR Open Grading.xlsx," tab "CY Grad by seg."
25 *See* e-workpaper "TPIRR Yard Matrix Opening Grading.xlsx."
26 The one-foot fill height was used for the TPIRR yards because an assumed fill height of one foot is used to allocate earthwork quantities to the yard tracks involved in the original construction and reflected in the ICC Engineering Reports. This methodology has been applied repeatedly, and accepted by the STB, to develop

Yard earthwork is classified as excavation because the estimated yard track quantities removed from the ICC Engineering Report total quantities were removed from the excavation quantities for each valuation section.

iii. Earthwork Unit Costs

Harvey Crouch and his associates are familiar with much of the route of the TPIRR and knowledgeable about the appropriate earthwork and equipment required for excavation. Rail lines, including the lines comprising the TPIRR, are generally laid out to follow the natural ground as much as possible, minimizing grade changes and avoiding difficult terrain whenever possible. The TPIRR relies upon the same least-cost-but-feasible grading approach.[27]

(a) Common Earthwork

In many previous stand-alone proceedings, earthwork excavation unit costs have been based on the Means Handbook.[28] The costs in the Means Handbook, however, are conservatively high because they are based on an average of costs for projects of all sizes from around the country, without specific consideration for the economies of scale that would benefit the TPIRR due to the much larger project size involved. But, in the two most recent stand-alone decisions, *WFA/Basin I* and *AEPCO*, complainants have proposed, and the STB has accepted, common earthwork unit costs based on actual projects instead of the Means Handbook. TPI has continued that trend.

SARR yard earthwork quantities. *See Wisconsin P&L* at 1022, *PSCo/Xcel I* at 675, *AEP Texas II* at 81, *Otter Tail* at D-10, *Duke/NS* at 172, *CP&L* at 310-311, *Duke/CSXT* at 477 and *AEPCO* at 90. *See* e-workpaper "TPIRR Open Grading.xlsx," tab "Yards."

[27] *See FMC* at *800* ("UP has not shown that it would be infeasible to use the equipment selected by FMC… FMC is entitled to have the equipment that results in the overall lowest cost used. Therefore, we use FMC's unit costs for grading to determine earthwork costs."). *See also Duke/CSXT* at 478-480; *PSCo/Xcel I* at 676-678.

[28] *See PSCo/Xcel I* at 677-678, *AEP Texas II* at 81-82, *Otter Tail* at D-11-12, *Duke/CSXT* at 478-479, *Duke/NS* at 174-176, and *CP&L* at 313.

Beginning with *WFA/Basin I,* complainants used costs from actual railroad construction projects. In that case, both BNSF and the Board accepted the common excavation cost per CY based on an actual BNSF track construction project.[29] This trend continued in *AEPCO*, where the complainant relied on costs from five BNSF railroad projects and these costs were similarly accepted by the Board.[30]

In this proceeding, CSXT provided a limited number of documents containing earthwork cost information in response to TPI's discovery requests. These documents included projects involving additions or modifications to existing track and right of way, such as new sidings or second main constructed adjacent to active tracks. But, performing projects under traffic or adjacent to active tracks increases the cost of the project because site access is limited, work has to be conducted in limited work windows, and work has to be performed in a manner that is safe with respect to the railroad and its contractor and the contractor's activities. The earthwork quantities for many of these CSXT projects also were less than 60,000 CY with several less than 20,000 CY. Nor were any costs provided for "common excavation." In addition, none of these projects were for new line construction such as the TPIRR. In short, none of the CSXT projects are remotely akin to new rail line construction like the TPIRR.

As discussed in the previous section on clearing and grubbing, TPI's Witness Crouch was involved with the Trestle Hollow Project, a railroad realignment project in Tennessee that required the construction of a new railroad line. While this project is short in length, it differs from the projects covered by CSXT's discovery responses in at least two important ways. First,

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[29] *See WFA/Basin I* at 86 ("the parties agreed on the unit costs for common excavation"); WFA/Basin Opening Evidence (Public Version) at III-F-36-37 (filed April 19, 2005) (describing the source of the common excavation unit cost); and WFA/Basin Rebuttal Evidence (Public Version) at III-F-56 (filed September 30, 2005) (stating that BNSF accepted WFA/Basin's common excavation unit cost).

[30] *See AEPCO* at 86-88.

the Trestle Hollow Project reflects new rail line construction. Second, there were considerable amounts of earthwork moved.[31]

The Trestle Hollow Project involved construction of a particularly challenging and complicated new alignment for the South Central Tennessee Railroad west of Nashville. This project was challenging for several reasons. The purpose of the project was to bypass several large timber bridges approximately 100 years old. The alignment was designed to improve the vertical grade and reduce curvature. The new design was difficult due to the hilly terrain and included several tall embankments and deep cuts all on an average 2.4% grade. Clearing was difficult due to the hilly nature of the land and the size of the trees. The material excavated was a combination of common earth and loose rock. Indeed, due to the presence of loose rock, TPI's engineers are being conservative by using the Trestle Hollow costs only for common excavation. The challenges associated with the Trestle Hollow project demonstrate that even its costs may overstate the actual common excavation costs for most of the TPIRR, which would not face comparable challenges over much of its network.

Common earthwork excavation costs for the TPIRR are based on the actual unit cost from the 2007 Trestle Hollow project of $1.65 per CY indexed to 3Q10. This unit cost includes all necessary work to prepare the roadbed for the placement of subballast (finish grading), the handling of waste and hauling it to off-site locations as needed, as well as costs associated with any subgrade preparation (water for compaction or drying of the soil) that might be necessary.[32]

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[31] *See* e-workpapers "Trestle Hollow Specifications.pdf," "Trestle Hollow Project Cost Sheet.pdf," "5070 SCTRA Trestle Hollow Phase I Contractor Invoices.pdf," and "5070 Full Set.pdf". Further information is provided in the sub-directory "Trestle Hollow Pictures" included in TPI's workpapers.

[32] *See* the construction specifications contained in e-workpaper "Trestle Hollow Specifications.pdf," Section 3, pages 152-153, 160-161, and 164.

The TPIRR also traverses some areas that TPI classified as adverse, i.e., the territory is more difficult and access is limited due to the terrain. These areas are identified in TPIRR's workpapers based on a review of topographical maps to identify the portions of the TPIRR that traverse areas with steep slopes alongside or surrounding the rail line.[33] Using the Means Handbook, TPI's engineers calculated a common excavation unit cost[34] and a cost for common excavation in adverse areas.[35] For the TPIRR line segments that were designated as adverse, the ratio between Means Handbook costs under ideal conditions and costs under adverse conditions was used to adjust the Trestle Hollow Project unit cost.

The cost for common excavation at 3Q10 levels is $1.79 per CY with $2.30 per CY used in areas with adverse conditions.[36]

(b) Loose Rock Excavation

Loose rock excavation is a category shown on the ICC Engineering Reports that does not have a counterpart in today's railroad construction environment. Railroads today use the categories of common (or unclassified) and solid rock. Thus, TPI is being extremely conservative by applying a separate loose rock cost to such excavation rather than including it with the common excavation quantities. Loose rock excavation costs are based on the combination of one 300 HP dozer and one 410 HP dozer for ripping the loose rock in ideal conditions and pushing it into piles, a three CY power shovel for placing the ripped and dozed rock into the truck (including the Means 15% additive), a combination of a 42-CY off-highway truck (48%) and a 22-CY off-highway truck (52%) to haul the material to the fill or disposal

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33 *See* e-workpapers "TPIRR Adverse Territory.xlsx," and "TPIRR Open Grading.xlsx," tab "EW Cost."
34 *See* e-workpaper "TPIRR Open Grading.xlsx," tab "Unit Costs."
35 *Id.*
36 *Id.*

site,[37] and a dozer to spread the material after it is dumped. Both of the dozers are equipped with rock rippers at the rear and large push blades in front. The cost for loose rock excavation in adverse areas is based on the same Means Handbook components except that the unit costs for ripping the loose rock are for adverse conditions.

The cost for loose rock excavation is $11.81 per CY with $11.94 per CY used in areas with adverse conditions.[38]

(c) Solid Rock Excavation

TPI's solid rock excavation unit cost development is consistent with recent Board decisions.[39] The unit cost for solid rock blasting is based on an average of the Means Handbook cost for blasting rock over 1,500 cubic yards and the cost for bulk drilling and blasting. TPI has added the costs to excavate the blasted rock, load it into trucks, haul it away, and dump it. In addition, the cost to spread the material and the average compaction cost for embankment that was used for the other earthwork categories were also applied.

TPI's engineers used a 50/50 combination unit cost made up of the solid rock unit cost ($19.00 per cubic yard in all conditions) and the loose rock unit cost ($11.81 per CY and $11.94 per CY in adverse conditions) based on their expert opinion that at least half of the quantities classified by the ICC as solid rock would be rippable (and therefore classified as loose rock or common excavation) using modern equipment.[40] This 50/50 combination results in a cost per

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[37] This percentage split was used by the parties in *DuPont*. *See* NS's Reply Evidence (Public Version) at III-F-69-70 (filed November 30, 2012) and DuPont's Rebuttal Evidence (Public Version) at III-F-38 (n. 74) (filed April 15, 2013).

[38] The unit costs from the 2010 Means Handbook are indexed to 3Q10 levels and adjusted by the Means Handbook location factors. *See* e-workpaper "TPIRR Open Grading.xlsx," tab "Unit Costs."

[39] *See WFA/Basin I* at 86-87, *AEP Texas II* at 82-83, *PSCo/Xcel I* at 677-678 and *AEPCO* at 89-90.

[40] This 50/50 combination has been repeatedly accepted by the Board in cases such as *WFA/Basin I*. *See* BNSF Reply Evidence (Public Version) at III.F-59 (n. 61) and III.F-63 (filed July 20, 2005) in STB Docket No. 42088. The 50/50 combination was also used in *AEP Texas II*. See BNSF Reply Evidence (Public Version) at III.F-45 (n. 52) and III.F-49 (filed May 25, 2004) in STB Docket No. 41191 (Sub-No. 1). *See also Otter Tail* at D-12;

CY of $15.41 for solid rock excavation with $15.47 per CY used in areas with adverse conditions.[41]

(d) Embankment/Borrow

The Means Handbook-based unit cost for borrow utilized by the TPI engineers is based on a five cubic yard wheel-mounted front end loader, 20-CY capacity dump trucks to haul material to the construction site, a dozer to spread the material, and the average compaction cost for embankment that was used for the other earthwork categories.[42] Borrow unit cost equals $16.82 per CY at 3Q10 levels.[43]

(e) Land for Waste Excavation

Not all of the excavated material for the TPIRR is re-used as fill. Consistent with the procedures used in other SAC cases, TPI's earthwork calculations assume a 30% waste ratio.[44] The 30% waste ratio is an average for the entire TPIRR. Some sections of the TPIRR may have no waste excavation as all of the excavated material is suitable and needed for reuse as embankment. Some sections may have more than 30% waste due to lesser embankment needs or the disposal of material unsuitable for reuse as embankment. The actual locations where waste dump sites will be needed during the construction of the TPIRR, and their corresponding size, cannot be specifically identified because there is no way to determine the actual quantities of waste material generated at specific locations along the TPIRR construction route. The ICC Engineering Reports contain only excavation quantities with no information regarding how much

PSCo/Xcel I at 677 (where BNSF also agreed on this split); *Duke/NS* at 174; *CP&L* at 312; *Duke/CSXT* at 478; *AEPCO* at 89-90.

[41] *See* e-workpaper "TPIRR Open Grading.xlsx," tab "Unit Costs."

[42] This is consistent with prior SAC proceedings. *See AEP Texas II* at 81 and *Otter Tail* at D-13.

[43] *See* e-workpaper "TPIRR Open Grading.xlsx," tab "Unit Costs."

[44] *See, e.g., AEP Texas II* at 86.

material was reused as embankment and how much was wasted. For this reason, the average 30% waste ratio has been in use and accepted for over two decades.[45]

Because this waste material needs to be placed somewhere, the TPIRR is acquiring additional land along the right-of-way to accommodate the dumping of the waste material. Waste dump sites are only needed near locations on the TPIRR where there is waste material. These waste sites will be located alongside the TPIRR right-of-way in close proximity to where the waste material is generated. TPI's decision to purchase land for waste quantities is conservative because, based on Mr. Crouch's experience, grading contractors typically make arrangements with landowners adjoining the railroad right-of-way for the placement of waste quantities rather than purchasing land.[46] The waste material could be sold from the waste site as fill dirt or the land could be re-sold after construction of the TPIRR is completed. TPI has not factored this stream of revenue into its development of stand-alone costs.

In calculating the number of acres needed for waste quantities, TPI's engineers have assumed an average 15-foot depth for wasted materials, or 24,200 CY per acre. TPI has increased the size of the waste site to accommodate a 1:1 side slope of the material and a 20-foot perimeter to accommodate work equipment. This results in acquiring 1.69 acres for every acre needed.[47]

TPI has included an additional 11,687 acres of rural land for this purpose at an estimated $18,451 per acre for a total cost of $215.6 million.[48]

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[45] The thirty (30) percent waste excavation ratio dates back to the early SAC proceedings when the ICC Engineering Report earthwork data was first used and thirty (30) percent has been used ever since.

[46] According to Mr. Crouch, this was how waste quantities were handled for the Trestle Hollow Project. The grading contractor made such arrangements with adjoining landowners and any cost to the contractor was included in his bid for the project as there was no separate payout identified with land for waste quantities.

[47] *See* e-workpapers "TPIRR Open Grading.xlsx," tab "Other Costs" and 'Land for waste quantities.pdf."

[48] *See* e-workpaper "TPIRR Open Grading.xlsx," tab "Other Costs."

(f) Total Earthwork Cost

The total earthwork cost associated with constructing the TPIRR (including the cost of land for waste excavation) is $3,146.4 million.[49]

c. Drainage

i. Lateral Drainage

The linear feet of pipe per route mile for lateral drainage was obtained from the ICC Engineering Reports and applied to the TPIRR's line segments. The cost per linear foot for installed drainage pipe, including backfill and compaction, was taken from the 2010 Means Handbook indexed to 3Q10 and adjusted by the Means Handbook location factors. Based on the ICC Engineering Reports, the TPIRR requires 2,243,035 linear feet of lateral drainage pipe. The TPIRR's total investment in lateral drainage equals $69.4 million at 3Q10.[50]

ii. Yard Drainage

Yard drainage costs for the TPIRR's yards are included in the yard site development costs discussed in Part III-F-7.

d. Culverts

Culverts are devices placed in the roadbed to facilitate the movement of water from one side of the track to the other where large drainage areas, typical of bridges, are not required. The culverts specified by TPI's engineers are aluminized steel corrugated metal pipe. All culverts used by the TPIRR are adequate to withstand railroad loadings to a gross weight on rail of 286,000 pounds per car (Cooper E-80 standards). Existing culvert flow rates were calculated and compared to the flow rate of the installed corrugated metal pipe to ensure that the pipe(s) were adequately sized. Existing culvert height was used to determine the maximum size circular pipe

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[49] *See* e-workpaper "TPIRR Open Grading.xlsx," tab "Summary."
[50] *See* e-workpaper "TPIRR Open Grading.xlsx," tab "Other Items."

that could be installed. If the existing flow could not be carried by installing corrugated metal pipe, the culvert is replaced with a Type I bridge.[51]

i. Culvert Unit Costs

Unit costs were developed from costs provided in quotes from a metal pipe manufacturer and the Means Handbook. Unit costs for corrugated metal pipe ("cmp") are driven by the linear feet ("LF") of length of each culvert required in a particular location as well as the diameter of the pipe.[52] Additional unit costs were developed for excavation, furnishing and placing crushed stone for bedding material, and backfill.[53] Transportation costs were added at $0.035 per ton-mile.[54]

ii. Culvert Installation

All culverts are installed during the early stages of preparation of the subgrade for the railroad. The sites are easily accessible, in part through the ongoing preparation of the roadbed and in part because much of the TPIRR's ROW is near public roads. Moreover, the culverts can be installed with a minimum of excavation using the open trench method of installation.

Specifically, once the base layer of the roadbed is in place, the trench for the culvert is excavated one foot wider on each side than the culvert width. The bottom of the excavation is covered with an average depth of 12" of crushed stone bedding material. The culvert is then placed in the trench and crushed stone bedding material is placed and compacted around the culvert in small, uniform compacted lifts, to approximately half the culvert's diameter. The

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51 *See* e-workpaper "TPI Bridge Construction costs.xlsx" for costs associated with culverts replaced by a Type I bridge.

52 *See* e-workpaper "Contech Pricing.pdf."

53 The price of bedding material is from the Trestle Hollow Project. All other unit costs are from the Means Handbook. *See* e-workpaper "TPIRR Culvert Construction.xlsx."

54 This transportation cost was used by both parties for culverts in the recent *DuPont v. Norfolk Southern* proceeding. *See* DuPont Rebuttal Evidence (Public Version) at III-F-58 (filed April 15, 2013) in STB Docket No. 42125.

bedding material acts as a foundation and cushion for the culvert, providing a means for transferring the load into the ground below the culvert as well as a level surface. The first culvert section is placed on the prepared bedding material. The next section is placed adjacent to the first and a connecting band is installed to connect the two sections. This continues until all sections have been set in place. The culvert is then backfilled uniformly using small compacted lifts of backfill material. After the sub-base has been prepared, most culverts can be installed in less than one day.

Work production of the crews is consistent with TPI's proposed construction schedule because there are no deep trenches to excavate or work in, and by installing the culverts at this stage of the project, no waterway diversions are required. Moreover, in the few instances where water is flowing immediately adjacent to the culvert, the culvert can be installed while the water is flowing.

iii. Culvert Quantities

TPI's engineers used the culvert inventories provided by CSXT in discovery to form an initial culvert list. However, upon review, TPI's engineers determined that CSXT's culvert data was not complete. The culvert list provided by CSXT was missing height data for multiple culverts being duplicated by the TPIRR. For these culverts, assumptions were made for sizes of these pipes. For culverts where no height information was given, an average culvert size was developed and used for cost calculations. For box culverts where only the width or height was provided, TPI assumed the height and width to be equal. CSXT provided existing box culvert dimensions in units of feet, but in a few cases TPI determined the dimensions were input as inches.

In some instances, the culvert inventories provided by CSXT did not include any culvert length data. TPI's engineers developed an average length and used this length where lengths were not provided. In order to ensure that the TPIRR's culverts could meet the loading requirements of the TPIRR, TPI's engineers elected to use aluminized cmp for all replicated culvert installations. For culverts that could not be replicated using circular aluminized cmp, the culvert was replaced by a Type I bridge.

iv. Total Culvert Costs

The total cost of the TPIRR's culverts is $124.9 million.[55]

e. Other

i. Ditches

In cuts, the TPIRR has side ditches that are two feet wide and two feet deep and that are trapezoidal in section. Two-foot ditches are commonly used by Class I railroads such as CSXT for new construction projects and have repeatedly been accepted by the Board.[56]

ii. Retaining Walls

Retaining wall quantities for the TPIRR are also extracted from the ICC Engineering Reports. The Engineering Report data includes cubic yards of masonry, timber walls, and walls made from timber ties and pilings under the category "Protection of Roadway" included in Account 3, Grading. TPI has assigned all of the ICC Engineering Report retaining wall quantities to the main line miles (route miles) of each valuation section. The resulting average quantity per main line mile for each valuation section is then applied to the route miles of the TPIRR corresponding to each valuation section to calculate the retaining wall quantities for the TPIRR line segments.

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55 *See* e-workpaper "TPIRR Culvert Construction.xlsx ."

56 *See Duke/NS* at 171, *CP&L* at 310, *Duke/CSXT* at 476, *TMPA* at 701 (n.183), *Wisconsin P&L* at 1023.

Rather than construct masonry or timber retaining walls, the TPIRR uses gabions (galvanized steel mesh boxes filled with rock) for all of its retaining walls. Gabions are suitable because they can be assembled on site and bent to fit the existing terrain.

TPI has used the cost for retaining wall gabions (including the rock) and the cost for timber pilings from the 2010 Means Handbook. Total retaining wall investment for the TPIRR equals $223.9 million at 3Q10 levels.[57]

iii. Rip Rap

TPI's engineers developed rip rap quantities from the ICC Engineering Reports, and applied the unit cost from the Means Handbook to machine-place the rip rap. The material portion (rock) of the unit cost is included because the material is not readily available from the excavated rock that is wasted. TPI has included $76.8 million for rip rap investment at 3Q10 levels.[58]

iv. Relocating and Protecting Utilities

The vast majority of the lines being replicated by the TPIRR were constructed by CSXT's predecessors in the 19th and early 20th centuries. Few, if any, utility lines existed at that time and would have had to be relocated. These costs were not incurred by the incumbent and thus, under the *Coal Rate Guidelines*, would constitute a barrier to entry if imposed on the TPIRR.[59]

However, TPI's engineers identified five TPIRR branch lines, totaling 47.3 route miles, which could not be found on the ICC valuation maps accompanying the ICC Engineering Reports. Therefore, TPI's engineers assumed that these rail lines were constructed in the second

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57 *See* e-workpaper "TPIRR Open Grading.xlsx," tab "Other Items."

58 This rip rap investment does not include the rip rap used on culvert faces and for bridge pier and abutment protection. Those costs are included, where needed, in the appropriate investment category. Details on rip rap investment for roadbed preparation are provided in e-workpaper "TPIRR Open Grading.xlsx," tab "Other Items."

59 *See AEP Texas II* at 84; *PSCo/Xcel I* at 680; *Duke/CSXT* at 483.

half of the 20th century. Consistent with prior STB decisions, TPI included $0.7 million, based on the cost per mile in *WFA/Basin I* indexed to 3Q10, for costs to relocate and protect utilities on these lines.[60]

v. Seeding/Topsoil Placement

Embankment protection quantities for all lines other than the recently-constructed branch lines were derived from the ICC Engineering Reports. Based on the ICC Engineering Report data, only 0.44 percent of the lines being replicated by the TPIRR had embankment protection quantities. For the recently-constructed branch lines, TPI's engineers estimated the acres per mile for seeding/topsoil placement based on the average acres per mile for the 79-mile Orin Line, constructed by the BNSF Railway in Wyoming during the 1970's.

For seeding and topsoil placement costs, TPI's engineers relied upon the unit cost of $1,600 per acre from the Trestle Hollow Project indexed to $1,733 per acre at 3Q10 levels.[61] Total TPIRR investment costs for seeding/placing topsoil equal $1.5 million.

vi. Water for Compaction

In the Eastern coal rate cases, the Board agreed with complainants that water for compaction was not necessary in the areas traversed by the stand-alone railroads because there is sufficient water content in the region to allow for proper compaction.[62] Consistent with the territory traversed by the stand-alone railroads in the Eastern coal rate cases, the TPIRR rail lines traverse sub-humid, moist sub-humid, and humid areas, not arid or semi-arid areas.[63] In any

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60 *See* e-workpaper "TPIRR Open Grading.xlsx," tabs "Other Costs" and "Utilities." *See also* WFA/Basin Rebuttal Evidence (Public Version) at III-F-78 (filed Sept. 30, 2005) in STB Docket No. 42088.

61 *See* e-workpapers "Trestle Hollow Project Cost Sheet.pdf," and "TPIRR Open Grading.xlsx," tab "Other Costs."

62 *See Duke/CSXT* at 483, *Duke/NS* at 179-180, and *CP&L* at 317.

63 *See* e-workpaper "TPIRR Route avg rainfall.pdf."

event, even if water for compaction was necessary in a certain area, the common earthwork unit costs relied on by TPI include any incidental items such as water.[64]

vii. Surfacing for Detour Roads

TPI's engineers did not include costs for any road detours for the TPIRR's lines that are covered by ICC Engineering Reports, as it is unlikely that CSXT incurred any costs for this item when the lines were originally built, and CSXT did not provide any information in discovery indicating that it incurred such costs. This is consistent with the approach approved by the Board in other SAC cases.[65]

For the TPIRR's recently-constructed branch lines, TPI's engineers included an estimate of $4.3 million for the cost to provide road detours during construction.[66]

viii. Construction Site Access Roads

In general, the TPIRR's track subgrade is used for its site construction roads. In addition, most of the TPIRR right-of-way is accessible from public roads and highways, thereby permitting construction access without building separate access roads. Further, the initial construction activity includes clearing the TPIRR right-of-way and creating initial site access with the heavy construction equipment. As the site is leveled by either cutting or filling the right-of-way, access roads are created for moving earth, rock, and other materials to and from the construction sites. In any event, no additional costs should be incurred for site construction access roads because, according to Mr. Crouch, the Trestle Hollow Project, used for common

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64 *See* e-workpaper "Trestle Hollow Specifications.pdf," pages 160, 161, and 164.

65 *See PSCo/Xcel I* at 681-682; *Duke/NS* at 180; *CP&L* at 317; *Duke/CSXT* at 484; *TMPA* at 707-708; *Wisconsin P&L* at 1024-1025; *FMC* at 802.

66 *See* e-workpaper "TPIRR Open Grading.xlsx," tab "Other Costs."

excavation costs, required the contractor to provide its own, uncompensated, access to the site. TPI's position on this issue is consistent with several prior SAC decisions.[67]

ix. Environmental Compliance

TPI included environmental compliance costs only for the five recently constructed branch lines. Inclusion of these costs on the lines originally constructed in the 19th and early 20th centuries by CSXT or its predecessors would constitute a barrier to entry.[68]

Total environmental compliance costs for the TPIRR equal $0.9 million.

3. Track Construction

TPI's track construction evidence is co-sponsored by Witnesses Harvey Crouch and Jerry Harris, Jr. Their qualifications are detailed in Part IV.

Track construction is the work required to lay track once the subgrade has been completed. This includes placing subballast, ballast, ties, rail, and other track components. The total quantities and costs required for construction of the TPIRR are summarized in Table III-F-7 below.

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[67] *See Duke/CSXT* at 476-477; *Duke/NS* at 172; *CP&L* at 317; and *AEP Texas II* at 80.

[68] *See Wisconsin P&L* at 1025 (the parties agreed that environmental mitigation was only required for the recently constructed segments); *FMC* at 802; *PSCo/Xcel I* at 682 (the parties agreed on the level of such costs); *AEP Texas II* at 86. *See also* WFA/Basin Rebuttal Evidence (Public Version) at III-F-81-82 (filed Sept. 30, 2005) in STB Docket No. 42088 (environmental compliance costs applied only to recently-constructed lines). Details supporting environmental compliance costs for the TPIRR are provided in e-workpaper "TPIRR Open Grading.xlsx, tabs "Other Costs" and "Environ Comp."

Table III-F-7
TPIRR Track Construction Costs

Item (1)	Cost (000) (2)
1. Geotextile Fabric	$3,506
2. Ballast and Sub-ballast	1,688,413
3. Ties	1,280,443
4. Track (Rail)	
a. Main Line	2,190,548
b. Yard and Other Track	305,463
c. Field Welds	31,311
d. Switches (Turnouts)	710,332
e. RR Crossing Diamonds	24,161
5. Rail Lubricators	13,235
6. Plates, Spikes and Anchors	769,662
7. Derails and Wheel Stops	9,292
8. Switch Heaters	10,328
9. Track Labor and Equipment	1,457,879
10. Total	$8,494,573

Source: *See* e-workpaper "Track Construction.xlsx," tab "Summary."

a. Geotextile Fabric

TPI has placed geotextile fabric under turnouts and at at-grade crossings.[69] TPI has calculated the number of square feet ("SF") of geotextile fabric needed for at-grade highway crossings and No. 20, No. 14, and No. 10 turnouts.[70] TPIRR requires a total of 25,618,656 SF of geotextile fabric under turnouts and at-grade highway crossings at a cost of $3.5 million.[71]

b. Ballast and Sub-ballast

TPI's engineers have used 18" of ballast and sub-ballast, consisting of a 6-inch sub-ballast layer and a 12-inch layer of clean rock ballast for all main tracks. Diagrams of the

[69] This is the practice accepted in prior SAC cases. *See, e.g.*, *WFA/Basin I* at 94-95.
[70] *See* e-workpapers "Track Construction.xlsx" and "Turnouts.pdf."
[71] *See* e-workpaper "Track Construction.xlsx."

standard TPIRR main track cross sections (single and double) are included in the accompanying workpapers.[72] This roadbed section conforms to CSXT's standard roadbed section.[73]

TPI's engineers used 4" of sub-ballast and 6" of ballast under yard tracks and helper pocket and set-out tracks because of the lighter traffic and slower speeds. This is consistent with CSXT's standard roadbed section.[74] Ballast for the TPIRR would be locally obtained limestone or granite, crushed to meet AREMA No. 4 size requirements and meeting Los Angeles and Mill Abrasion requirements.[75] Sub-ballast consists of similar parent materials crushed to provide a well-graded, dense layer of crushed rock similar to road base material.[76]

Ballast and sub-ballast quantities were developed for all sections of track based on the lengths of single and multiple track sections, and the roadbed section referenced above. As noted above, the TPI engineers have included cross-sections of the TPIRR track designs. The workpapers include the volume per foot of track for all items, including the volume per foot of track for ballast and sub-ballast.[77] The quantities were calculated by multiplying the sectional area in square feet by one foot in length and then dividing by 27 to obtain cubic yards. The volume of rock displaced by the volume of the ties being used in particular locations was removed from the total volume calculation.[78]

Ballast and sub-ballast quantities for yards were calculated assuming each track in the yard is a single track and using the 4" sub-ballast and 6" ballast depth. TPI's experts used a

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72 *See* e-workpaper "TPIRR Typical Sections.pdf."
73 *See* e-workpaper "Ballast & Sub-ballast Depth.pdf."
74 *Id.*
75 *See* e-workpaper "AREMA Recommended Ballast Gradation.pdf."
76 *See* e-workpaper "AREMA Sub-ballast Specification.pdf."
77 *See* e-workpaper "TPIRR Typical Sections.pdf."
78 *See* e-workpapers "TPIRR Typical Sections.pdf" and "Track Construction.xlsx."

conversion factor of 1.5 tons/CY for sub-ballast and 1.35 tons/CY for ballast in determining quantities. Support for these conversion factors is contained in TPI's workpapers.[79]

TPI's engineers used prices for ballast from direct quotes obtained from suppliers and historical pricing data provided by CSXT in discovery.[80] TPI's engineers utilized sub-ballast unit costs obtained for the Trestle Hollow Project, which included delivery costs. Delivered costs for ballast are based on shipping distances from the sources to various locations on the TPIRR system, which were then multiplied by $0.035 per ton-mile based on a transportation charge from *AEPCO*.[81] Transportation costs on the TPIRR are based on average shipping distances from the various locations where ballast was delivered to the placement location on the TPIRR multiplied by $0.035 per ton-mile. The supply and shipping costs were then totaled and averaged to develop an average cost per ton delivered for ballast. The total cost of ballast and sub-ballast for the TPIRR is $1,688 million.[82]

c. Ties

TPI's engineers selected wood ties with a tie spacing of 20.5 inches for all main track, passing sidings, and branch lines consistent with railroad industry standards for mainline track. The Board has also repeatedly accepted wood tie spacing of 20.5 inches.[83] Because of the lighter traffic and slower speeds, TPI's engineers used wood ties with 24 inch spacing in yards, helper tracks, and set-out tracks.[84]

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[79] *See* e-workpaper "Ballast & Sub-ballast Density.pdf."
[80] *See* e-workpaper "Track Construction.xlsx."
[81] *See AEPCO* at 100-101.
[82] *See* e-workpaper "Track Construction.xlsx."
[83] *See, e.g., WFA/Basin I* at 96; *West Texas Utilities* at 707.
[84] *See WFA/Basin I* at 96 (accepting this spacing in yards).

TPI's engineers selected standard Grade 5 treated hardwood railroad ties with dimensions of 7" x 9" x 8'6", for all track. Unit costs for Grade 5 ties were based on CSXT's 2010 cost.[85] Transportation costs were added based on the miles from the supplier to the TPIRR locations times $0.035 per ton-mile.

The TPIRR is constructing its bridges with ballast decks, thereby obviating the need for transition ties. In addition, the Board has rejected transition ties at turnouts.[86] The total cost of ties for the TPIRR is $1,280 million.

d. Track (Rail)

i. Main Line

As discussed in Part III-B, the TPIRR will use 136-pound CWR for most of the TPIRR's main tracks and passing sidings (20 MGT/year or greater), with premium rail used in curves 3 degrees and greater. For the lighter density portions of the TPIRR (less than 20 MGT/year), new 115-pound rail will be used.[87] The price per ton for the TPIRR's rail is $857 based on CSXT's 2010 R-1.[88] Transportation costs for rail from the manufacturer to the TPIRR railheads were based on the miles times $0.035 per ton-mile. The delivered cost used for the TPIRR's mainline rail is $994 per ton.[89]

The rail is welded together into approximately 1,440-foot lengths and then loaded onto a rail train. The cost for moving the rail from the TPIRR railhead to the placement location is

85 *See* e-workpaper "Tie Cost – Page 87 from CSX 2010 R-1 Revised.pdf."
86 *See WFA/Basin I* at 97.
87 *See* e-workpaper "Track Construxction.xlsx."
88 *See* e-workpaper "Page 89 from CSX 2010 R-1 Revised PDF (searchable) 2011-07-07.pdf."
89 *See* e-workpaper "Track Construction.xlsx."

based on the on-line distance times $0.035 per ton-mile plus costs for rail trains and crews.[90] The total cost of mainline rail for the TPIRR is $2,190 million.[91]

ii. Yard and Other Tracks

As discussed in Part III-B, the TPIRR is using new 115-pound CWR rail for yard tracks, helper pocket tracks, and set-out tracks. The costs for the rail for yard and other tracks were developed in the same manner discussed above for main line track.[92] The total cost of rail for yards and other tracks for the TPIRR is $305 million.[93]

iii. Field Welds

The cost of labor for field welds is derived from direct quotes and historical prices from projects overseen by Crouch Engineering.[94] The cost of field weld materials is included in the costs for field welding labor.[95] Field welds are required to connect the 1,440-foot strings of welded rail produced by the manufacturer as well as to insert insulated joints, turnouts, at-grade road crossings, and diamond crossings. TPI's cost for at-grade road crossings includes the required field welds needed. TPI's cost for turnouts includes the field welds needed to assemble the panelized turnouts. The calculations for the remaining number of field welds as well as the number of compromise welds (where 115-pound and 136-pound rail are joined together) are included in the workpapers accompanying this opening evidence.[96] The total cost for field welds is $31 million.[97]

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[90] *See* e-workpaper "Rail Train Costs.pdf."
[91] *See* e-workpaper "Track Construction.xlsx."
[92] *Id.*
[93] *Id.*
[94] *See* e-workpaper "Bayline Weld Bid.pdf."
[95] *Id.*
[96] *See* e-workpaper "Track Construction.xlsx."
[97] *Id.*

iv. Insulated Joints

Insulated joint requirements are included with the signals and communications costs discussed in Section III-F-6 below.

e. Switches (Turnouts)

TPI's engineers included the number and size of turnouts specified in the TPIRR's stick diagrams (as discussed in Section III-B). Turnouts were also included for the TPIRR's yards and connections to customers served by the TPIRR.[98] Unit costs for turnouts were obtained from quotes from vendors.[99] The turnout quotations include all materials necessary for construction of complete No. 20 power turnouts, No. 14 power turnouts, and No. 10 hand-thrown turnouts, including, but not limited to rail, switch ties, rail, frogs, guard rails, switch points, base plates and tie plates, switch plates, switch point heel blocks, adjustable wedge brace plates for the switch point section, insulated tie bar rods, connecting rods, the switch machine mechanical switchman), field welds to connect the panels, and all other items incidental to turnout construction. Transportation costs were developed by multiplying the weight of each turnout by the distance from the supplier to the TPIRR location and $0.035 per ton-mile.[100]

Switch heaters were included on power turnouts on the TPIRR lines in NY, PA, OH, WV, MD, IN and IL. Switch heater costs were based on a quote received from CCI Thermal Technologies, Inc.[101] plus shipping costs.

The total cost to the TPIRR for turnouts (excluding geotextiles and including switch heaters) is $721 million.[102]

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98 *Id.*
99 *Id.*
100 *Id.*
101 *See* e-workpaper "Quote E20 N0. 20 Switch.pdf."
102 *See* e-workpaper "Track Construction.xlsx."

f. Other

i. Rail Lubrication

Rail lubricators are used by the TPIRR to distribute grease to the wheel/flangeway interface. CSXT did not provide actual rail lubricator locations in discovery.[103] TPI calculated the number of rail lubricators on the TPIRR using the formula included in the CSXT Field Manual provided in discovery. These calculations are based on the length and degree of curves in the track, considering all track miles of main line track and sidings.[104] The unit cost for rail lubricators is based on quotes from vendors.[105] TPI has also included the costs for a protective mat, shipping, and installation.[106] The TPIRR's total cost for rail lubricators is $13 million.[107]

ii. Plates, Spikes and Anchors

The TPIRR is using treated hardwood ties with high carbon steel cut track spikes that will be used to hold the rail to the tie plate and the tie plate to the ties, and to provide lateral restraint to hold the rail to gauge (4 feet 8.5 inches inside dimension between the railheads). TPI used 7 ¾" x 14" tie plates for tangent track and curved track up to 6 degrees and 7 ¾" x 18" tie plates for curved track greater than 6 degrees. Two spikes per tie plate (four spikes per tie) are used on all track with timber ties and less than 3-degree curves. This spiking pattern is standard practice for U.S. railroads. AREMA standards also support two spikes per plate.[108]

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[103] Rail lubricators are not shown on CSXT's track charts and CSXT did not provide any location or count information in discovery.
[104] *See* e-workpapers "Lubricator Spacing.pdf" and "TPIRR Curves & Lubricator Spacing.xlsx."
[105] *See* e-workpaper "LB Foster – Lubricator Price Quote.pdf."
[106] *See* e-workpaper "Railroad Track Absorbent Matting.pdf."
[107] *See* e-workpaper "Track Construction.xlsx."
[108] *See* e-workpaper "TPIRR Spiking Patterns.pdf."

For curves between 3 and 6 degrees, 4 spikes per plate are used. This pattern is consistent with industry practice and AREMA.[109] For curves greater than 6 degrees, 5 spikes per plate are used.[110]

Rail anchors are drive-on or spring clip-on devices that clamp under the base of the rail and bear against the sides of the timber ties. Anchoring the rail, combined with the interlocking of the track ballast, prevents the rail from running, buckling, or moving in a longitudinal direction down the track, due to thermal expansion or train acceleration/braking loads. The anchors transmit the longitudinal stress forces in the rail to the ties, which then transmit the forces to the ballast thereby restraining lateral movement of the track structure. Anchors are used on both sides of every other tie on main track, branch lines, yard tracks, set-out tracks, and interchange tracks where the curvature does not exceed 3 degrees. Anchors are used on both sides of every tie for curves 3 degrees or greater and for 200' on each end of grade crossings (those costs are included in the grade crossing and turnout costs). The anchoring pattern being used on the TPIRR is consistent with AREMA standards.[111]

Transportation costs for these items were developed based on the weight of these items, the distance from supplier to TPIRR railhead, and $0.035 per ton-mile.[112]

The total cost for plates, spikes, and anchors is $770 million.[113]

iii. Derails and Wheel Stops

Derails are used to protect main line tracks by preventing cars and on-track work equipment from rolling from a side track through a turnout and onto the main track. Double

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[109] *Id.*
[110] *Id.*
[111] *See* e-workpaper "TPI Rail Anchor Pattern Details.pdf."
[112] *See* e-workpaper "Track Construction.xlsx."
[113] *Id.*

switch point derails are included at 50% of all set-out track turnouts near Failed Equipment Detectors ("FED") based on the assumption that only 50% of the set-out tracks would be on a descending grade towards the mainline. Retractable derails are necessary at the remaining 50% of the set-out tracks that are on a descending grade away from the mainline and at yard turnouts where cars are set out from trains and stored. Wheel stops are used at the end of single-ended tracks such as set-out tracks to keep the cars from rolling off the end of the track. The cost for derails and wheels stops were developed from Aldon vendor price catalogues.[114] The total cost for derails and wheel stops for the TPIRR is $9 million.[115]

iv. At-Grade Railroad Crossings

At-grade railroad crossings were identified from the CSXT timetables covering the lines being replicated by the TPIRR.[116] Costs for the at-grade railroad crossings were obtained from public evidence in a recent proceeding[117] and indexed to 3Q10 levels. TPI has used its turnout installation labor quote for the installation of at-grade railroad crossings. The total cost for at-grade railroad crossings on the TPIRR equals $24 million.[118]

v. Materials Transportation

As described above, specific transportation costs associated with a given item are included in the total costs for that item. Therefore, no additional transportation costs have been added.

Material prices include the costs to deliver the materials to the TPIRR railheads, including, but not limited to, Chicago, IL, Fostoria, OH, Cincinnati, OH, East St. Louis, IL, McKeesport, PA, Syracuse, NY, Richmond, VA, Nashville, TN, Fayetteville, NC, Atlanta, GA,

[114] *See* e-workpaper "WheelStopCost.pdf."
[115] *See* e-workpaper Track Construction.xlsx."
[116] *See* e-workpaper "TPIRR At-Grade Railroad Crossings.xlsx."
[117] *See* Norfolk Southern Reply Evidence (Public Version) at III-F-155 (filed November 30, 2012) in *DuPont*.
[118] *See* e-workpaper "Track Construction.xlsx."

Montgomery, AL, and Jacksonville, FL. Because of the numerous road access points along the TPIRR, the fairly uniform topography for most of the railroad, and interstate roads paralleling many line segments, materials that cannot be shipped by rail have been priced with shipping by truck to one or more of the road access points along the TPIRR's lines. The track construction costs include moving those materials from the various railheads to where they are required along the TPIRR right-of-way.

vi. Track Labor and Equipment

The TPIRR's track laying and related costs are derived from direct quotes and bids obtained from contractors on projects where Crouch Engineering bid and oversaw rail construction, and from recent quotes solicited from contractors for similar projects. A quote for track construction labor was obtained from Queen City Railroad Construction. The lowest quote/bid has been used for track construction and includes the following:

- Provide labor to unload all track material including 136 RE CWR or 115 RE CWR from rail train, timber crossties, tie plates, rail anchors, spikes, and ballast
- Construct track complete using CWR, crossties on 21" centers, box anchoring every other tie, box anchor every tie within 200' of grade crossings
- Distribute ballast from hoppers or ballast cars
- Surface and line track, regulate ballast, 12" of ballast under center of ties

The total cost of track labor for the TPIRR is $1,458 million.[119]

The total cost of track construction for the TPIRR is $8,495 million.[120]

[119] *Id.*
[120] *Id.*

4. Tunnels

Tunnel inventory and tunnel lengths were provided by CSXT in discovery. The CSXT tunnel inventory did not specify which tunnels were lined and which were not lined, but it did classify the tunnels into the categories of timber, steel, rock, brick, and concrete.[121] TPI assumed that all categories except rock are lined. TPI pared the CSXT listing down to only those tunnels located on the TPIRR.[122]

Unit costs per foot for tunnels were obtained from public evidence in a recent proceeding[123] and indexed to 3Q10 levels. The costs per foot vary by the number of tracks in the tunnel, the length of the tunnel, and whether or not the tunnel is lined. Each tunnel on the TPIRR was matched to the appropriate cost per foot to determine the cost for each tunnel.[124]

Total tunnel costs for the TPIRR equal $1,596 million.[125]

5. Bridges

TPI's bridge evidence is co-sponsored by Witnesses Harvey Crouch and Kevin Lindsey. Their qualifications are detailed in Part IV. TPI's engineers have observed bridges on some of the lines being replicated by the TPIRR and reviewed the specific information contained in CSXT's bridge inventory. Bridge quantities for the TPIRR were developed from CSXT bridge inventory information provided in discovery. Bridge designs were developed by TPI's engineers and unit costs are derived from various real-world sources as described below.

a. Bridge Inventory

Mr. Crouch prepared the bridge inventory for the TPIRR based on a review of the bridge information provided by CSXT in discovery. The bridge inventory furnished by CSXT in

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[121] *See* e-workpaper "2010 Active Tunnels.xlsx."
[122] *See* e-workpaper "TPIRR Tunnel Construction.xlsx."
[123] *See* Norfolk Southern Reply Evidence (Public Version) at III-F-166 (filed November 30, 2012) in *DuPont*.
[124] *See* e-workpaper "TPIRR Tunnel Construction.xlsx."
[125] *Id.*

discovery and utilized by TPI's engineers includes milepost, feature crossed (for some bridges), number of spans, structure type, bridge clearance (for approximately 55% of bridges) and total length.[126]

b. Bridge Design and Cost Overview

When the CSXT lines replicated by the TPIRR were constructed, a variety of bridge types were used. This was due to the different technologies that were available at the time of original bridge construction, the proclivities of the particular railroad company that constructed the bridge, the desired load rating, and the available materials. Many existing CSXT bridges include masonry and timber structural components. As technology has become more sophisticated, so has bridge design and implementation.

The TPIRR's bridges have the same lengths as those being replicated, but TPI's engineers have designed those bridges using more efficient spans where possible and several standard bridge designs (*e.g.*, Type I, II, III, and IV bridges) based on the diverse bridge lengths and heights that are required.[127] First, the bridge inventory provided by CSXT did not include bridge height data; however, CSXT did provide bridge under clearance data for approximately 55% of the bridges in its system. Using this data, TPI's engineers were able to utilize concrete piers, concrete abutments and steel viaducts to handle the varying clearances and span lengths. The bridge clearances for the remaining 45% of the bridges were developed by CSXT division. The average bridge clearance was calculated for each CSXT division, rather than the CSXT system as a whole, by summing the provided bridge clearances and dividing by the number of

[126] *See* e-workpaper "TPI Bridge Construction Costs.xlsx."
[127] This is standard practice in prior SAC rate cases. *See Duke/NS* at 190-191, *CP&L* at 327, *Duke/CSXT* at 496 and *WFA/Basin I* at 110-112.

bridges for which a clearance was provided. These averages by division were then applied to those bridges in each division for which a clearance was not provided.

Bridge height/clearance is an important component in developing the cost of a bridge. The higher the bridge, the more bracing will be required for stability, the more materials will be used to construct the substructure, and the higher the construction cost will be due to the difficulty in forming concrete, driving longer steel piles, and lap-splicing rebar.

No information was provided in discovery on the hydraulic opening area of the bridges. However, water flow increase/decrease is negligible due to the fact that, for each bridge, TPI's engineers either maintained the same number of spans and piers, or decreased the number of spans and piers, while keeping the length the same as the existing bridge. In this manner, the hydraulic opening of many bridges has been increased and improved by reducing the number of spans and bridge bents/piers.

Next, TPI's engineers developed a cost formula for each of the bridge types using a composite of costs from Crouch Engineering's historical data of successful bidders on similar-scale railroad bridge construction. The historical data includes the cost quotes from successful bidders for bridges built in rural Tennessee and rural Alabama with terrain very similar to that of the lines being replicated by the TPIRR. This project data focused on bridges that were not being built under traffic conditions or limited work windows, i.e., the bridges were built under working conditions similar to those assumed to exist when building the TPIRR. Once a standard cost formula was developed, it was applied to every bridge within the relevant category in the inventory. The cost of each bridge is developed separately. The primary formula applied for each bridge, but separately by Type as needed is: Bridge Cost = [(Abutment cost X number of Abutments) + (Pier Cost X number of Piers) + (Per Linear Foot Cost x Length of Bridge)].

Other components such as piling, handrail, elastomeric pads, base plates, and PVC deck drains are also reflected in the costs.[128] From a design standpoint, using Crouch Engineering's historical costs for building bridges ensures that all items necessary for building the bridges are included, especially since these historical costs are actual costs from real world applications thereby demonstrating the feasibility of the methodology. These bridges are adequate in design and have a minimum rating of 286,000 pounds and a life cycle of 100 years (meaning that no major repairs will be required for 100 years).

The total investment cost for the TPIRR's bridges is $3,438 million. [129]

i. Type I Bridges

Type I bridges have varying spans of up to 32'-0". These bridges are typically one span unless they are incorporated in the configuration of a much longer bridge requiring multiple bridge types and/or multiple span configurations. The same precast deck, column caps, abutment caps, and wing-walls are used for all of these bridges. The typical column uses 8 to 12-HP14x89 piles as the foundation depending on the clearance requirements and each abutment uses 4-HP14x73 piles as the foundation.[130] Type I bridges less than 32' in length are single span structures; structures that are 32-55' are two spans. In addition, Type I spans were often used when approach spans were necessary due to the inconsistent span lengths on the bridge inventory list.[131]

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[128] *See* e-workpaper "TPI Bridge Construction Costs.xlsx."
[129] *Id.*
[130] *See* e-workpapers "TPI Bridge Construction Costs.xlsx," "Type I_Photos and Plans.pdf," "CSXT Standard Stub Abutment.pdf," "BR09-Tpye I & II Pier-1.pdf," "BR09-Type I & II Pier-2.pdf," and "TPI Pier & Pile Design.pdf."
[131] *See* e-workpaper "TPI Bridge Construction Costs.xlsx."

ii. Type II Bridges

Type II bridges have spans of 32'-0" to 45'-0". These bridges are typically one span unless they are incorporated into the configuration of a much longer bridge requiring multiple bridge types and/or multiple span configurations. These intermediate spans are achieved by placing rolled beam sections next to each other. The same columns, abutments, caps, and wing-walls are used for all of these bridges. The typical column uses 8 to 12-HP14x89 piles as the foundation depending on the clearance requirements and each abutment uses 4-HP14x73 piles as the foundation.[132] The Type II Bridge classification on the TPIRR is reserved for single-span bridges between 32'-0" and 45'-0" in length and an occasional multi-span bridge requiring a shorter span.

iii. Type III Bridges

Type III bridges have spans of 60'-0" to 92'-6". These bridges are typically one span unless they are incorporated in the configuration of a much longer bridge requiring multiple bridge types and/or multiple span configurations. These intermediate spans are achieved by placing four pre-stressed concrete Bulb-T beams side-by-side. A cast-in-place deck is installed over the pre-stressed Bulb-T beams. The same columns, abutments, caps, and wing-walls are used for all of these bridges. The typical column uses 8 to 12-HP14x89 piles as the foundation depending on the clearance requirements and each abutment uses 9-HP14x73 piles as the foundation.[133] The Type III Bridge classification on the TPIRR is reserved for single-span

[132] *See* e-workpapers "TPI Bridge Construction Costs.xlsx," "Type II_Photos and Plans.pdf," "BR04-Type II-1.pdf," "BR04-Type II-2.pdf," "BR04-Type II-3.pdf," "BR04-Type II-4.pdf," " BR04-Type II-5.pdf," " BR04-Type II-6.pdf," "BR04-Type II-7.pdf," "CSXT Standard Abutment.pdf," "BR09-Footing.pdf," "BR09-Type I & II Pier-1.pdf," BR09-Type I & II Pier-2.pdf," and "TPI Pier & Pile Design.pdf."

[133] *See* e-workpapers "TPI Bridge Construction Costs.xlsx," "Type III_Photos and Plans.pdf," "BR05-Type III-1.pdf," "BR05-Type III-2.pdf," "BR05-Type III-3.pdf," "BR05-Type III-4.pdf," "BR05-Type III-5.pdf," "BR05-Type III-6.pdf," "BR05-Type III-7.pdf," "TPI Type III Abutment.pdf," "BR09-Footing.pdf," "BR09-Type III Pier-1.pdf," "BR09-Type III Pier-2.pdf," and "TPI Pier & Pile Design.pdf."

bridges between 60'-0"- 92'-6" in length and an occasional multi-span bridge requiring a longer span. Type III Bridges are the most economical span, and therefore, this is the span that was chosen for single-span bridges between 60'-0" and 92'-6" in length and for multi-span bridges longer than 92'-6" (unless USCG restrictions are in-place).

iv. Type IV Bridges

Type IV bridges have spans of 150'-0", consist of a Steel Through Plate Girder, and can be comprised of multiple bridge types in order to achieve long multiple span structures. Type IV bridges were selected to cross over large rivers needing to comply with USCG clearance requirements, as well as instances where a longer span would be more cost-effective than multiple shorter span bridges. The same columns, abutments, caps and wingwalls are used for all of these bridges. The typical column uses 12-HP14x89 or HP14x117 piles as the foundation depending on the clearance requirements and each abutment uses 10-HP14x73 piles as the foundation.[134] The Type IV bridge classification on the TPIRR is reserved for bridges with USCG clearance requirements and for multi-span bridges longer than 150'. If 150' spans were used, it was necessary in some instances to have additional bridge types to extend the structure so as to keep it out of the floodplain. This is consistent with the information provided by CSXT in discovery. TPI's engineers have observed many existing CSXT bridges that include multiple span types.

v. Bridges with Mixed Spans

Bridges with mixed spans on the TPIRR have been removed from the main TPI bridge list and the costs have been calculated separately. The main reason for separating these bridges

[134] *See* e-workpapers "TPI Bridge Construction Costs.xlsx," "Type IV_Plans and Photos.pdf," "BR06-Type IV-1.pdf," "BR06-Type IV-2.pdf," "TPI Type IV Abutment.pdf," "BR09-Footing.pdf," "BR09-Type IV Pier-1.pdf," "BR09-Type IV Pier-2.pdf," and "TPI Pier & Pile Design.pdf."

is simply for ease of calculation. It is often necessary to utilize different span types on a particular bridge. The use of concrete girders with steel girders, etc., happens often in bridge development. TPI has been able to accommodate the different span types by utilizing step caps for the different sized superstructure, using the appropriate abutments for different span types, and using the appropriate piers for the different span types and clearances. For example, although a two-span bridge having a single Type II span and a single Type III span will use the appropriate Type III pier, depending on the clearance requirements, the bridge will use both a Type II and Type III abutment. The costs are then developed similar to the Type I–IV bridges, accounting for the necessary piers, abutments, and spans.[135]

vi. Tall Bridges

Bridges with a clearance of 65 feet or greater were classified as tall bridges. Tall bridges were separated out into a different tab in e-workpaper "TPI Bridge Construction Costs.xlsx" and the costs for these bridges were then calculated based on the clearance and span lengths required. The superstructure was calculated depending on the bridge length requirements, and the substructure utilizes a steel viaduct instead of a concrete pier for both economic and practical purposes. Using plans for the Pitman Creek Bridge, which utilizes steel towers, the weight of one tower was calculated on a pound-per-foot basis.[136] This weight was then used to calculate the costs of all the tall bridges by multiplying the clearance needed by the weight per foot calculated. This weight was then multiplied by a unit cost of steel, thus giving a cost per steel viaduct dependent upon the clearance provided.[137]

[135] *See* e-workpaper "TPI Bridge Construction Costs.xlsx."

[136] *See* e-workpapers "Pitman Creek Bridge MP 163.4.pdf," "Pitman Creek Bridge Viaduct #2 Steel Weight.pdf" and "Pitman Creek Bridge Viaduct Bearing on Concrete Pedestal.pdf."

[137] *See* e-workpaper "TPI Bridge Construction Costs.xlsx."

vii. Movable Bridges

Based on the CSXT bridge inventory, there are 14 swing spans, 8 bascule spans, and 4 vertical lift spans for a total of 26 movable bridges on the lines of the TPIRR. The TPIRR is constructing both vertical lift spans and bascule spans. The TPIRR is substituting bascule spans for swing spans because bascule spans are more economical.

Costs for the TPIRR's movable bridges were developed as follows. Bridges with movable spans were removed from the main TPI bridge inventory list and placed in a separate tab of e-workpaper "TPI Bridge Construction Costs.xlsx." The movable-span length is subtracted out from the total bridge length, and the cost for the movable span is then calculated depending upon the span type. The remainder of the bridge is calculated similar to the Type I–IV bridges, accounting for the necessary piers, abutments, and spans needed.[138]

The TPIRR is responsible for only 10% of the cost of the movable span portion of theses bridges. The Truman-Hobbs Act is a Federal government funding mechanism currently in place with the purpose of aiding bridge owners with the costs of movable bridges. Furthermore, in 2009, the year before the TPIRR commences operations, the American Recovery and Reinvestment Act of 2009 became law. This act authorized billions of Federal funding for transportation infrastructure projects, including $142 million earmarked specifically to fund movable bridge costs under Section 6 of the Truman-Hobbs Act.[139] The TPIRR would have been ideally suited to take advantage of this Federal funding stream, as did other Class I railroads. Indeed, BNSF issued a press release in 2009 that indicated it was taking advantage of Truman-Hobbs funding: "Work has begun to replace BNSF Railway's 118-year-old swing span over the Mississippi River at Burlington, IA… Construction of the lift span is being financed in

[138] *Id.*
[139] *See* American Recovery and Reinvestment Act of 2009, Pub. L. No. 111-5, 23 Stat. 115, 162 (2009).

part through the American Recovery and Reinvestment Act of 2009 and previous year appropriations under the Truman-Hobbs Act."[140]

CSXT is entitled to Truman-Hobbs Act funding for movable bridges so the TPIRR must also be entitled to access these funds. To deny the TPIRR the ability to take advantage of this funding is a barrier to entry.

viii. Highway Overpasses

Grade-separated road crossings, or highway overpasses, are included as part of the TPIRR cost calculations for bridges. The TPIRR is constructing 1,447 such overpasses. As noted previously, the CSXT lines being replicated predate many of the roads in this territory. Consistent with Board precedent, TPI has included 10% of the costs for highway overpasses.[141]

The unit cost for highway overpass construction was derived from five highway overpass construction projects. The cost per square foot of deck for each of these five projects was calculated and then averaged together to come up with a unit cost per square foot of deck. This cost was then multiplied by the total square footage of highway overpass bridges on the TPIRR times the 10% factor noted above.

The deck areas for each highway overpass on the TPIRR were developed in the following manner. First, TPI obtained the Federal Highway Administration ("FHWA") database containing the count of highway bridges and total deck area (in square meters) by county by state.[142] Next, TPI used the most current data (2012) and developed the average deck size by county (converted from square meters to square feet[143]) for the states traversed by the TPIRR.[144]

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[140] *See* BNSF, *BNSF Burlington Bridge Update Work Begins*, Sept. 21, 2009, available at http://www.bnsf.com/media/news-releases/2009/september/2009-09-21a.html (last visited Feb. 8, 2014).
[141] *See AEP Texas II* at 103.
[142] *See* e-workpaper "counties.xlsx."
[143] *See* e-workpaper "Square meters to square feet.pdf."
[144] *See* e-workpaper "FHWA highway bridges by state and county TPIRR.xlsx."

Then, TPI sorted the highway overpasses on the TPIRR by state and county and assigned the applicable average deck size for the county where the highway overpass is located. This resulted in an average deck size of 8,850 square feet.[145]

The total cost for highway overpasses on the TPIRR is $130 million.[146]

6. Signals and Communications

The TPIRR will rely on a standard CTC-based vital signal system with components added to provide Positive Train Control ("PTC"). It will rely on a microwave system for communications. The signal system, including PTC, and communication system costs are sponsored by witnesses Victor Grappone, PE, and James Hoelscher.

a. PTC Signal System

The Rail Safety Improvement Act of 2008 (RSIA) (signed by the President on October 16, 2008, as Public Law 110-432) has mandated the widespread installation of PTC systems by December 2015. The TPIRR network employs a PTC system for all train control communications on the entirety of its constructed track network (i.e., the TPIRR does not include investment cost for signaling and communications system on trackage rights and joint facility tracks owned by other carriers).

Unlike existing Class I carriers, the TPIRR is installing a PTC system from the outset of its construction and investment, rather than converting an existing train communications and control system to a PTC system. As a result, the investment expenditures by the TPIRR are less than what an existing Class I carrier will incur to achieve the same level of infrastructure. To develop the cost of the PTC system, TPI's experts relied on information provided by CSXT in discovery related to its estimates of the costs of the various components of the PTC system. The

[145] *See* e-workpaper "TPIRR Highway Overpasses.xlsx."
[146] *See* e-workpaper "TPIRR Highway Overpass Construction.xlsx."

costs were adjusted, where appropriate, to reflect the cost of a PTC system as an initial installation rather than conversion from an existing CTC or other signaling system.[147]

The technology existed in 2008 to implement a PTC-compliant signaling system, including the technology upon which CSXT's PTC system is based. A variety of manufacturers and railroads were using and/or developing PTC technology prior to 2008, as described in the list below:

1. CSXT was testing ETMS version 2 and the FRA approved its Product Safety Plan on December 26, 2006. The FRA approved field testing of ETMS 2 on June 27, 2007.[148]

2. On the Northeast Corridor, Amtrak installed a system called Advanced Civil Speed Enforcement System (ACSES) starting in 2000. The final system, known as ACSES II, was completed and in service in April 2009. This system has since been granted type approval by the FRA as a PTC system.[149]

3. Starting in 1994, Harmon Industries and Amtrak designed and installed a system known as Incremental Train Control System (ITCS). This system was in service allowing speeds up to 95 MPH on the Michigan Corridor in 2005.[150] This system also meets the PTC requirements of the RSIA.

4. In December 2007, the four major U.S. signaling suppliers (Alstom, Ansaldo, GE Transportation, and Safetran), working under a grant from the FRA, started the development of an Interoperable Communications-Based Train Control System (ICBS). The suppliers based the system on current in-use products, modified to meet the requirements of a PTC system. In parallel with that effort, interface and message standards were developed with AREMA and published in the 2009 AREMA C & S

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[147] The cost used for interlocking controllers included the PTC component, i.e., TPI's engineers did not develop a cost for a non-PTC electronic interlocking controller and then add a PTC wayside interface unit ("WIU") for each interlocking controller. Similarly, TPI's engineers did not develop a cost for a non-PTC dispatch system and then add a PTC component to it. Interlocking controllers and dispatch systems have the ability to perform the necessary PTC functions and it is not necessary to install an older style piece of equipment and then add PTC functionality as an add-on piece of equipment. In addition, as TPI's costs are based on the ERTMS II system, no additional costs were included for interoperability as they should already be included in the costs provided by CSXT.

[148] *See* e-workpapers "US DOT FRA – Letter Approving BNSF's Product Safety Plan Ver 2_1 Dec 26 2006" and "US DOT FRA – Approval with Conditions for Field Testing of ETMS Configuration II Jun 27 2007."

[149] "PTC Commuter Ahead of the Curve: Amtrak's PTC Advantage," Progressive Railroading Webcast, February 23, 2012, moderated by Jeff Stagl. Presented by Keith Holt, Deputy Chief Engineer, Amtrak. *See* <http://www.progressiverailroading.com/webcasts/details.asp?id=30073>.

[150] *Id*. *See also* "Incremental Train Control System," by Greg Hann, IEEE Vehicular Technology Magazine, December 2010 and "Train Control Incrementally," by Pat Foran, Editor, Progressive Railroading, May 2006. These articles are found at e-workpapers "Incremental Train Control System Dec 2010.pdf" and "Train Control Incrementally May 2006.pdf."

> Manual (distributed fall 2008). A lab demonstration of the system was completed in late 2008 using actual hardware and following the AREMA recommended practices.[151]

Thus, it is clear that the technology was available in 2008 to install PTC on the TPIRR. Although suppliers may not have had on-the-shelf components available, they were in a position to quickly develop and supply those components if an actual project (such as construction of the TPIRR) requested such components. Accordingly, TPI would not have incurred development costs associated with PTC testing and back office systems development.

TPI included PTC investment costs for three basic components: track (wayside), geographic information systems ("GIS"), and locomotive communications and onboard equipment. Wayside PTC costs are captured for wayside interface units ("WIUs") and radios. For interlockings, WIUs are considered built in as an inherent part of the vital microprocessor equipment. For electric lock locations, separate stand-alone WIUs are provided. PTC radios are provided at both interlockings and electric lock locations. Information technology costs are included in the form of GIS upgrades. Costs are developed using information supplied by CSXT in discovery.[152] These costs were calculated on an average cost per mile and multiplied by the number of TPI constructed route miles.[153]

Signal system costs, including the costs for the wayside and information technology portions of PTC, are contained in TPI's workpapers.[154] This file contains a description of the components that comprise the system, plus a count of the components, and assigns unit costs for material and labor. The number and type of components associated with typical installations

[151] *See* e-workpaper "Interoperable Communication-Based Signalling Project Jun 2009."
[152] *See* e-workpaper "CSXT PTC Unit Costing Detail.xlsx."
[153] *See* e-workpaper TPI Signals & Communications.xlsx," tab ""PTC."
[154] *See* e-workpaper "TPI Signals & Communications.xlsx."

along the right of way are defined. The number of each type of installation was identified based on the layout of the TPIRR as manifested in the TPIRR stick diagrams.

TPI defined several types of typical installations, including interlockings, automatic signals, electric locks, FEDs, and AEIs.[155] Interlocking locations are categorized by the number of signals and switches. For example, "I42" represents an interlocking with four signals and two switches. Automatic signal and electric lock locations are categorized by the number of tracks, "AS1" through "AS4" and "EL1" and "EL2", respectively. FEDs (one per track) and AEIs are accounted for individually.

Based on the TPIRR stick diagrams, TPI included counts for each type of installation. These are referenced by stick diagram page number, line prefix, and milepost. In some cases, particularly for larger interlocking locations, the TPIRR stick diagrams indicate a configuration that does not exactly match the above-mentioned typical installations. In those instances, an equivalent configuration was used, taking the conservative approach of being larger than actually required. The highway crossing locations are categorized by typical installations "X1F" through "X4F" and "X1G" through "X4G," representing one to four track crossings with flasher signals only or gates and flashers, respectively.[156] To account for the additional complexity of highway crossing approaches that overlap interlockings, an additional typical location "X Adjacent Interlocking" has been provided. These are counted on a per-track and by direction basis.[157] Material and labor costs are projected for each as an incremental 10% based on the costs for a double-track highway crossing predictor hut.

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[155] *See* e-workpaper "TPI Signals & Communications.xlsx," tab "Page Counts," top row.

[156] Consistent with the Board's decision in *Duke/CSXT*, TPI's engineers have included ten (10) percent of the costs for highway crossing protection signals. *See* 7 STB at 504.

[157] *See* e-workpaper "TPI Signals & Communications.xlsx," tab "Components & Tabulation," Item "Crossing equipment for adjacent interlocking."

The components comprising each typical installation are specifically defined.[158] These include pre-wired interlocking huts, automatic signal and electric lock cases, highway predictor huts, wayside signals, highway crossing gates/signals, switch machines, cables, FED and AEI equipment, and power components. Components are counted and costs are calculated using these counts as well as unit material and labor costs for each component.[159] To account for the complexity of huts for larger interlocking locations, a reasonable and conservative multiplier is applied to three standard hut configurations: three signals / one switch, four signals / one crossover, and four signals / two crossovers.

Movable bridges are accounted for either as stand-alone interlockings of equivalent complexity, or as expansions of co-located interlockings indicated on the stick diagrams. Additionally, circuit controllers required for detection of bridge locks, wedges, and related equipment are included.[160]

b. Detectors

Automatic roll-by failed equipment detectors ("FEDs")[161] are included along the TPIRR main lines as required by operations and consistent with the current industry standard.[162] As discussed in Part III-B, these FEDs are located in approximately the same locations as they currently exist along the CSXT lines replicated by the TPIRR (one for each main track in areas with two or more main tracks).[163] Bad order setout tracks have been sited within two miles of the failed equipment detectors in each direction to provide for train stopping distances and allow removal of bad order cars to the setout tracks. All setout tracks near the detectors are single-

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[158] *See* e-workpaper "TPI Signals & Communications.xlsx," tab "Typical."
[159] *See* e-workpaper "TPI Signals & Communications.xlsx," tabs "Component Counts" and "Components & Tabulation."
[160] *See* e-workpaper TPI Signals & Communications.xlsx," tab "Typical," Item "Movable Bridge per Track."
[161] TPI also includes a Dragging Equipment Detector ("DED") at each FED location.
[162] *See* AREMA 2001 Standards, Chapter 16, Section 5.3.1, Items j & k.
[163] *See* e-workpaper "FED Locations on the TPIRR.xlsx."

ended tracks, 735 feet in length providing 600 feet in the clear past the switch. For interface to the signal and PTC system, each setout track is provided with either a single- or double-track ("EL1" or "EL2") electric lock manual switch installation. Costs for FED and electric lock locations are contained in TPI's workpapers.[164]

The TPIRR has 105 AEI scanners. Details of the costs and components are shown in TPI's workpapers.[165]

c. Communications System

The TPIRR's railroad radio system enables locomotive communications, two-way radio communications, general voice communications, general data communications, and FED alerts. Microwave radio technology is used for the radio system backbone and land mobile radio technology is used to facilitate communications between end user applications and the radio system backbone. Land Mobile Radio ("LMR") technologies provide communication access (via fixed, mobile, and portable radios) to the radio system backbone for operating crews, supervisory and track maintenance personnel that need to communicate with the railroad's operating headquarters and central dispatching facility at Atlanta, GA. LMR technologies are co-located with microwave radio technologies at network (tower) sites if appropriate. LMR technologies operate in Very High Frequency ("VHF") mode to accommodate railroad operational frequencies assigned by the AAR.

The backbone of the TPIRR's railroad radio system includes microwave towers along the TPIRR route.[166] The use of microwave towers for railroad communications is widespread,

[164] *See* e-workpaper "TPI Signals & Communications.xlsx."
[165] *Id.*
[166] *Id.*

although fiber optic communications are now also being used. On average, microwave towers are placed at 20 mile intervals along the TPIRR.

Each tower includes a full set of microwave equipment, including two microwave base stations enabling sending and receiving along a straight path, and four microwave antennas. End towers have only one microwave station and two antennas. Where necessary, a tower may have three or four base stations and six or eight antennas. Each microwave tower also includes a LMR base station, with corresponding radio equipment. Finally, each tower includes the necessary communications shed.

The type of multiplexor deployed at each network (tower) site is the Alcatel 1518 Integrated Access Device ("AD"). The 1518 AD is rack-mountable and will convert analog RF signals from/to digital signals. The 1518 AD also interconnects with the MTR2000 LMR base station by standard Plain Old Telephone System ("POTS") four-wire. The 1518 AD will also interconnect with the Alcatel MDR-8606 microwave base station by standard DS1 cable and shall conform to Telcordia TR-TSY-000499 and ANSI T1.102 standards. The 1518 AD supports up to 24 PCM channels per group that are intermixed at random, providing voice frequency ("VF") trunking, special service interfaces, synchronous and asynchronous data channels, program/broadcast services, and FCC registered channels in one assembly.

CTC infrastructure components that are radio-enabled (*e.g.*, AEIs and FEDs) are equipped with the Kenwood TK-762GK radio, KAP-1 switching unit, and required cables. For technical descriptions of the Kenwood TK-762GK VHF radio, see TPI's workpapers.[167] This mobile radio is VHF capable and operates in the 148-174 MHz frequency range.

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[167] *See* e-workpaper "S & C Workpapers.pdf."

In addition to the radios handling CTC infrastructure, TPI's engineering experts have included 1,740 LMR repeating stations positioned along the right-of-way. These LMR repeaters allow for uninterrupted RF communications along the right-of-way because the LMR stations on the microwave tower may or may not be accessible at all points. Many of the LMR repeaters include a 60-foot antenna to extend the range.

The costs for the locomotive communications component of PTC are also included in the TPIRR's communications system costs.[168] Total investment cost for the TPIRR's communications system is $341.5 million.[169]

d. Hump Yard Equipment

As discussed in Parts III-B and III-C, the TPIRR has eleven hump yards. Costs for the hump yard equipment were obtained from public evidence in a recent proceeding[170] and indexed to 3Q10 levels. Total costs for hump yard equipment for the TPIRR's eleven hump yards equal $301 million[171] and are included in the signals system costs.

Total signals and communications system costs are shown in Table III-F-8 below.

Table III-F-8
Signals And Communications System Costs
($ millions)

Item (1)	Cost (2)
1. Signals System	$1,212.6
2. Communications	341.5
3. Total	$1,554.1

Source: *See* e-workpaper "TPI Signals & Communications.xlsx."

[168] *See* e-workpaper "TPIRR PTC Locomotive Cost.xlsx."
[169] *See* e-workpapers "TPI Signals & Communications.xlsx," and "TPIRR PTC Locomotive Cost.xlsx."
[170] *See* Norfolk Southern Reply Evidence (Public Version) at III-F-253 (filed November 30, 2012) in *DuPont*.
[171] *See* e-workpaper "TPIRR Hump Yard Equipment.pdf."

7. Buildings and Facilities

TPI's buildings and facilities evidence is also sponsored by witness Harvey Crouch. The TPIRR's major system facilities are located at its 12 major yards. These facilities include the TPIRR's headquarters building, crew facilities, locomotive repair shops, 1,000- and 1,500-mile inspection facilities, and car and locomotive storage. Additional smaller yards are located throughout the TPIRR system.[172] The total building and facilities costs are summarized in Table III-F-9 below.

[172] *See* e-workpaper "TPIRR Yard Matrix Opening Grading.xlsx."

Table III-F-9
TPIRR Buildings And Facilities

	Facility	Cost (000)
	(1)	(2)
1.	Headquarters Building	$16,753
2.	Fueling Facilities	33,397
3.	Locomotive Shops	90,277
4.	Car Repair Shop	0
5.	Crew Change Facilities	14,281
6.	Yard Offices	17,504
7.	Roadway Buildings (MOW)	14,158
8.	Guard Booths	856
9.	Yardmaster Towers	2,609
10.	Other Facilities/Site Costs	795,010
11.	Total Buildings and Facilities	$984,845

Source: *See* e-workpaper "TPIRR Facilities.xlsx."

a. Headquarters Building

The TPIRR headquarters is located at the TPIRR's Tilford Yard in Atlanta, GA. The TPI engineers calculated the required square footage using the American Institute of Architects (AIA) standard square footage per employee, which includes additional space for work rooms, IT equipment, hallways, bathrooms, and mechanical services. Executive employees were allotted additional space per the AIA standards. The resulting building is two stories with a total of 112,500 square feet.[173] The building's costs were based on the RS Means cost for building structures of this kind. Costs for additional items not included in the RS Means cost have been added.[174] The total cost of the headquarters building is $16.8 million.

b. Fueling Facilities

Large fixed fueling platforms, consisting of eight fueling stations, are located at each of the 12 major yards. Smaller fixed fueling platforms, consisting of four fixed fueling stations, are

[173] *See* e-workpapers "TPIRR Facilities.xlsx," and "Headquarters Building Unit Costs.pdf."
[174] *Id.*

included at four other yards on the TPIRR.[175] Locomotive servicing (replenishment of lube oil and sand) also takes place at these facilities.

TPI's operating plan has also designated fifteen (15) locations where locomotive fueling facilities are provided for fueling by trucks (i.e., direct-to-locomotive (DTL) fueling) as well as locomotive servicing.[176] In addition, DTL fueling will occur at all other locations where fueling is necessary. All fueling by truck will be performed track-side. The yard tracks where locomotive fueling by truck will occur are built on 25-foot track centers, thereby providing sufficient space for the trucks to operate. The cost for fueling facilities on the TPIRR equals $33.4 million.[177]

c. Locomotive Shop

As discussed in Part III-B, TPI's engineers have included a locomotive shop at Willard, OH, Cumberland, MD, Nashville, TN, and Waycross, GA. Each locomotive shop is designed to handle larger overhaul work as well as 92-day inspections and running repairs. Each shop includes a two-track facility designed to handle 92-day inspections and other minor running repairs as required. Three additional tracks capable of holding up to ten (10) locomotives are included for the larger overhaul work. The heavier work-track design includes overhead and jib cranes, drop tables, and other necessary heavy equipment based on the function of each track. In addition, the shop is equipped with a wheel turning machine and other heavy equipment.[178]

Unit costs and designs are based on a cost per square foot developed from bid prices received on previous projects involving Crouch Engineering. Additional items and equipment not included in the cost per square foot were developed from manufacturer quotes and CSXT

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[175] *See* e-workpaper "TPIRR Yard Matrix Opening Grading.xlsx."
[176] *Id*.
[177] *See* e-workpaper "TPIRR Facilities.xlsx."
[178] *Id.*

discovery material and added to the locomotive shop cost. Details of the shop fixtures and costs are included in TPI's workpapers.[179] The total cost for locomotive shops for the TPIRR is $90.3 million.[180]

d. Car Repair Shop

As noted in Section III-C, the TPIRR acquires its railcars via full service leases and, therefore, the lessor and not the TPIRR is responsible for providing all necessary car repair shops.[181] Consequently, TPI's experts have not included costs for any car repair facilities. However, they have provided the necessary space and tracks for such a facility at three yards on the TPIRR.

e. Crew Change Facilities

There are 48 crew change locations on the TPIRR which require a crew change facility.[182] The buildings at locations with an average of twenty (20) or more crew starts per day (14 locations) are sized 35 feet by 64 feet for a total of 2,240 square feet per building. The buildings at the other thirty-four (34) locations are sized 25 feet by 56 feet for a total of 1,400 square feet per building. Based on Mr. Crouch's experience, these buildings generally replicate the buildings used by CSXT for such purposes. Each building includes basic facilities such as locker rooms, a break area, a work room, and other necessities. The costs for the crew change facilities are based on the RS Means cost per square foot for a building of this type. The costs for additional items not included in the square-foot costs, such as HVAC, lockers, and

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[179] *Id.*
[180] *Id.*
[181] *See PSCo/Xcel I* at 693, *CP&L* at 333-334; *Duke/NS* at 196.
[182] Some crew change locations do not require a facility because the crew is away from home and goes directly to a motel upon going off duty.

furnishings, have been added. The total cost for crew change facilities on the TPIRR is $14.3 million.[183]

f. Yard Offices

There are 12 large and 50 small yard offices on the TPIRR. Yard offices are included at locations where there are car inspectors, transportation department field personnel, and more than one yard crew.[184] The large buildings are 35' by 64' while the small buildings are 25' by 56'.

Costs for these buildings are based on pricing developed for the large and small crew-change facilities, since the size and construction will be similar.[185]

The total cost for yard offices on the TPIRR is $17.5 million.[186]

g. Maintenance of Way Buildings (Roadway Buildings)

The TPIRR has 51 MOW buildings. Each building is similar in office space and design to the crew-change facilities, but the interior is smaller because fewer employees use the space. Additional area is provided for garaging certain vehicles, as necessary, and storing MOW supplies. TPI's engineers developed the space requirements based on the typical MOW crew in each location as well as the need to house signal maintainers. The unit costs and specifications were derived from the cost for a small crew-change facility with additional costs added for site construction since not all MOW buildings are located at yards. The total cost for MOW buildings on the TPIRR is $14.2 million.[187]

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[183] *See* e-workpapers "TPIRR Facilities.xlsx," and "Crew Change-Yard Building-MOW Building Unit Costs.pdf."
[184] *See* e-workpaper "TPIRR Yard Matrix Opening Grading.xlsx."
[185] *See* e-workpapers "TPIRR Facilities.xlsx," and "Crew Change-Yard Building-MOW Building Unit Costs.pdf."
[186] *Id.*
[187] *Id.*

h. Guard Booths

TPI has included one guard booth at each intermodal and automotive facility it is constructing for a total of 34 guard booths. Costs for the guard booths were developed from a quote from a manufacturer plus additional costs for items such as HVAC, concrete pad, and furnishings.[188] The total cost for guard booths on the TPIRR equals $0.9 million.[189]

i. Yardmaster Towers

TPI has included one yardmaster tower at each of the eleven (11) hump yards on the TPIRR. Costs for the yardmaster towers were developed from costs provided by CSXT in discovery[190] and indexed to 3Q10. The total cost for yardmaster towers on the TPIRR equal $2.6 million.[191]

j. Wastewater Treatment

The TPIRR building facilities are located near existing towns and cities and are able to be served by a local sewer connection or similar service. TPI's engineers, therefore, included costs for sewer tie-ins in the site costs for each facility. In addition, to handle runoff from various work by-products (*e.g.*, oil) before reaching the public sewer system, TPI's engineers have included oil/water separators. The costs for these items were included in the costs for each facility where they are required.

k. Other Facilities / Site Costs

TPI has also included costs for other facilities and site preparation costs. These costs include costs for lighting, paving, and drainage at intermodal, automotive, and bulk transfer facilities as well as other TPIRR yards, plus other site preparation costs.

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[188] *See* e-workpapers "TPIRR Facilities.xlsx," and "Guard Booth Unit Costs.pdf."
[189] *Id*.
[190] *See* e-workpaper "Facility Assets Update.xlsx."
[191] *See* e-workpapers "TPIRR Facilities.xlsx," and "Yardmaster Tower Unit Costs.pdf."

Lighting plans were developed for the intermodal, automotive, and bulk transfer facilities as well as the major and other TPIRR yards. Lighting plans are based on existing CSXT lighting shown on plans provided by CSXT in discovery and Google Earth aerial views. The plans specify lighting types, wattage, heights, spacing, configuration, coverage areas, conduit lengths, and duct banks.[192] Lighting costs are based on quotes from suppliers and RS Means.[193]

Paving plans were developed for the intermodal, automotive, and bulk transfer facilities as well as the TPIRR major and other yards.[194] Paving areas are based on existing CSXT paving.[195] Paved inspection roads are provided between the tracks in the TPIRR's inspection yards. Based on existing CSXT yard plans provided in discovery and review of these locations in Google Earth, TPI determined the paving quantities needed for the TPIRR yards.[196] Paving costs are based on RS Means unit costs for the appropriate pavement section required.[197]

Drainage facilities have been provided for the TPIRR major and other yards as well as the automotive, intermodal, and bulk transfer facilities based on plans provided by CSXT in discovery.[198] Prior to the installation of any drainage facilities, the roadbed for yard track construction will be constructed to slope away from the main line. Yard drainage has been included at intermodal, automotive, and bulk transfer yards to account for the runoff due to increased paved areas when compared to other yards. Catch basins, drainage pipes, and

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[192] *See* e-workpapers "TPIRR Facilities.xlsx," "TPIRR Major Yards Workpapers.pdf," "TPIRR Other Yards Workpapers.pdf," "TPIRR Intermodal Terminals Workpapers.pdf," "TPIRR Automotive Terminals Workpapers.pdf," and "TPIRR Bulk Transfer Terminals Workpapers.pdf."

[193] *See* e-workpapers "TPIRR Facilities.xlsx" and "Lighting Unit Costs.pdf."

[194] *See* e-workpaper "TPIRR Facilities.xlsx."

[195] *Id.*

[196] *See* e-workpapers "TPIRR Facilities.xlsx," "TPIRR Major Yards Workpapers.pdf," "TPIRR Other Yards Workpapers.pdf," "TPIRR Intermodal Terminals Workpapers.pdf," "TPIRR Automotive Terminals Workpapers.pdf," and "TPIRR Bulk Transfer Terminals Workpapers.pdf."

[197] *See* e-workpapers "TPIRR Facilities.xlsx" and "Yard Pavements, Fencing & Pavement Markings Unit Costs.pdf."

[198] *See* e-workpaper "TPIRR Facilities.xlsx," TPIRR Major Yards Workpapers.pdf," TPIRR Other Yards Workpapers.pdf," TPIRR Intermodal Terminals Workpapers.pdf," TPIRR Automotive Terminals Workpapers.pdf," and "TPIRR Bulk Transfer Terminals Workpapers.pdf."

headwalls have been added to the drainage site costs of each yard based on drainage systems layouts for yards provided in discovery and Google Earth aerial images. Quantities for each component were developed for each yard based on the size of similar yards where drainage system plans were provided. Drainage facilities are not necessary in the TPIRR other yards with no classification tracks or additional interchange yards as they consist of less than ten tracks and will be sufficiently graded to allow for the water to drain naturally, over the crusher run cap and through the track ballast. Based on Mr. Crouch's experience, this is the case in many railroad yards.

Other site preparation costs have been included in the cost for each facility discussed in this section

TPI has included $795 million for these items.[199]

8. Public Improvements

TPI's public improvements evidence is also sponsored by witness Harvey Crouch. While public improvements are discussed in detail below, the costs for some of items were included in other investment categories, such as buildings and facilities and signals.

a. Fences

CSXT did not provide any data concerning the quantities or locations of fencing on any of the lines being replicated by the TPIRR. Consequently, TPI has relied on its experts' experience that the vast majority of the lines being replicated are not fenced. Therefore, TPI has included fences only for its intermodal and automotive yards.[200]

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[199] *See* e-workpaper "TPIRR Facilities.xlsx."
[200] *Id.*

b. Signs

TPI's operating and engineering experts have included a standard package of railroad signs, including milepost, whistle post, yard limit, and cross-buck signs and posts. TPI has also included Emergency Notification Signs ("ENS") at all highway at-grade crossings, as required by 49 C.F.R. § 234.311. TPI has included $16.8 million for railroad signs.[201]

c. Highway Crossings and Road Crossing Devices

The TPIRR is building all at-grade highway crossings, and paying 100% of the cost for the crossing materials.[202] TPI has included $78.7 million for at-grade highway crossings. Consistent with *Duke/CSXT* and *AEP Texas II*, TPI has included 10% of the costs associated with crossing protection, such as gates, flashers, and related signal elements like crossing predictor huts.[203] These costs are included with the signals costs described in Part III-F-6 above.[204] For grade-separated crossings (highway overpasses), the TPIRR is paying for 10% of the total investment costs in such structures[205] resulting in $130 million. These costs and designs are discussed in Part III-F-5 above.

9. Mobilization

TPI's engineers have added a 2.7% mobilization factor for all items where mobilization is not already included in the contractor's bid.[206] The total cost for mobilization on the TPIRR is $541 million.[207]

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[201] *See* e-workpaper "Track Construction.xlsx."
[202] *See AEP Texas II* at 102 and *PSCo/Xcel I* at 695-696. *See also* e-workpaper "Track Construction.xlsx."
[203] *See Duke/CSXT* at 504.
[204] *See* e-workpaper "TPI Signals & Communications.xlsx."
[205] *See WFA/Basin I* at 130 and *Duke/CSXT* at 504.
[206] *See Duke/CSXT* at 505. The STB accepted 2.6% in *CP&L* (at 338) and 2.5% in *Duke/NS* (at 201). The STB also accepted 2.4% in *AEPCO* (at 132). TPI is being conservative by using 2.7% for mobilization.
[207] *See* e-workpaper "III-F Total.xls."

10. Engineering

The Board has used a 10% estimate for all engineering cost components.[208] Thus, TPI's engineers have used a 10% additive here to cover all engineering, construction management, and resident inspection costs, as well as other items such as soil testing. The total cost for engineering on the TPIRR is $2,004 million.[209]

11. Contingencies

Consistent with prior Board decisions in other SAC rate cases,[210] TPI's engineering experts have used a 10% contingency factor and applied it to the construction subtotal excluding land. Total contingency costs for the TPIRR are $2,258 million.[211]

12. Other

a. Construction Time Period

The construction time period for the TPIRR is controlled by the time it takes to construct the Henderson Bridge over the Ohio River in Henderson, KY.

The work will begin with the start of surveying and aerial mapping operations. A two-month period will be allocated to obtain sufficient information to allow preliminary planning and engineering design to begin. Design of the railroad and appurtenances will require a fourteen-month period including the two-month start-up/surveying period.

Land acquisition will take approximately seven months to complete. It will commence five months after project initiation. Test borings will be timed to coincide with land acquisition so sufficient test borings can be made during the design process.

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[208] *See PSCo/Xcel I* at 697-698.
[209] *See* e-workpaper "III-F Total.xls."
[210] *See WFA/Basin I* at 132-133; *AEP Texas II* at 104; *PSCo/Xcel I* at 698 (parties agreed to 10 percent contingency); *TMPA* at 746-747; *West Texas Utilities* at 710; *APS* at 402.
[211] *See* e-workpaper "III-F Total.xls."

By the tenth month, at about the 70% design phase, the longest bridge, the Henderson Bridge, will be bid with construction to start by the fourteenth month. The remaining site work bid packages will be ready to bid in the eleventh month, and work on all site work, bridges, and tunnels will be started by the sixteenth month. In the twelfth month, the PTC, signal, communications, and track packages will be bid.

Construction of all bridges and structures other than the Henderson Bridge is anticipated to take a maximum period of 12 months. It is expected that the Henderson Bridge can be constructed in 14 months.

In general, the construction work has been planned by division and subdivision. The work has been structured so that all site work, bridges, and tunnels can be completed prior to installation of track and signals. Total construction time for the Nashville Division, which will take the longest to construct, will be 14 months. Total design and construction time for this project is 24 months, with 6 months (of which 4 months overlap construction) available at the end of construction for final operational testing. Thus a 30-month overall construction period has been provided.

The TPIRR construction project would be divided into 97 track packages, 950 grading packages, 632 bridge packages, 73 tunnel packages, and 11 building packages.[212] The bridge packages have been set up to include no more than eight bridges in each package, and the bridges in a package are in the same subdivision and in relative proximity to each other.

Track gangs will lay track at an average of one-half mile per day, ballasted and anchored. With crews working 6 days per week, the rate of 1/2 mile per day would enable the project to be completed within the established schedule.

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[212] *See* e-workpaper "Complete Construction Schedule.xls."

Finally, material prices have been obtained for most track materials delivered to railheads, including, but not limited to, Chicago, IL, Fostoria, OH, Cincinnati, OH, East St. Louis, IL, McKeesport, PA, Syracuse, NY, Richmond, VA, Nashville, TN, Fayetteville, NC, Atlanta, GA, Montgomery, AL, and Jacksonville, FL. Because of the numerous road access points along the lines (the longest distance between two road-access points is less than 5 miles), the uniform topography for most of the railroad, and interstate roads paralleling many line segments, materials that cannot be shipped by rail have been priced with shipping by truck to one or more of the road-access points along the TPIRR's lines. The track construction costs include moving those materials from the various rail heads to where they are required along the right-of-way.

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III. STAND-ALONE COST

G. DISCOUNTED CASH FLOW ANALYSIS

The expert witnesses responsible for this Part are Thomas D. Crowley and Daniel L. Fapp of L.E. Peabody & Associates, Inc. Their credentials are detailed in Part IV.

The Board's SAC constraint rests on the premise that a captive shipper should pay no more than the minimum necessary to receive service from a least-cost, presumptively efficient replacement for the incumbent railroad, and that the shipper should not bear the cost of any facilities or services from which it derives no benefit.[1] The SAC constraint is derived from and constitutes an application of the theory of contestable markets.[2]

In the contestable market structure, the incumbent railroad's rates are deemed constrained by the threat of entry by the hypothetical stand-alone entity.[3] If it is shown that the prospective cost of substitute service is less than the rate charged by the incumbent, there is an incentive for the new entity to enter the market. The presence of that incentive, in turn, is evidence that, under the incumbent's rates, the shipper is contributing to (subsidizing) the cost of services that it does not use, and/or is contributing monopoly profits to the incumbent.[4]

SAC provides a regulatory ceiling on rates under conditions of rail market dominance; if the incumbent's rates are higher than those that would be charged by the stand-alone entity (the TPIRR in this case), then the incumbent's rates are unreasonable. As the Board summarized in *CP&L*:

> A SAC analysis seeks to determine the lowest cost at which a hypothetical, optimally efficient carrier could provide the service at issue free from any costs associated with inefficiencies or cross-subsidization of

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1 *See, e.g., Coal Rate Guidelines* at 523 and 542; *AEPCO* at 3-4.
2 *See, e.g., Coal Rate Guidelines* at 528.
3 *Id*. at 542.
4 *Id.* at 528.

> other traffic. A stand-alone railroad is hypothesized that could serve the traffic if the rail industry were free of barriers to entry or exit. (It is such barriers that can make it possible for railroads to engage in monopoly pricing absent regulatory constraint.) Under the SAC constraint, the rate at issue cannot be higher than what the SARR would need to charge to serve the complaining shipper while fully covering all of its costs, including a reasonable return on investment.[5]

Since the function of a SAC analysis is to identify the cost associated with providing the most-efficient, least-cost service to the captive shipper, it follows that application of the SAC standard should be premised on rational economic behavior by the stand-alone entrant. In particular, the stand-alone entrant should pay no more than is necessary for its inputs. Thus, while the TPIRR is considered to be a substitute for CSXT to the extent of the scope of the TPIRR's planned services, SAC does not require that the TPIRR replicate the CSXT system in all respects.[6] As the Board's predecessor confirmed in *Coal Rate Guidelines*, the design of the stand-alone system and the traffic it carries are chosen to achieve the goals of maximizing revenues and minimizing service costs to the shipper, regardless of the actual circumstances of the incumbent railroad.[7] This means that the TPIRR must be considered a replacement for the relevant portions of the CSXT system, not a rival, and must be afforded the flexibility to configure its system and service scope in a manner that maximizes efficiency and cost effectiveness.[8]

These core principles guide the traffic group, design, configuration, and planned operation of the TPIRR as detailed in the previous Parts of this Opening Evidence. They also inform the proper treatment of capital cost recovery, inflation, and taxes.

5 *See CP&L* at 244-245.
6 *See, e.g.*, *AEPCO* at 10.
7 *See Coal Rate Guidelines* at 543-544.
8 *See, e.g.*, *Nevada Power II* at 280-281 (Chairman McDonald, commenting).

1. Cost of Capital

Calculation of the capital recovery charge for the TPIRR necessarily depends on the TPIRR's assumed cost of capital. The Board has consistently accepted the general railroad industry's average costs of common equity, debt, and preferred equity (if any), and their percentage mix within the industry's capital structure[9] in forming a capital structure for the SARR over the relevant construction period (January 1, 2008 through June 30, 2010 in this case) and operating period (July 1, 2010 through June 30, 2020).[10]

The TPIRR's cost of debt and preferred equity[11] capital during the 10-year DCF period is assumed to equal the weighted average railroad industry cost of debt or preferred equity over the TPIRR's construction period, weighted by the TPIRR's investment by construction year. The cost of common equity capital is assumed to equal the then-current year railroad industry cost of equity as determined by the Board. If the Board has not calculated the cost of equity capital for such year, the simple average of all prior years' costs of equity capital beginning in the first year of the SARR's construction is used.[12] To project capital costs forward and estimate the value of the TPIRR at the end of the DCF period, the Board relies on an average of available past years' industry capital costs, reaching back to the first construction year.[13]

TPI has followed the Board's approach, as described above, in developing capital costs for the TPIRR.[14] TPI employs the 2008 through 2010 industry average costs of debt as determined by the Board in its annual cost of capital proceedings.[15] For the cost of common

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9 As determined by the Board in its annual railroad cost of capital proceedings in Ex Parte No. 558.

10 *See, e.g.*, *WFA/Basin I* at 135; *AEPCO* at 135-137; *Duke/NS* at 123; *CP&L* at 261-262.

11 The STB's annual cost of capital findings since calendar year 2002 have not included preferred equity.

12 *See AEP Texas II* at 107-108. *See also Otter Tail* at E-2; *WFA/Basin II* at 26.

13 *See AEP Texas II* at 108-109.

14 *See* e-workpaper "Exhibit III-H-1.xlsx," worksheet "Cost of Capital."

15 *See Railroad Cost of Capital – 2008*, STB Ex Parte No. 558 (Sub-No. 12) (served Sept. 25, 2009) ("*2008 Cost of Capital*"); *Railroad Cost of Capital – 2009*, STB Ex Parte No. 558 (Sub-No. 13) (served Oct. 29, 2010) ("*2009*

equity, TPI relies on the railroad industry costs of common equity for the years 2008 through 2012.[16] TPI uses the railroad industry cost of capital to calculate the capital recovery charges for all road property investment.

2. Inflation Indices

The prices of goods and services used by the TPIRR undoubtedly will change over the 10-year DCF period. It therefore is necessary to forecast rates of inflation for application to the capital assets and operating expenses over the timeline covered by the SAC analysis, July 1, 2010 through June 30, 2020. The time path of capital recovery charges for the TPIRR likewise must maintain the real purchasing power of those charges. A summary of the indexes applied to the TPIRR's capital assets and operating expenses is shown in Table III-G-1 below.

Cost of Capital"); and *Railroad Cost of Capital – 2010*, STB Ex Parte No. 558 (Sub-No. 14) (served Oct. 3, 2011) ("*2010 Cost of Capital*"). The railroad industry had no preferred equity capital outstanding for these years, and, therefore, the TPIRR incurs no cost of preferred equity.

[16] *See 2008 Cost of Capital, 2009 Cost of Capital, 2010 Cost of Capital, Railroad Cost of Capital – 2011*, STB Ex Parte No. 558 (Sub-No. 15) (served Sept. 13, 2012) ("*2011 Cost of Capital*"), and *Railroad Cost of Capital – 2012*, STB Ex Parte No. 558 (Sub-No. 16) (served Aug. 30, 2012) ("*2012 Cost of Capital*").

Table III-G-1
Index Values Utilized In The TPIRR DCF Model

Year (1)	**Land** (2)	**Materials and Supplies** (3)	**Wage Rates and Supplements** (4)	**Materials, Supplies, Wage Rates and Supplements (Excluding Fuel)** (5)	**Operating Expenses** (6)
2008	100.0	100.0	100.0	100.0	xxx
2009	77.9	106.5	103.9	104.2	xxx
2010	73.8	106.8	111.4	110.7	100.0
2011	78.1	110.4	113.4	113.0	107.7
2012	83.9	117.1	116.6	116.7	108.8
2013	89.3	115.6	117.4	117.1	109.8
2014	93.8	117.8	120.0	119.7	109.3
2015	96.9	121.5	124.9	124.5	111.5
2016	100.0	124.1	128.9	128.2	112.9
2017	103.2	127.3	133.7	132.7	114.9
2018	106.6	130.6	139.0	137.7	118.0
2019	110.1	133.8	144.5	142.8	121.3
2020	112.8	136.5	148.7	146.7	123.6

Sources: e-workpapers "TPIRR Land Appreciation.xls," and "Exhibit III-H-1.xls."

The annual inflation forecast that is used to calculate the value of the TPIRR's road property assets is based on actual railroad chargeout prices and wage rate indexes calculated by the AAR for materials and supplies, wage rates and supplements, and materials prices, wage rates, and supplements combined (excluding fuel) ("MWSExFuel") for eastern railroads, and the Global Insight's December 2013 Rail Cost Adjustment Factor Forecast for rail labor and rail materials and supplies.[17]

[17] Global Insight (now IHS Economics) does not develop a forecast of the AAR's MWSExFuel index. TPI therefore uses a proxy that weights Global Insight's materials and supplies and labor rate index forecasts, which the Board has relied upon for purposes of execution of the DCF model. *See AEP Texas II* at 109; *Otter Tail* at E-2 to E-3; *PSCo/Xcel* at 621; *Duke/NS* at 123; *CP&L* at 261.

For land assets, the annual forecast inflation rate is based on a weighted combination of indices that reflect rural and urban land prices in proportion to the mix of the land values on the TPIRR system routes.[18]

Rural land indexes were developed from historic rural land values reported by the U.S. Department of Agriculture ("USDA").[19] Use of the historic change in rural land values as a surrogate for a forecast of future changes in land prices is consistent with long-term STB precedent.[20] The STB determined in *AEPCO* that it is preferable to use a longer rather than a shorter period of historic data when forecasting future economic trends, such as an inflation rate for land values.[21] The STB cited its use of historical averages of more than 80-years in developing railroad costs of equity estimates.[22] Given the STB's clear preference for longer historical averages, and the use of averages based on data beginning with 1930 or earlier to calculate the TPIRR's cost of equity, TPI developed the historic average annual and quarterly percentage change in rural land values between 1933 and 2013 for the TPIRR states, and used these historic averages to forecast future changes in rural land values.[23]

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[18] Historically, parties in SAC cases weighted the different urban and rural land indexes based upon the percentage of SARR acres which were urban and rural. In *AEPCO*, the STB changed its approach to weight the indexes based on the value of the rural and urban land acquired by the SARR. *See AEPCO* at 139. TPI has applied the STB's revised approach in its opening DCF model.

[19] USDA values have been used in prior cases such as *Otter Tail*. *See* OTP Opening at III-G-3 (filed June 13, 2003), BNSF Reply at III-G-3 (filed Oct. 8, 2003), and Board decision at E-2 (served Jan. 27, 2006).

[20] *Cf. WFA/Basin II* at 26 (using historic data to develop forecast for cost of equity); *AEPCO* at 139 (using historic data to develop forecast of land values); *Use of a Multi-Stage Discounted Cash Flow Model in Determining the Railroad Industry's Cost of Capital*, STB Ex Parte No. 664 (Sub-No. 1), slip op. at 11 (served Jan. 28, 2009) ("long-term trends are informative of future prospects").

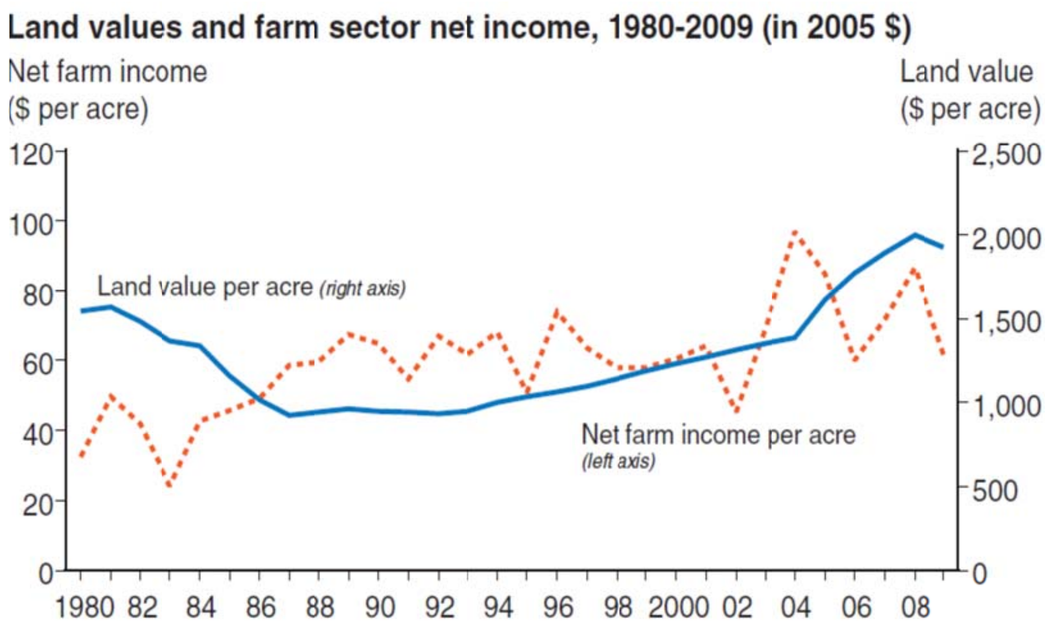
[21] *See AEPCO* at 139.

[22] *See AEPCO* at 139 ("In measuring the terminal growth rate (from year 11 out) in the cost of equity, the Morningstar/Ibbotson model uses, in part 'the average annual percentage change in real GDP from 1930 to the year being analyzed'"). Similarly, in developing the Capital Asset Pricing Model ("CAPM") cost of equity, the STB relies upon the historic average equity risk premium calculated from the year 1926 to the present. *See Railroad Cost of Capital – 2006*, STB Ex Parte No. 558 (Sub-No. 10), slip op. at 1 (served January 17, 2008).

[23] For the years 2008 through 2013, TPI relied upon the actual historic change in rural land values instead of the historic average.

Use of the historic change in rural land values as a surrogate for a forecast of future changes in land prices is consistent with a new era in farming and farm land values. For the first half of the twentieth century, agricultural economists believed that farm values and farm income were closely linked. This belief extended from the belief that farmland values were derived from the expected stream of returns from the agricultural products produced. However, as numerous studies have recently shown, the links between farm income and land values have dramatically declined. Current USDA research has found little correlation between land values and farm income.[24] This lack of correlation is clearly evident in Figure 1 below, which contains a graph of farmland values and farm income produced by the USDA.

Figure 1



Source: USDA, ERS Farm Income Accounts data, available at http://www.ers.usda.gov/data/FarmIncome/Finfidmuxls.htm

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[24] Cynthia Nickerson et al., *Trends in U.S. Farmland Values and Ownership* at 5, EIB-92, U.S. Dept. of Agriculture, Economic Research Service, February 2012. The study is available at http://www.ers.usda.gov/publications/eib-economic-information-bulletin/eib92.aspx#.UvP8x7QzphQ.

As shown in Figure 1 above, in recent years there has been little correlation between land values and farm incomes. Therefore, in times of falling farm income, there should be no assumption of falling farm land values.

This lack of correlation between farm income and land values is being brought about by nonagricultural factors having greater influence on farmland values. Factors such as income from hunting leases and from developers' potential returns from developing the farmland make farmland more valuable even in the wake of declining farm incomes.[25] Research has shown that, in certain parts of the nation, including the state of Georgia (which includes significant amounts of TPIRR right of way), nonagricultural factors have a stronger influence on land values than cash rents from agricultural production.[26]

Overall, the former assumptions regarding farm land values may no longer be valid in this new era of agriculture. As summarized by the USDA:

> Yet, several macroeconomic measures indicate that over a longer horizon, farmland values are becoming less correlated with farm-related factors once thought to support those values. Declining rent-to-value ratios indicate cash rents are increasingly smaller relative to farmland values, and the ratio is smallest for cropland close to urban areas. Also, the affordability of farmland has varied over time. While in 2009-2010 average income from farming has been more than sufficient to service farm real estate debt, during 2005-08 and during 1978-1985, this was not the case. A lack of correlation with net farm incomes, declining rent-to-value ratios, and low levels of affordability all suggest that nonagricultural factors are increasingly important in determining farmland values.[27]

Urban land values, which are assumed to consist of a mix of investment, residential, and commercial properties, were indexed using a combination of indexes published by investment reporting firms Moody's and Standard & Poor's. These indexes are the same ones used by TPI

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25 *Trends in U.S. Farmland Values and Ownership* at 5-7.
26 *Id*. at 5.
27 *Id*. at 34.

land acquisition experts in Section III-F, which maintains consistency between land inflation values used in the land appraisals and in the DCF model.

For residential properties, TPI used a combination of the Moody's/RCA Commercial Property Price Index ("Moody's/RCA CPPI") for Apartment buildings and the Standard & Poor's/Case-Shiller Home Price Index ("S&P/Case-Shiller"), which tracks changes in home prices.[28] For commercial properties, Moody's/RCA CPPI for office buildings and retail properties were used to index commercial properties, while Moody's/RCA CPPI for industrial properties was used to index industrial land values. TPI used the actual index values published by Moody's/RCA and by S&P/Case-Shiller for the periods 1Q08 through 3Q13, the last full quarter published for the indexes. For the quarters after 3Q13, TPI relied on the historic change in the Moody's/RCA and by S&P/Case-Shiller between 2001 and 2013.[29] As discussed above, the STB decided in *AEPCO* that it is preferable to use a longer rather than a shorter period of historic data when forecasting future economic trends, such as an inflation rate for land values, when unbiased, third-party forecasts are unavailable. In this instance, the Moody's/RCA are relatively new with data going only back to 2001, so the maximum of 12-years of historic data is used to develop the future land inflation values.

For indexing of operating expenses, TPI followed the procedure established by the Board in *Major Issues*. In that proceeding, the Board decided to index SARR operating expenses for the first year based on 100 percent of the change in the RCAF-U; expenses for the second year would adjust based on 95 percent of the change in the RCAF-U and five (5) percent of the change in the RCAF-A; and each succeeding year of the DCF period would use a mix reflecting

[28] *See* e-workpaper "TPIRR Land Appreciation.xlsx."
[29] *Id.*

increasing shares of the RCAF-A in five (5) percent increments.[30] TPI applied this method to index operating expenses for the TPIRR.[31] TPI's model uses actual RCAF-U and RCAF-A indexes through the first quarter of 2014 ("1Q14"), the latest quarter available, and applies Global Insight's December 2013 RCAF-U and RCAF-A forecasted indexes thereafter. The Board has recently used the Global Insight forecasts in this manner.[32]

3. Tax Liability

Federal taxes for the TPIRR are calculated on the assumption that it pays taxes at the 35 percent corporate rate, with all payments for debt interest, state income taxes and depreciation expenses treated as reductions in taxable income. As explained in greater detail in Section III-H-1-d, TPIRR interest expense is calculated based on the real-world practice of railroads issuing primarily coupon bonds of different maturities, which pay periodic, even interest payments. Depreciation expenses for tax purposes use accounting lives from the Modified Accelerated Cost Recovery System ("MACRS") with investments placed in service in the second quarter using a mid-quarter convention. In addition, as described in Part III-H-1-f, the TPIRR calculated bonus depreciation available under current tax laws.

The TPIRR also must account for any income tax liability accruing to the 17 states and the District of Columbia in which it operates. Following Board-approved procedures, the taxes applicable to railroads in each state were weighted together based on the TPIRR route-miles located within each state.[33] As summarized in Table III-G-2 below and detailed in Exhibit III-H-

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[30] Under the Board's hybrid approach, operating expenses for the tenth and final year of the DCF period would be determined using an index comprised of 55 percent of the change in the RCAF-U, and 45 percent of the change in the RCAF-A. *See Major Issues* at 40 and 44.

[31] *See* e-workpaper "Exhibit III-H-1.xlsx," worksheet "Inputs."

[32] *See Otter Tail* at 21-22. The parties in *AEPCO* also agreed to use Global Insight to forecast operating expenses. *See* AEPCO Opening at III-G-17 (filed Jan. 25, 2010) and BNSF/UP Reply at III.G-8 (filed May 7, 2010).

[33] *See, e.g.*, *Coal Trading Corp.* at 527.

1, the weighted average rates for each state produce an effective state tax rate of 6.11 percent for the TPIRR.

Table III-G-2
State Tax Rates And
Constructed Miles For The TPIRR

	State (1)	Tax Rate (2)	Route Miles (3)
1.	AL	6.5%	661.0
2.	DC	9.975%	14.7
3.	FL	5.5%	487.2
4.	GA	6.0%	929.4
5.	IL	7.3%	229.4
6.	IN	8.5%	690.7
7.	KY	6.0%	592.1
8.	LA	8.0%	35.1
9.	MD	8.25%	114.6
10.	MS	5.0%	73.7
11.	NC	6.9%	280.0
12.	NY	7.1%	518.7
13.	OH	0.26%	721.2
14.	PA	9.99%	283.4
15.	SC	5.0%	163.1
16.	TN	6.5%	719.4
17.	VA	6.0%	214.4
18.	WV	8.5%	146.9
19.	Total	6.11%	6,865.9

Source: Exhibit III-H-1

4. Capital Cost Recovery

Under the Board's DCF methodology, economic depreciation is used to calculate the capital recovery cost of the TPIRR's property. Economic depreciation effectively represents an asset's loss of earning power as it approaches the end of its life and/or its replacement date. The changes adopted in *Major Issues* dictate the use of a 10-year analysis period to benchmark the TPIRR's asset value. However, the TPIRR's investments would not be retired at the end of the 10-year DCF period; rather, it is assumed that continuing investments will be made in the TPIRR, and that it would operate, hypothetically, in perpetuity. TPI's calculation of SAC, in Exhibit III-H-1, therefore accounts for the costs associated with the renewed investments in and continued operation of the TPIRR after June 30, 2020, using the approach approved by the Board in previous cases.[34]

Beginning with *FMC* and continuing through subsequent decisions, the Board has utilized a real capital carrying charge that is equal in each year of the DCF period, regardless of changes in volume. Under this assumption, the relationship between stand-alone revenues and SAC (and, thus, the measure of potential rate relief and the maximum reasonable rate) fluctuates with annual changes in volume and associated revenue.[35] TPI's computation of the pattern of capital recovery applies this approach.[36]

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[34] *See, e.g.*, *AEP Texas II* at 105-106.
[35] *See WFA/Basin I* at 134-135; *AEPCO* at 134-135.
[36] *See* Exhibit III-H-1.

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III. STAND-ALONE COST

H. RESULTS OF SAC ANALYSIS

The expert witnesses responsible for this Part are Thomas D. Crowley and Daniel L. Fapp of L. E. Peabody & Associates, Inc. Their credentials are detailed in Part IV.

1. Results of SAC DCF Analysis

The results of the SAC DCF analysis conducted by TPI are shown in Exhibit III-H-1. The calculations shown in each table of that Exhibit are summarized below.[1]

a. Cost of Capital

The cost of capital (Table A) for the TPIRR is based upon the Board's annual cost of capital determinations for 2008 through 2012. The TPIRR's cost of debt for years 2008 through 2010, the TPIRR's construction period, is assumed to equal the railroad industry average cost of debt for each specific year in the construction period. For years 2011 through 2020, the TPIRR's cost of debt equals 5.79 percent and reflects the weighted average of the construction years' debt costs used through the remaining years of the DCF model. The TPIRR's cost of common equity for the years 2008 through 2012 is assumed to equal the railroad industry cost of common equity for each specific year. For years 2013 through 2020, the TPIRR's cost of common equity equals 13.1 percent, which, consistent with prior SAC cases, is equal to the simple average of the prior years' costs of common equity, beginning with the first year of TPIRR construction.[2] The TPIRR has no preferred equity.

b. Road Property Investment Values

The calculation of road property investment costs is summarized in Table C of Exhibit III-H-1. The investment cost also incorporates one-time fees paid for land easements.

[1] The cost of capital (Table A) and inflation indices (Table B) are addressed in more detail in Part III-G.
[2] See Part III-G-1 for additional explanation and support.

c. Interest During Construction

Interest During Construction ("IDC") accrues on the road property assets of the TPIRR. Table D shows the total IDC amount, and the portion that is debt-related. IDC is calculated based on the investment values in Table C, the composite cost of capital by year from Table A, and the assumed length of the finance period for each account. The construction schedule described in Part III-F-12 is used as the basis for the length of the finance period. The portion of IDC that is debt-related is calculated by multiplying the investment by the length of the finance period, the TPIRR's debt percentage, and the annual cost of debt for the year of investment. Debt-related IDC is shown as an interest deduction for tax purposes during the construction period in Table J.

d. Interest Schedule of Assets Purchased With Debt Capital

Parties in prior SAC proceedings have assumed that the hypothetical SARR's debt capital would mirror the debt issued by the U.S. Class I railroads included in the Board's annual cost of capital determination.[3] Although these parties incorporated the cost of the railroad industry debt as reflected in the Board's annual determinations, they implicitly deviated from the type of debt the railroad industry utilized in its capital structure. In prior cases, both shippers and railroads assumed that the SARR would issue debt structured similar to a typical home mortgage loan. In other words, they assumed that the SARR would make quarterly payments that contained a principal repayment component and an interest component. Over time, as the debt was amortized, the interest component portion of the payment declined as larger amounts of the principal were repaid until, after 20 years, the debt was assumed to be completely repaid.

[3] *See, e.g., West Texas Utilities* at 712.

While such a payment stream is consistent with a typical home mortgage, it is contradictory to the payment schemes of the vast majority of railroad industry debt. Railroad companies, like other large corporations, do not customarily make periodic payments that contain constantly changing principal and interest components, but rather make coupon payments on the debt consisting only of fixed interest payments.[4] As the debt nears maturity, it is simply re-issued as a new debt instrument, thereby requiring new coupon (interest) payments. Therefore, parties in prior SAC cases created an inexplicable mismatch between the debt rate (based on railroad cost of capital determinations by the Board) and the debt type (based on a home mortgage).

The AAR's filing in the 2012 cost of capital determination shows that approximately 93 percent of railroad industry debt consists of corporate bonds, notes and debentures that incorporate such periodic coupon payments.[5] In fact, the vast majority of CSX Corporation's ("CSX") own debt is held in the form of corporate notes and debentures. According to the CSX's 2012 SEC Report 10-K and the AAR's 2012 cost of capital filing, \$9.713 billion of CSX's \$9.832 billion of long-term debt (after discounts and premiums) is held in notes and debentures paying fixed coupon (interest) payments.[6] In other words, over 90 percent of CSX's total long-term debt requires CSX to only make interest payments.

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4 *See Nevada Power II* at 319.

5 *See* the Verified Statement of John T. Gray at page 19, in Ex Parte No. 558 (Sub No. 16), *Railroad Cost of Capital – 2012* (filed April 19, 2013), which discusses the pricing of bonds based in part on their coupon payments and shows the coupon payments for the railroads' long-term notes and debentures. Mr. Gray submitted verified statements in the 2008, 2009, 2010 and 2011 *Railroad Cost of Capital* proceedings that show that the debt issued by the railroads in those years also primarily consisted of notes and debentures with coupon provisions.

6 *See* Comments of the Association of American Railroads and Its Member Railroads in STB Ex Parte No. 558 (Sub-No. 16), *Railroad Cost of Capital - 2012* (filed April 19, 2013) at Appendix A, pages 1 to 3, which shows \$9.727 billion in long-term debt less \$0.014 billion in variable rate debt, and CSX SEC Form 10-K for the Fiscal Year Ended December 28, 2012 at page 94, which shows \$9.832 billion in long-term debt (including current portion).

If Board precedent assumes that the SARR's cost of debt should mirror the railroad industry cost of debt, the SARR debt should also mirror the composition of that debt and how the interest is paid to the debt holders. Otherwise, a mismatch occurs. To that end, instead of amortizing the debt in a mortgage-style approach over a 20-year schedule, TPI has developed quarterly coupon payments associated with the TPIRR's debt as depicted in Table E of Exhibit III-H-1.[7] The TPIRR's quarterly interest payments are developed by multiplying the fourth-root of the appropriate Table A cost of debt by the sum of the total investment and IDC for the year.

TPI's approach is consistent with the STB's industry cost of capital calculation, which is composed of a mix of debt with different maturities, and produces a weighted-cost of debt equal to the railroad industry cost of debt for each year. In at least one prior case, the Board expressed concern about the SARR issuing debt obligations of 20 years (or other lengths) that may not match the actual length of debt obligations issued by the railroads in the cost of capital determination group.[8] The Board's previous concern does not negatively impact TPI's use of a real-world debt structure for its SARR. As explained more fully below, the railroads' level of debt has remained fairly uniform since the last round of mergers in the mid-1990s. This is because the railroads are issuing new debt as debt instruments mature, or as they redeem older debt issuance and replace them with newer issuances. In other words, the railroads are holding their levels of debt fairly constant, and as such, are consistently paying interest on this debt. Between 1998 and 2009, the four main railroads included in the STB's cost of capital calculation incurred aggregate interest expenses ranging in a narrow band between $3.9 and $4.3 billion.[9]

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7 Most railroad companies pay interest semi-annually, but to remain consistent with the structure of the Board's DCF model, TPI has assumed the SARR will make coupon payments on a quarterly basis.

8 *See AEP Texas II* at page 107.

9 *See* e-workpaper "Interest Expense by Railroad.xlsx."

Businesses maintain an ongoing level of debt for many reasons, such as using the power of leverage to manage earnings and cash flexibility. From an earnings perspective, the interest a company pays is a tax deductible expense, and, thus, returns to bondholders escape taxation at the corporate level. Debt confers a tax shield in which the government, in effect, pays a portion of the interest expenses equal to the corporate tax rate. Maintaining certain levels of debt allows a company to exploit these tax shields to maximize the return to shareholders. If the debt portion of the capital structure of a company is held relatively constant over time, the company commits to refinance its present debt obligations when they mature and to keep rolling over its debt obligations indefinitely as is done by real world railroads.[10] The company can then look forward to a permanent increase in earnings and cash flow equal to the interest expenses associated with the debt multiplied by the effective corporate tax rate. Additionally, if the company can earn a higher rate of return than the interest rate paid on long-term debt, then it may be wise for the company to maintain long-term debt to increase earnings.

From a cash flow perspective, maintaining consistent levels of debt can provide financial slack to a company. Financial slack means having cash or marketable securities available to pursue opportunities when they present themselves. A company that is cash poor from unnecessarily paying down debt may miss out on such an opportunity. Additionally, since a company's cash flow is seldom consistent from month-to-month or year-to-year, maintaining certain levels of debt allows the company to manage these peaks and valleys in cash flow. This is one reason why companies do not immediately pay off debt when they are in a long cash position, but instead will maintain the debt to assist with fluctuating cash levels.

[10] *See* Brealey, R. A., Myers, S. C., and Allen, F., "Principles of Corporate Finance, Eighth Edition," McGraw-Hill Irwin, 2006, at page 469-470 ("Brealey, Myers and Allen").

For example, CSXT parent company CSX issued $800 million of notes in 2010, $1.2 billion of notes in 2011, and $1.1 billion of notes in 2012.[11] The majority of the proceeds from these issuances were used for "general corporate purposes," which includes "debt payments from time to time."[12] CSX also recently engaged in a "debt exchange" in which $660 million of notes were exchanged for longer-term (but lower interest) notes plus a cash payment.[13]

TPI's approach for calculating debt costs is fully consistent with real-world debt financing, both in terms of utilizing a variety of debt instruments and in terms of relying on coupon payments of interest only, rather than amortizing principal with each payment.

TPI's approach also implicitly assumes that the future cost of debt will equal the average current cost of debt during the construction period. Such an assumption is consistent with STB precedent regarding the use of historic data when unbiased forecasts are not available, and consistent with STB precedent about future interest rates.[14]

As explained in Section III-G-2 above, STB precedent holds where an unbiased, third party forecast of a future value is unavailable, the average historic value is an appropriate surrogate. Since there are no reliable forecasts of interest rates into perpetuity, use of historic average interest rates is a reasonable surrogate. Additionally, the STB's standard DCF model already uses the historic average cost of debt when developing the replacement costs of future assets, in some cases over 100 years into the future. TPI's approach simply mirrors the STB's

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[11] *See* 2010 CSX 10-K (fiscal year ending Dec. 31, 2010) at page 102; 2011 CSX 10-K (fiscal year ending Dec. 30, 2011) at page 93; 2012 CSX 10-K (fiscal year ending Dec. 28, 2012) at page 94.

[12] *See* 2011 CSX 10-K at page 93.

[13] *See* 2010 CSX 10-K at page 104.

[14] *See AEPCO* at page 139 ("We reiterate that it is preferable to use a longer rather than a shorter period of historic data when forecasting future economic trends, such as an inflation rate for land values or the cost of equity"). *See also West Texas Utilities* at 712 ("averages, rather than single-year data, are generally used to predict the future").

already standard assumption about the future cost of debt, and also eliminates the mis-match between the debt rate used and the type of debt incurred.

e. Present Value of Replacement Cost

Table F shows the additional investment (on a present value basis) that the TPIRR would have to make if each of its assets (excluding land) was replaced indefinitely at the end of its useful life. The 2009-2012 average cost of capital is used to calculate replacement value for road property assets. This calculated investment is added to the initial investment in Table I prior to determining the quarterly cash flows.

f. Tax Depreciation Schedules

Table G displays the tax depreciation percentages currently in effect in the Federal Tax Code.[15] Depreciation was calculated assuming a mid-quarter convention, with assets placed in service in the third quarter. Investments in communications (Account 26), signals and interlockers (Account 27), and the track accounts (Accounts 8-12) were depreciated over seven (7) years employing a 200 percent declining balance methodology, then switching to straight-line depreciation when the straight line percentage exceeds the declining balance percentage. Investments in bridges and culverts (Account 6), public improvements (Account 39), fences and roadway signs (Account 13), station and office buildings (Account 16), roadway buildings (Account 17), and shops and engine houses (Account 20) were depreciated over 15 years using a 150 percent declining balance method, and then switching to straight-line depreciation at the same point consistent with Board precedent. Investments in grading (Account 3) and tunnels (Account 5) were amortized over 50 years using straight-line amortization. Investments in

[15] The mandatory method for depreciating most tangible property placed in service after December 31, 1986 is MACRS. In addition, engineering costs have been amortized over a 60 month period, starting with the month in which the business begins.

engineering (Account 1) were amortized over five (5) years using straight-line amortization. This approach is consistent with the depreciation methodologies used by the STB in prior decisions, including *WFA/Basin, AEP Texas,* and *Otter Tail.*

The TPIRR will take advantage of additional or "bonus" depreciation provisions enacted in 2008, 2009, and 2010. These provisions were part of the Economic Stimulus Act of 2008 ("Stimulus Act"), the American Reinvestment and Recovery Act ("ARRA") of 2009, and the Small Business Jobs Act of 2010 ("2010 Jobs Act"). These acts provided bonus depreciation on capital investments with MACRS recovery periods of 20 years or less.[16] Qualifying investments made between January 1, 2008 and June 30, 2010 are allowed a 50 percent depreciation bonus in the year that they are placed into service. Tax depreciation for the remaining 50 percent of the cost, or the remaining cost basis, is calculated using the standard MACRS schedules.[17] Because the DCF model assumes that all assets are placed into service in the first year of the 10-year DCF period, which in this case is the twelve-month period ending June 30, 2011, the majority of the TPIRR's investment qualifies for bonus depreciation.[18] Table G of Exhibit III-H-1 displays the amount of bonus depreciation available to the TPIRR in 2011.

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[16] CSX took advantage of bonus depreciation provisions in the federal tax code in 2008 through 2010 to defer significant taxes to later years. *See* CSX 2008 SEC Form 10-K (year ending Dec. 26, 2008) at 119 ("[t]he increase in deferred tax liability during 2008 is primarily due to the bonus depreciation provision of the Economic Stimulus Act of 2008"), CSX 2009 SEC Form 10-K (year ending Dec. 25, 2009) at 117 ("[t]he increase in deferred tax expense during 2008 is primarily due to the bonus depreciation provision of the Economic Stimulus Act of 2008 which had an impact of approximately $200 million. Likewise, 2009 deferred tax expense was impacted by approximately $160 million related to bonus depreciation"), and CSX 2010 SEC Form 10-K (year ending Dec. 31, 2010) at 44 ("[d]eferred income tax liability also increased by $525 million due to the impact of accelerated depreciation and bonus depreciation").

[17] For example, a $1 million asset with a five (5) year MACRS life placed into service between January 1, 2008 and June 30, 2010 would accrue $500,000 in bonus depreciation in year one ($1 million x 50 percent bonus factor), plus $100,000 in standard MACRS depreciation ($500,000 remaining cost basis x 20% for the Year 1 MACRS factor for a 5 year asset) for a total of $600,000 in depreciation in the first year. *See* http://www.depreciationbonus.org/ for a description and example of bonus depreciation under the various enacting laws.

[18] The TPIRR begins calculating depreciation on all assets in the first year of railroad operations. This is consistent with the fact that no depreciation charges are incurred during the 30-month construction and testing period.

The STB expressed some skepticism in *AEPCO* as to whether bonus depreciation allowed under the prior and current tax law should be allowed in SAC presentations. Not allowing a shipper to avail itself of the bonus depreciation provisions clearly taken and used by the railroad companies, however, would create a barrier to entry, and place the shipper at a distinct disadvantage relative to the incumbent railroad. The STB defines a barrier to entry as any type of cost that a new entrant would have to incur that was not actually incurred by the defendant carrier.[19] There is no denying that CSXT reduced its tax costs and increased its cash flows by employing the tax shielding effects of the bonus depreciation. If the STB were to disallow shippers the same tax advantage enjoyed by the incumbent railroad, it would be creating a clear barrier to entry by forcing the SARR to pay higher taxes than those paid by the incumbent. In this instance, the incumbent carrier, CSXT, was able to lower its tax expense and increase its cash flow by employing bonus depreciation allowed under the law. Denying the TPIRR the same tax-shielding benefits as the CSXT would be a textbook example of a barrier to entry to the SARR.

The STB may also have been concerned about the bonus depreciation since it deemed the bonus depreciation as "temporary," and "now-expired."[20] However, the bonus depreciation allowances allowed by federal tax law extended over at least six (6) tax years.[21] In other words, bonus depreciation was current under federal tax law at the time the SARR was constructed and several years beyond. Moreover, the structure of the Board's DCF model limits the bonus depreciation taken by TPI to only the assets placed into service in 2008, 2009, and 2010. This is

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19 *See West Texas Utilities* at 670-671.
20 *See AEPCO* at 142.
21 On January 2, 2013 President Obama signed the American Taxpayer Relief Act (H.R. 8) to temporarily avert the "fiscal cliff." Section 331 of the new law extended 50 percent bonus depreciation through the end of 2013.

because the DCF model assumes assets are only replaced at the end of their useful lives, meaning replacement assets are ineligible for use of the bonus depreciation.

Bonus depreciation was a tax benefit available to the TPIRR under then-applicable tax laws. To expect or require complainants in rate cases to disregard laws in existence during construction and operation of the SARR because the laws are "temporary" ignores the fact that the legal regime under which society exists is constantly changing and evolving. New laws are always being enacted; pre-existing laws are always being amended or repealed. Moreover, to ignore existing law would invite potentially limitless speculation into the SAC process. One party would argue that certain laws should not apply, while the opposing party would object and, instead, argue that different laws should be disregarded. As the Board recently stated, "we must follow existing law…We have no reason in this 10-year DCF analysis to exclude costs that are required by Federal law because of the possibility that the law might change in the future or tax breaks that do not currently exist may be enacted."[22]

Given that CSXT has utilized bonus depreciation, TPI should not be penalized by incurring a cost that the incumbent carrier has not incurred. Moreover, CSXT and/or its predecessor companies have benefited from investment tax credits and other tax deferral mechanisms that are not available to the TPIRR. For example, investment tax credits were available to railroads in the 1970's and 1980's, which the railroads, including CSXT and its predecessors, used to help develop their current networks.[23] It would be manifestly unfair to limit tax benefits available to the TPIRR under current tax law while allowing CSXT and its predecessors to fully benefit from prior tax avoidance mechanisms not available to the TPIRR.

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[22] *See AEPCO* at 34 [footnote omitted].
[23] *See, e.g., Nevada Power II* at 317.

g. Average Annual Inflation In Asset Prices

Table H computes the average annual inflation rate by which the capital recovery charge in Table I is indexed. The weighted average inflation rate was used because Table H calculates the required capital recovery necessary to return the investment. All road property and equipment accounts are indexed at the quarterly rates shown in Table B. The weighted average inflation rates are based on the inflation indexes discussed in Part III-G.

h. Discounted Cash Flow

Table I shows the calculation of the capital carrying charge and associated flow of funds required to recover the total road property investment and equipment investment. Inputs to this spreadsheet were taken from the Tables A through H described *supra.* Table I calculates the quarterly capital carrying charge required over the 40 quarters of the DCF period, after consideration of the applicable tax liability.

The total start-up investment is comprised of the road property and equipment investment shown in Table C, the road property IDC calculated in Table D, the present value of replacement investment calculated in Table F, and any capitalized maintenance-of-way expenses. The result equals the total investment to be recovered over the life of the TPIRR from the quarterly capital recovery stream. The quarterly capital recovery stream reflects the tax benefits associated with interest on the investment financed with debt from Table E and the asset tax depreciation from Table G.

The cash flow shown in Column (8) of Table I is the amount remaining each quarter after the payment of federal and state tax liabilities. This cash flow is used for payment of return on total investment in the TPIRR. For road property investment, this quarterly figure is then discounted by the fourth root of the composite annual cost of capital from Table A, adjusted to reflect the assets being placed in service on June 30, 2010. The present value cash flow is then summed for each quarter along with the future cash flow; the total equals the total cost that must be recovered. The future cash flow is the residual value of the TPIRR's unconsumed assets, future interest payments and remaining tax liabilities (remaining interest and depreciation), and reflects the cash flow required to account for the value of the assets not consumed during the 10-year life of the DCF model.

Prior to the STB's decision in *AEPCO*, unused depreciation was accounted for in the terminal value calculation on an undiscounted basis. However, the STB modified its approach in *AEPCO* to calculate the present value of unused depreciation in the terminal value calculation.[24] TPI has included the STB's modified terminal value approach in its DCF model, but in doing so, has identified a flaw in the STB's model. The STB's DCF model explicitly assumes that the SARR's capital structure will remain constant into perpetuity.[25] This means that the amounts of common equity and debt carried on the assumed SARR's financial statements will remain the same forever. However, the STB's DCF model assumes that after year 20, and until the first assets are replaced in the replacement level 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. This creates an irreconcilable mismatch between the SARR's capital structure and its cash flows. The capital structure assumes that the SARR is carrying debt, and its associated interest payments, but the cash flows reflect no benefits from the interest tax shields.

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[24] *See AEPCO* at 140-141.

[25] The cost of capital used to calculate the terminal value in the DCF model equals the simple average cost of capital from the first year of the SARR's construction to the most recent cost of capital issued by the STB. It also reflects the average railroad industry capital structure over the same period. Between 2009 and 2012, debt as a percentage of railroad industry capital ranged from 20.8 to 29.1 percent. *See Railroad Cost of Capital – 2009* at page 19, *Railroad Cost of Capital – 2010* at page 18, *Railroad Cost of Capital – 2011* at page 24, and *Railroad Cost of Capital -- 2012* at page 17.

To correct for this flaw, TPI adjusted the terminal value in the capital carrying charges to reflect the cost of capital assumption that the SARR's level of debt is held constant into perpetuity, and that interest tax shields consistent with this level of debt are accounted for in the cash flow calculation. Specifically, TPI calculated an interest tax shield perpetuity by dividing the last full quarterly coupon payment by one plus the quarterly real cost of capital.[26] This calculation aligns the capital structure assumption of a fixed level of debt forever with the interest payable on this debt.[27]

This change not only corrects for a flaw in the STB's DCF model, but also aligns the SARR with how real world railroads operate. As indicated above in Part III-H-1(d), the railroads are constantly issuing new debt as older debt issuances mature, or the railroads call the debt before its maturity. Since the last round of mergers in the mid-1990s the amount of railroad industry debt, as measured by the four major railroads included in the STB's cost of capital calculations (UP, BNSF, CSXT and NS), has remained consistent. As shown in Exhibit III-H-2, the amount of railroad industry debt between 1998 and 2009 remained at approximately $30 billion in aggregate.[28] It is generally agreed in the financial community that borrowing can add value to a firm because of the tax shielding impact of interest payments.[29] Under the STB's current DCF model assumptions, the value this debt adds from the interest tax shields is unaccounted for in all periods in the cash flow projections, but is accounted for in the cost of capital. The change made by TPI corrects this flaw.

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26 This is the same type of calculation used to develop the terminal capital carrying charge.

27 To avoid a double count in the impact of the interest tax shields, TPI has adjusted the asset replacement calculations to remove the impact of the interest tax shields on replacement assets.

28 The amount of debt carried by the railroads increased beginning in 1996 as the railroads took on debt to finance their last round of mergers. 2009 is the final year in this analysis because that was the last year that BNSF was included in the STB's cost of capital calculation.

29 *See, e.g.*, Brealey, Myers, and Allen, at page 476 ("… most financial managers believe that there is a moderate tax advantage to corporate borrowing, at least for companies that are reasonably sure they can use the corporate tax shields.").

TPI's correction is also consistent with financial theory. It is well settled that a firm's cost of equity will change with changes in leverage. This is famously known as Modigliani and Miller's ("MM") Proposition 2, which states that the expected return on the common stock of a levered firm increases in proportion to the debt-equity ratio.[30] This means a higher debt-to-equity ratio leads to a higher required return on equity, because of the higher risk involved for equity-holders in a company with debt. The converse of this is also true. Stated differently, as the amount of debt held by a company falls, the required return on equity falls because of the lower risk involved for equity-holders in a company without any debt. [31]

If the TPIRR's debt was assumed to be reduced over time as principal was repaid, the cost of both the TPIRR's debt and equity would shift. The cost of debt would fall because firms with less debt, holding all else constant, will pay a lower interest rate than higher levered firms. Similarly, the cost of equity would fall pursuant to MM Proposition 2 because the expected return on TPIRR common equity falls in proportion to the debt-equity ratio. The only proper way to show a constant capital structure in perpetuity, as the STB has assumed in its DCF model, is to assume a constant level of debt over the SARR's infinite life. Moreover, the Board's use of the railroad industry cost of capital necessarily requires that the TPIRR have a capital structure similar to that of the railroad industry. TPI's adjustment to the DCF model aligns the disconnect inherent in the current version of the STB's model.

The development of the quarterly levelized capital carrying charge requirement is a relatively simple calculation, *i.e.*, the starting capital carrying charge requirement times the quarterly index factor from Table H, which will recover total investment during the 10-year DCF model period. The starting capital carrying charge requirement which recovers the total

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[30] *See* Brealey, Myers and Allen at page 453 for a fuller explanation of MM's Proposition 2.
[31] *Id.*

investment is developed through an iterative process. The DCF model begins with a specified amount and then runs through the calculation described above to develop the cumulative present value of the cash flow. If this cumulative number does not equal the total costs to be recovered from the quarterly revenue flow (start-up investment plus the present value of the replacement investment), the starting cost is adjusted upward or downward as necessary and the DCF model runs through the calculations again. The process is repeated until the starting quarterly charge yields a cumulative present value cash flow which equals the required investment to be recovered from the quarterly capital recovery flow.

i. Computation of Tax Liability - Taxable Income

Table J, Part 1 of Exhibit III-H-1 displays the calculation of the TPIRR's federal tax liability on road property. The procedures followed to develop the federal tax liability are discussed in Part III-G. Table J, Part 2 shows the calculation of the TPIRR's state income tax liability for both road and equipment property, which also is discussed in Part III-G.

j. Operating Expenses

Table K displays the operating expenses incurred in each year of the DCF period based on the traffic levels described in Part III-A. Annual operating expenses that change with the level of traffic volumes are adjusted by the annual change in gross ton-miles to take into consideration the shifting nature of TPIRR's traffic.[32]

[32] For example, assume that in Year 1 of the 10-year period, Movement A transports 1,000 gross tons over 1,000 miles of the SARR, producing 1.0 million gross ton-miles of traffic (1,000 gross tons x 1,000 miles = 1,000,000 gross ton-miles). In Year 2, Movement A is forecasted to be discontinued, but is replaced in the SARR traffic group by Movement B. Movement B also transports 1,000 gross tons, but only moves over 100 miles of the SARR, producing 100,000 gross ton-miles (1,000 gross tons x 100 miles = 100,000 ton-miles). Even though both Movement A and Movement B represent 1,000 tons of traffic annually, Movement B will be less expensive to move than Movement A, given the lower aggregate costs associated with a shorter movement and the 90 percent reduction in gross ton-miles. Adjusting costs by the change in gross ton-miles instead of the change in tons reflects the shifting nature of the SARR's traffic mix and its actual impact on the SARR's operating costs.

TPI developed the correlation between CSXT operating expenses (adjusted to current year price levels through the use of the RCAF-U) and various operating metrics, including net tons, gross ton-miles, net ton-miles and car-miles, and found the change in operating expenses between 1996 and 2012 was more closely correlated with gross ton-miles than the other two factors.[33] The change in gross ton-miles is an appropriate metric to use to adjust operating expenses because it takes into consideration multiple operating factors, in this case distance and tonnage factors.

Therefore, TPI has adjusted train and engine personnel expenses, locomotive related expenses, loss and damage expenses, and intermodal lift costs annually by the change in TPIRR gross ton-miles. Table K states the annual operating costs on a quarterly basis, and indexes them to reflect inflation over the 10-year analysis period based on the inflation rates shown in Table B.

In addition, TPI has capitalized rail grinding and rail crossing maintenance, instead of treating these activities as standard operating cost items. TPI took this approach because, based on the accounting standards CSXT previously used in its real world operations and statements made by CSXT engineering executives which are discussed below, TPI believes the proper methodology for accounting for these MOW costs is to include them in TPIRR's capital recovery stream.

CSX's 2009 SEC Form 10-K discusses when and where the railroad decided to treat maintenance of way outlays as either a capital expense or an operating expense. As indicated by CSX:

> The Company's largest category of capital spending is track assets which are typically completed by CSXT employees. Costs for track projects that are capitalized include:

[33] *See* e-workpaper "Analysis of Op Exp and Statistics.xlsx" which shows an 89.9 percent correlation between changes in gross ton-miles and operating expenses.

- labor costs, because many of the assets are self-constructed;
- costs to purchase or construct new track or to prepare ground for the laying of track;
- welding (rail, field and plant) which are processes used to connect segments of rail;
- rail grinding which is a procedure for removing ridges and defects in a rail surface to restore rail to its original shape and extend its useful life;

…..

- gauging which is the process of standardizing the distance between rails.[34]

Based on CSX's prior description of its own accounting practices, the key factor of whether the cost is expensed or capitalized is whether the activity extends the life of the asset: "[t]he Company's capital spending includes purchased or self-constructed assets and property additions that substantially extend the service life or increase the utility of those assets."[35] Based on statements made by CSXT engineering executives, there is no question that rail grinding and crossing repaving extend the useful lives of CSXT's assets. A recent news article included the following statement:

> At CSX Transportation, MOW officials are seeking a computerized selection of the daily grind plan based on a laser-head profile at the front of the grinder and a daily pre-grind measurement to improve grinding operations. In addition, if grinders could operate more efficiently, CSXT could reduce the amount of track time needed for grinding, said CSXT Spokesman Gary Sease in an email, adding that the Class I's "preventative grinding philosophy" calls for operating production grinders on main routes to maintain rail and extend rail life.[36]

There is no question that rail grinding extends the useful life of rail and crossings. Based on this widely acknowledged fact, and CSXT's own statement that it capitalizes maintenance activities that extend the life of assets, TPI has chosen to capitalize rail grinding and certain maintenance of way activities.

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[34] *See* CSX SEC Form 10-K for Year Ending December 25, 2009 at 98.
[35] *Id.* at 96.
[36] *See* "*Technology update: Rail grinding equipment*," Progressive Railroading, May 2010.

The objective in identifying the costs of an asset is to distinguish the expenditures that produce future benefits from those that produce benefits only in the current period. The costs in the second group (i.e., costs that produce benefits only in the current period) are recorded as expenses, but those in the first group are capitalized; that is, they are recorded as an asset and expensed in future periods through depreciation. As indicated above, the key aspect is the timing of the benefits associated with the expenditure. If the expenditure extends the future life of the asset, e.g., produces future benefits, it can be capitalized under GAAP. TPI recognizes that CSXT recently decided to expense rail grinding.[37] While expensing some maintenance cost, such as rail grinding, is allowable under GAAP, this does not mean capitalizing of the costs is disallowed. In fact, CSXT itself stated that capitalization of rail grinding is an "acceptable method."[38] In this instance, TPI has chosen to capitalize certain maintenance-of-way expenses, which is perfectly consistent with GAAP and is "acceptable" according to CSXT.

k. Summary of SAC

Total SAC for the TPIRR based on investment and operating costs is summarized in Table L of Exhibit III-H-1. The capital requirement from Table I and the annual operating expenses from Table K are presented and summed in Table L for each year of the TPIRR's operation.

2. Maximum Rate Calculations

The SAC analysis summarized in Parts III-A through III-G and the accompanying Exhibits, and displayed in Exhibit III-H-1, demonstrates that over the 10-year DCF period the revenues generated by the TPIRR exceed its total capital and operating costs. Table III-H-1 below shows the excess revenue over SAC in each year of the DCF period for this case.

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37 *See* CSX Corporation Third Quarter 2010 Quarterly Financial Report at 11.
38 *Id*.

Table III-H-1
Summary of DCF Results – July 1, 2010 to June 30, 2020
($ in millions)

Year (1)	Annual Stand-Alone Requirement (2)	Stand-Alone Revenues (3)	Overpayments or Shortfalls (4)	PV Difference (5)	Cumulative PV Difference (6)
July 1, 2010 – Dec 2010	$2,815	$3,152	$337	$337	$337
2011	5,900	6,832	932	835	1,172
2012	6,008	6,851	842	678	1,850
2013	6,161	7,301	1,139	828	2,679
2014	6,299	7,671	1,371	896	3,575
2015	6,582	8,139	1,557	915	4,490
2016	6,837	8,720	1,882	995	5,484
2017	7,066	9,122	2,056	977	6,461
2018	7,384	9,721	2,337	999	7,460
2019	7,724	10,422	2,698	1,036	8,496
Jan 2020 – June 30, 2020	4,012	5,587	1,575	574	9,070

Source: Exhibit III-H-1

Where stand-alone revenues are shown to exceed costs, rates for the members of the TPIRR traffic group -- including TPI in particular -- must be adjusted to bring revenues and SAC into equilibrium. In *Major Issues*, the Board adopted MMM as its rate prescription approach for use in proceedings under the *Coal Rate Guidelines*.[39]

Under MMM, maximum reasonable rates for each year of the DCF period are expressed as a ratio of each movement's stand-alone revenues to the variable cost of providing the subject service over the TPIRR route. Revenues are expressed as each movement's annual stand-alone revenue calculated using the ATC methodology detailed in Part III-A. Revenues are categorized based on traffic type (*i.e.*, coal, intermodal, or general freight), ultimate origin and destination, and CSXT origin and destination. Variable costs for each movement are calculated using

[39] *See Major Issues* at 14-23.

CSXT's 2012 URCS costs for the portion of the movement replicated by the TPIRR, based on the nine (9) cost inputs identified in *Major Issues*.[40]

a. Calculation of Variable Costs Used In The MMM

In *Major Issues*, the Board determined that parties in SAC cases should use the incumbent railroad's unadjusted URCS Phase III variable costs as the cost input for the MMM model.[41] The Board, however, expressed a concern in *AEPCO* that use of variable costs based on a movement's characteristics on the incumbent carrier would not reflect, in some cases, the movement's characteristics when it moved over the SARR.[42] Specifically, the STB stated that, where the SARR transported trains in overhead service between interchanges with the incumbent carrier (i.e., cross-over traffic), parties should calculate the variable costs for all cars on a trainload service basis even if the cars moved in single car or multiple car service on the incumbent railroad. The Board felt this would better reflect the actual cost of operations incurred by the SARR in moving this traffic.

Pursuant to the Board's order, the shipper in *AEPCO* submitted revised variable cost calculations for use in its MMM model.[43] The incumbent railroads subsequently submitted their reply variable cost calculations pursuant to the Board's order, and made one key change from the shipper's opening submission. The railroads asserted that, while the variable costs for non-issue overhead traffic should be calculated as if the traffic were operated in unit train service, the

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[40] In developing the revenues and variable costs for use in the MMM model, TPI found instances of clear errors in the CSXT traffic and revenue data pertaining to the number of units transported. For example, the revenue data may have shown revenue associated with a full unit train of coal, but the traffic data only indicated one (1) car on the train. Where such anomalies occurred, TPI adjusted the number of units on the movement as to properly calculate the variable costs associated with the movement.

[41] *See Major Issues* at 14.

[42] *See AEPCO* at 35.

[43] *See* "*Revised Variable Cost Calculations of Complainant Arizona Electric Power Cooperative, Inc.*," filed July 5, 2011 in STB Docket No. 42113. AEPCO stated that its filing should not be mistaken for any acquiescence in or agreement with the Board's basic premises or assumptions. *See* page 3.

empty return ratio should not reflect the standard 2.0 empty return ratio used in unit train costing. Instead, the railroads indicated the empty return ratios should reflect each applicable traffic group.[44] In simple terms, the railroads argued that parties should use movement specific adjustments to the variable cost calculations to replace the default empty return ratio with an empty return ratio based on the type of traffic moved.

The STB did not come to a final conclusion on these issues in *AEPCO* because the impact was immaterial to the outcome of the case.[45] Instead, the Board indicated it had properly positioned the issue for litigants in future cases to consider and brief. Consistent with the Board's position, TPI considers this issue below.

i. The Proposed Variable Cost Adjustments Are Inconsistent With The Focus On An Incumbent's Costs

In its June 27, 2011 decision in *AEPCO*, the Board stated that the variable costs used in the MMM model should reflect the "actual operating characteristics of the movements on the SARR" rather than those of the incumbent's operations.[46] The Board also stated that this treatment was required by pages 47-48 of *Major Issues*.[47] However, the discussion in *Major Issues* centered on the general issue of whether to allow movement-specific adjustments to URCS when calculating variable costs; it did not address MMM. The relevant MMM part of the *Major Issues* decision indicates that the defendant's unadjusted variable costs should be used, not those of the SARR:

> The Maximum Markup Methodology provides for demand-based differential pricing. The approach recognizes that, because competition would compel the <u>defendant</u> carrier to price some of its services below an

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[44] *See* BNSF/UP Response on Variable Cost Calculations at page 3-5 (filed July 19, 2011) in STB Docket No. 42113.

[45] *See AEPCO* at 36.

[46] *See AEPCO II* at 2.

[47] *Id*.

> average R/VC level, the defendant carrier must be able to price other services above the average to compensate. By design, the Maximum Markup Methodology therefore calculates the precise amount that the defendant carrier would need to price its services above the average R/VC ratio to cover all its costs and earn adequate revenues. This calculation rests on the demand for rail transportation services, as observed in the existing rate structure of the defendant carrier.[48]

In adopting MMM, the Board strove to develop a method based on demand-based differential pricing that reflected the relationship between revenues and costs for the real-world movements of the defendant railroad, with a cap only at the highest level and only if the selected SARR traffic group provides a reasonable return on investment.[49] Adjusting the variable costs used in the MMM to reflect a SARR's operations would adversely distort this relationship and the resulting rate prescriptions.

A simple example illustrates the need to use the defendant railroad's variable costs in application of MMM: assume that two incumbent-railroad, single car movements, identical in all ways, move over the SARR, except that one is an overhead movement on the SARR (i.e., the car moves on the same train from the SARR origin to the SARR destination) and the other is not (i.e., the car receives an inter-train switch while on the SARR). The two movements would also have the same URCS variable costs, because under the Board's costing methodology, the two movements would have the same nine (9) inputs into the Board's Phase III cost model. By the adjustment proposed by the Board in *AEPCO*, the overhead movement would have lower variable costs than the second movement and subsequently a higher R/VC ratio. This may lead to the overhead movement receiving a rate reduction in the MMM process while the identical movement, which does not move in overhead service, sees no change in rates. This outcome is completely contradictory to the idea that demand, as reflected by relative R/VC ratios, should set

48 *See Major Issues* at 20 (emphasis added).
49 *See Major Issues* at 20-23.

the price.[50] Conversely, there is no distortion if the variable cost parameters are based on the incumbent's movement characteristics and not the SARR's characteristics.

This was the position taken by the Board in *WFA/Basin*. In discussing the correct variable costs to use in the MMM model, the Board unequivocally stated that the variable costs used in the MMM model are the defendant railroad's variable costs estimated by URCS and not the SARR's variable costs.[51]

ii. The Proposed Adjustments Violate the Long-Cannon Factors

Under Constrained Market Pricing and the so-called "Long-Cannon" factors, a carrier must charge its competitive traffic as much of its unattributable costs as demand will permit before passing along the remaining costs to captive shippers.[52] This is one of the primary reasons the STB rejected the percent rate reduction approach formerly used to establish SAC rates prior to *Major Issues*.[53] The STB found in *Major Issues* that MMM "reflects the important principle that a railroad should recover as much of its costs as possible from each shipper served before charging differentially higher rates to its captive shippers."[54] Adjusting the variable costs used in the MMM model to reflect operations of the SARR instead of the incumbent could violate these factors by reducing rates on competitive traffic below the rates dictated by their demand.

[50] *See Guidelines*, at 523 (the ICC "concluded that a meaningful maximum rate policy could not be founded on a strictly cost-based approach….Therefore, we expressed our commitment to the concept of demand-based differential pricing, whereby the carrier may price its services according to the varying demand elasticities for them") (footnote omitted).

[51] *See WFA/Basin II* at 30.

[52] *See Guidelines* at 539-540. *See also* 49 USC § 10701(d)(2).

[53] The percent reduction method violated the Long-Cannon factors because it reduced all rates by an equal percentage, and thus did not require competitive traffic to carry as much unattributable costs as demand would allow. *See Major Issues* at 12-13.

[54] *See Major Issues* at 16.

For example, assume a competitive movement with a rate of $10 and variable costs of $8 based on the incumbent carrier's operating characteristics. This produces an R/VC ratio of 125 percent, which, according to the Board, reflects the highest rate the railroad can charge without fear of losing this traffic to a competitor. This rate also reflects the amount of unattributable costs that this movement can absorb.

Now assume that this movement moves in overhead service on a SARR, and has variable costs of $6.67 based on the SARR operating characteristics. This produces an R/VC of 150 percent for MMM purposes. If the final MMM ratio were, say, 140 percent, the competitive movement would not be due relief when using the incumbent's variable cost characteristics, because it is contributing as much as it can given its competitive environment. However, if the variable costs were calculated based on the fictional SARR's operating characteristics, this move would be due relief under the STB's proposed variable cost adjustments.[55] This reduction, however, is completely contradictory to the Long-Cannon Factor that a competitive movement contribute as much as its demand permits. A railroad can charge up to $10 for this movement, but making the Board's proposed MMM adjustments provides a rate below this theoretically optimal level, thus contradicting the Long-Cannon Factors.

Within the MMM rate reduction approach, reducing the rate for a competitive movement means captive traffic must assume a greater share of the SAC, and subsequently higher rates. The Board rejected this very notion in *Major Issues* when the railroads argued that it is more efficient to lower rates on shippers with more competitive options and shift recovery of

[55] The MMM adjusted R/VC ratio of 150 percent exceeds the MMM R/VC ratio of 140 percent. Based on MMM the 140 percent R/VC ratio would then be multiplied by the SARR variable cost of $6.67, producing a rate of $9.34, or a $0.66 reduction in the rate.

unattributable costs to shippers with fewer competitive alternatives.[56] As required by *Guidelines* and 49 USC § 10702, the Board should continue to use the incumbent railroad's characteristics when calculating the MMM variable costs.

iii. The Board Should Reject Any Adjustment To Variable Costs

Even if the Board were to decide that parties should adjust the variable costs used in the MMM model to reflect the SARR's operating characteristics, the Board should not accept the railroads' recommendation to use movement specific empty return ratios.

As indicated above, the incumbent railroads in *AEPCO* asserted that the empty return ratio on the overhead movements should be adjusted from the URCS default of 2.0 to a movement specific factor.[57] The STB must reject this position for several reasons.

First, the Board clearly indicated in *Major Issues* that parties need to use unadjusted URCS to estimate the variable costs for each movement in the MMM model:

> We will replace the percent reduction approach with the Maximum Markup Methodology. Under this method, the parties should use unadjusted URCS to estimate the variable cost of each movement in the traffic group, and then determine the maximum contribution of each movement towards SAC costs, expressed as a markup over variable cost.[58]

The Board used unadjusted Phase III URCS costs in its analyses for a variety of reasons, including, but not limited to, reducing the complexity involved with maximum reasonable rate cases.[59] The movement specific adjustment recommended by the railroads clearly contradicts this intent. Second, adjusting the empty return ratio away from the 2.0 factor used when costing

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56 *See Major Issues* at 17.
57 *See AEPCO* at 35-36.
58 *See Major Issues* at 14.
59 *Id.* at 50.

trainload movements introduces piecemeal and incomplete adjustments to the variable cost calculations.[60]

The railroads asserted in their *AEPCO* filing that, while it is proper to determine the variable costs for individual overhead traffic as if the traffic moved in unit train service, it is improper to assign the Phase III default unit train empty return ratio of 2.0.[61] Instead, the railroads claimed that parties must override the Phase III model's default unit train empty return ratio and instead substitute a movement specific ratio based on traffic group types. The railroads argued this adjustment would reflect the fact that non-unit train traffic does not have an empty car for every loaded car moved.[62]

The problem with the railroads' position in *AEPCO* is that it introduces incomplete adjustments to the variable cost calculation. The Board's URCS Phase III model calculates total unit train miles by multiplying the URCS short line miles by the empty return ratio. The Phase III model then uses the total unit train miles to develop locomotive unit mile ("LUM") dependent costs. If the empty return ratio used is different than the default Phase III empty return ratio, then LUM costs will be either overstated or understated. To solve this problem, a user would have to make another adjustment to LUM to remove the impact of the changed empty return ratio. As the Board has said, "piecemeal…adjustments to URCS are suspect."[63] "[S]elective replacement of system-average costs with movement-specific costs may bias the entire analysis, rendering the modified URCS output unreliable."[64]

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[60] *See Major Issues* at 51. *Cf. Cargill* at 11 ("we conclude that permitting piecemeal movement-specific adjustments to URCS in the fuel surcharge context…would not likely lead to more accurate results, and would almost certainly increase litigation and litigation costs").

[61] *See* "*Defendants' Response To The Revised Variable Cost Calculations Of Complainant Arizona Electric Power Cooperative, Inc.*," filed July 19, 2011 at 4.

[62] *Id*.

[63] *See Major Issues* at 48 and 51.

[64] *Id* at 52.

The Board chose not to allow movement specific adjustments, in part, because of the impact these one-time adjustments would have on unit costs and the complexity of a SAC case.[65] The *AEPCO* defendants' recommended adjustment to the empty return ratio would introduce additional complexity and piecemeal results to the variable cost calculation process, while also casting doubt on the accuracy of the URCS result.

b. Indexing Variable Costs In The MMM Model

The Board indicated in *Major Issues* that parties in SAC cases should project the base year URCS variable costs in MMM forward using the hybrid RCAF approach used to index a SARR's operating expenses.[66] The Board revised this position in *WFA/Basin II*, saying that the hybrid RCAF would distort the actual distribution of R/VC ratios used to develop MMM rate reductions and the degree of differential pricing the carrier will need in the future.[67] Instead, the Board indicated parties should apply the RCAF-A index to base year URCS variable costs in order to forecast future variable costs because the RCAF-A would better reflect the future productivity of the incumbent railroad than the hybrid RCAF.[68]

While the RCAF-A may better reflect future costs than the hybrid RCAF, the Board's standard URCS indexing method is superior to both, and the Board should use the standard URCS method to index URCS variable costs in MMM in this proceeding. The Board previously determined that, in calculating variable costs to implement an R/VC ratio rate standard, the standard URCS indexing approach produces the most accurate results. Specifically, the Board determined in *OG&E* that the standard URCS indexing approach would produce the most accurate results in developing future variable costs for rate prescription purposes, and directed its

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65 *See, e.g., Major Issues* at 60.
66 *See Major Issues* at 14 (n. 19).
67 *See WFA/Basin II* at 30.
68 *See WFA/Basin II* at 30.

use.[69] Obviously it would be inappropriate to use two (2) different indices, the STB's standard URCS index and the RCAF-A, to accomplish the same, singular purpose, i.e., to forecast variable costs.

The use of a forecasted CSXT-specific URCS index also is better suited to the goals of the MMM approach than the application of the more general RCAF-A index. The STB indicated in *WFA/Basin II* that an accurate presentation of the defendant railroad's variable costs is key to the MMM's ability to maintain differential pricing required by the defendant carrier:

> In sum, for MMM to correctly calculate the degree of differential pricing needed by the defendant railroad to recover the total SAC costs over the DCF analysis period, we need to properly forecast the defendant carrier's variable costs.[70]

In other words, obtaining a "correct[ ]" MMM "calculat[ion]" requires properly forecasting the defendant's variable costs. The best way to do this is use of a carrier-specific URCS index instead of the industry-wide RCAF-A. An URCS index takes into consideration the specific weighting of cost components unique to a specific railroad, while the RCAF-A bases its cost weighting on inputs from all Class I railroads. The most accurate way to calculate a railroad's future variable costs is to use an index specific to that carrier.

The STB's URCS index uses five (5) indices: the (1) AAR Wage Index, (2) AAR Wage Supplements Index, (3) AAR Materials and Supplies Index, (4) AAR Fuel Index, and (5) Producer Price Index – All Commodities ("PPI"). All five indices are weighted by actual railroad costs reported in the railroad's Annual Report Form R-1. Global Insight[71] publishes forecasts for each of the first four (4) indices, and the Board already accepts Global Insight's forecasts of the first three (3) for use in the DCF model. The fuel forecast is included in the

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[69] *See OG&E* at 11.
[70] *See WFA/Basin II* at 30.
[71] Now IHS Economics.

same documentation. Likewise, the Energy Information Administration ("EIA") – whose coal production, transportation cost, and GDP-IPD forecasts already are accepted by the Board – publishes a PPI forecast.[72] To forecast CSXT URCS Phase III variable costs for MMM purposes, therefore, TPI uses the STB's URCS index, with the December 2013 Global Insight and the EIA's 2014 Annual Energy Outlook forecasts for its components. Weighting factors are taken from CSXT's Annual Report Form R-1 data.

Following the calculation of the specific annual variable costs for each movement, TPI calculated each movement's maximum contribution toward SAC each year, expressed as a mark-up over the movement's variable costs. Under MMM, a movement cannot contribute more to SAC than the contribution reflected in its current actual R/VC or forecasted R/VC.[73] For each year in the DCF period, the MMM model sets each movement's R/VC ratio at the lesser of the average R/VC ratio required to cover total SAC, or the movement's actual R/VC ratio.[74] The average R/VC ratio required to cover SAC then is iteratively increased until no movement in the traffic group is assigned a share of SAC greater than its actual contribution over variable costs as measured by its R/VC ratio, and the aggregate adjusted stand-alone revenues equal total SAC.[75]

Application of MMM yields the maximum R/VC ratios for each year of the DCF model summarized in Table III-H-2 below.

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72 The EIA lists its PPI forecasts as its Wholesale Price Index forecasts in its Annual Energy Outlook.

73 *See Major Issues* at 14.

74 *Id*.

75 According to the Board, this step reflects the assumption that the rates charged by the defendant railroad on all non-issue traffic are profit-maximizing rates, such that the reapportionment represents "an appropriate application of demand-based differential pricing." *See Major Issues* at 14.

Table III-H-2
TPIRR MMM Results

Time Period (1)	Maximum R/VC Ratios (2)
July 1, 2010 – Dec 2010	223.6%
2011	179.5%
2012	174.3%
2013	160.2%
2014	149.7%
2015	145.6%
2016	137.8%
2017	135.5%
2018	131.3%
2019	126.9%
Jan 2020 – June 30, 2020	122.2%

Source: Exhibit III-H-3.

As indicated in Table III-H-2, the maximum R/VC ranges from 122.2 percent to 223.6 percent over the 10-year DCF period.

The maximum lawful transportation rates for TPI traffic equal the greater of the jurisdictional threshold or the MMM maximum rates. Exhibit III-H-4 through Exhibit III-H-17 compare CSXT's rates at 3Q10 through 4Q13, respectively, to the jurisdictional threshold and the MMM maximum rates. The issue CSXT rates are greater than both the jurisdictional threshold and the MMM rates for all movements and all time periods.

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IV. WITNESS QUALIFICATIONS AND VERIFICATIONS

This Part contains the Statement of Qualifications and Verifications of each witnesses who is responsible for a portion of TPI's Opening Evidence narrative (and the exhibits and workpapers referred to therein). Each statement identifies the portion of the narrative for which the witness is responsible.

1. RICHARD H. MCDONALD

Mr. McDonald is president of RHM Consulting, Inc., a transportation planning firm specializing in the railroad industry. RHM Consulting is located at 516 W. Shady Lane, Barrington, Illinois. Mr. McDonald's experience includes 42 years in varied and increasingly responsible positions with the New York Central ("NYC"), Penn-Central ("PC"), and Chicago and Northwestern ("CNW") Railroads.

The specific evidence Mr. McDonald developed and is sponsoring is TPI's evidence as it relates to the stand-alone railroad ("SARR") system (Part III-B), SARR operating plan (Part III-C), the operating personnel and equipment required for the TPI SARR (Part III-D).

Mr. McDonald graduated from the University of Illinois, College of Engineering with a Bachelor of Science degree in Engineering in 1957. He completed the following certificate programs: Railroad Engineering, University of Illinois, 1975; Management for Engineers, University of Iowa, 1976; Accounting for the Non-Accounting Executive, Wharton School, University of Pennsylvania, 1977; and Railroad Profit Strategy, Kellogg Center, Northwestern University, 1990. Mr. McDonald has been an active member of the American Railway Engineering Association and the Chicago Maintenance of Way Club. Mr. McDonald served on the Board of Directors of the Peoria & Pekin Union Railway and Minnesota Transfer Properties, Inc. from 1984 to 1994.

Mr. McDonald founded RHM Consulting in 1994 and since that time has successfully completed numerous assignments for railroads, shippers and public entities related to transportation issues, including; rail line construction projects, operational adjustments and analyses of railroad operations, such as restructuring the Ferrocarriles Nacionales de Mexico ("FNM") into an independent, modern terminal transportation company.

Prior to joining CNW, Mr. McDonald was an officer in the Operating Department on the NYC and PC railroads from 1960 to 1974. During this period, Mr. McDonald was assigned duties in Indianapolis, IN, Columbus, OH, Youngstown, OH and Rochester, NY.

Mr. McDonald's career with CNW included a number of high-level positions over a period of twenty years. These positions included: Vice President–Planning & Acquisitions, Vice President–Operations, Vice President–Engineering, Vice President–Operating Administration, Vice President–Transportation, Vice President–Western Railroad Properties, Inc., Assistant Vice President–Transportation, Assistant Vice President – Division Manager and Assistant to Vice President–Transportation. As Vice President–Western Rail Properties, Inc. ("WRPI"), Mr. McDonald was responsible for the successful planning, construction and operation of the CNW/WRPI rail line into the Powder River Basin ("PRB"). As Vice-President Operations, he was responsible for Transportation, Engineering and Mechanical departments and related functions for both freight and commuter service on the CNW, which was similar in size and complexity to the TPI Railroad. CNW was merged into the Union Pacific system in 1995. Mr. McDonald has testified before the Surface Transportation Board in numerous stand-alone cost proceedings, including STB Docket No. 42051, *Wisconsin Power & Light Company v. Union Pacific Railroad Company*, STB Docket No. 42054, *PPL Montana, LLC v. The Burlington Northern and Santa Fe Railway Company,* STB Docket No. 42051, *Public Service Company of Colorado d/b/a Xcel Energy v. The Burlington Northern and Santa Fe Railroad Company,* STB Docket No. 42125, *E.I. DuPont De Nemours & Company v. Norfolk Southern Railway Company and* STB Docket No. 42130, *SunBelt Chlor Alkalai Partnership v. Norfolk Southern Railway Company.*

VERIFICATION

I, Richard H. McDonald, verify under penalty of perjury that I have read the Opening Evidence of Total Petrochemicals & Refining USA, Inc. in this proceeding that I have sponsored, as described in the foregoing Statement of Qualifications, that I know the contents thereof, and that the same are true and correct. Further, I certify that I am qualified and authorized to file this statement.

Richard H. McDonald

Executed on February 14, 2014

2. HARVEY A. CROUCH, P.E.

Mr. Crouch is President and CEO of Crouch Engineering, P.C. His business address is 428 Wilson Pike Circle, Brentwood, TN 37027. Crouch Engineering is a consulting firm providing high quality railway engineering and planning services to railroads, governmental agencies and private industry.

The specific portions of TPI's Opening Evidence that Mr. Crouch is sponsoring are (1) Part III-D-5 and Exhibit III-D-3 relating to the SARR maintenance-of-way-plan and annual expenses, and (2) the portions of Part III-F relating to the SARR's construction costs and roadbed preparation.

Mr. Crouch has served as a Track Supervisor and Project Engineer in the Maintenance of Way & Structures ("MW&S") Department of Norfolk Southern Railway ("NS"). He founded Crouch Engineering in 1991 and since that time has provided railway engineering services to numerous railroads and government agencies. He has been responsible for many track and bridge construction and rehabilitation projects across the United States, predominantly in the Eastern United States, in the Central and Southern Appalachian regions and elsewhere. His clients have included NS (for which he has designed over 30 capital projects), and over 150 short line and regional railroads, including many of the Pioneer, RailAmerica and Genesee and Wyoming railroads, East Tennessee Railway, Eastern Alabama Railway, South Central Tennessee Railroad, Knoxville & Holston River Railroad, South Central Florida Express, Alabama Gulf Coast Railroad, Nashville & Eastern Railroad, New England Central Railroad, Tennessee Southern Railroad, TennKen Railroad, Toledo, Peoria and Western Railroad, and the Kyle Railroad among others. He has conducted hundreds of on-site evaluations of railroad facilities to identify needed repairs or improvements; conducted engineering surveys and prepared plans, specifications and cost estimates for railroad capital construction projects, repairs and improvements; provided construction management and inspection services, including preparation and analysis of bid documents; and evaluated many new railroad routes for proposed construction or proposed line changes. Mr. Crouch has also designed many railroad locomotive and car repair facilities, including shops on the Connecticut Southern Railroad, San Luis & Rio Grande Railroad, South Carolina Central Railroad, Tennessee Southern Railroad, Alabama Gulf Coast Railroad, Franklin Industries Railroad, KWT Railway, and Knoxville & Holston River Railroad.

From 1977 to 1987, Mr. Crouch worked for Southern Railway and NS (after the merger of the Southern and Norfolk & Western Railroads) in the MW&S Department. He started with Southern Railway as a Coop Engineer in Industrial Development in 1977, and continued in that position through 1980. Mr. Crouch resumed service in 1982 with NS as a Management Trainee, and in 1983 was appointed Project Engineer in which position he was responsible for project management of railroad construction projects in Alabama, near Eastover, SC, and on NS's Appalachian Division which included mountainous areas in western Virginia and Tennessee. He was responsible for a variety of projects including construction of new connection tracks, sidings, yards, lead tracks, and assisted on a tunnel bypass, conversions from dark territory to CTC, and other projects.

From 1986 to 1987, Mr. Crouch was a Track Supervisor and was responsible for the inspection and maintenance of the NS main line trackage from Danville to a point near Richmond, VA, including track inspection, day-to-day supervision of work gangs, safety program, ordering material, budgeting, planning, and construction management for rehabilitation and maintenance of track and bridges. Mr. Crouch was qualified by NS as an FRA-qualified track inspector, and continues to perform inspections based on FRA track safety standards.

From 1988 to 1991, Mr. Crouch worked as a Graduate Research Assistant for Tennessee Tech, as an Environmental Engineer for the Tennessee Valley Authority, and as Project Manager for McCoy Associates, Inc., an engineering firm involved in bridge inspection, design, planning and project management and new railroad facility design. He founded Crouch Engineering in 1991. In addition to his U.S. consulting work, Mr. Crouch has worked on bridge evaluations in Canada, and on contractor requirements, bidding and negotiations for Freight Victoria's entire rail infrastructure (over 2,500 miles) in Australia. Mr. Crouch has also worked on a preliminary concept design of a 260-mile rail line in West Africa, including design for 286K for track and bridges, sidings, yards, and locomotive and car repair facilities.

Mr. Crouch received a Bachelor of Science in Civil Engineering from Tennessee Technological University in 1982 and a Master of Science in Civil Engineering from Tennessee Tech in 1989. Mr. Crouch is a registered Professional Engineer in more than 35 states. He is a member of the American Railway Engineering and Maintenance of Way Association (AREMA), the American Short Line and Regional Railroad Association, the American Society of Civil Engineers, and the National Society of Professional Engineers.

Mr. Crouch was assisted in preparing the SARR construction-cost evidence in Part III-F by various members of his firm, including in particular Kyle McKinney, EIT, who was primarily responsible for identifying and laying out the TPIRR's routes, Jerry H. Harris, Jr. who was responsible for track and roadbed costs and calculations; and Kevin N. Lindsey, P.E. in development of the SARR's bridge designs, bridge inspection needs, repair costs and maintenance-of-way plan.

VERIFICATION

I, Harvey A. Crouch, verify under penalty of perjury that I have read the Opening Evidence of Total Petrochemicals & Refining USA, Inc. in this proceeding that I have sponsored, as described in the foregoing Statement of Qualifications, that I know the contents thereof, and that the same are true and correct. Further, I certify that I am qualified and authorized to file this statement.

Harvey A. Crouch

Harvey A. Crouch

Executed on February 14, 2014

3. **THOMAS D. CROWLEY**

Mr. Crowley is an economist and President of L.E. Peabody & Associates, Inc., an economic consulting firm that specializes in solving economic, marketing, fuel supply and transportation issues. The Firm's offices are located at 1501 Duke Street, Suite 200, Alexandria, VA, 22314, 760 E. Pusch View Lane, Suite 150, Tucson, AZ 85737 and 7 Horicon Avenue, Glens Falls, NY 12801.

Mr. Crowley co-sponsored Part II-A with Witness Timothy D. Crowley in the market dominance phase of this proceeding. In this part of the Opening Evidence, he is co-sponsoring Part III-A with Witnesses Michael E. Lillis, Daniel L. Fapp and Sean D. Nolan. Mr. Crowley is also co-sponsoring Part III-G and Part III-H with Mr. Fapp.

Mr. Crowley is a graduate of the University of Maine from which he obtained a Bachelor of Science degree in Economics. He has also taken graduate courses in transportation at The George Washington University in Washington, D.C. He spent three years in the United States Army and has been employed by L.E. Peabody & Associates, Inc. since February, 1971. He is a member of the American Economic Association, the Transportation Research Forum, and the American Railway Engineering Association.

As an economic consultant, Mr. Crowley has organized and directed economic studies and prepared reports for railroads, freight forwarders and other carriers, shippers, associations, and state governments and other public bodies dealing with transportation and related economic and financial matters. Examples of studies in which he has participated include organizing and directing traffic, operational and cost analyses in connection with multiple car movements, unit train operations for coal and other commodities, freight forwarder facilities, TOFC/COFC rail facilities, divisions of through rail rates, operating commuter passenger service, and other studies dealing with markets and the transportation by different modes of various commodities from both eastern and western origins to various destinations in the United States. The nature of these studies has enabled Mr. Crowley to become familiar with the operating and accounting procedures utilized by railroads in the normal course of business.

Additionally, Mr. Crowley has inspected both railroad terminal and line-haul facilities used in handling general freight, intermodal and unit train movements of coal and other commodities in all portions of the United States. The determination of the traffic and operating characteristics for specific movements was based, in part, on these field trips.

In addition to utilizing the methodology for developing a maximum rail rate based on stand-alone costs, Mr. Crowley also presented testimony before the Interstate Commerce Commission ("ICC") in Ex Parte No. 347 (Sub-No. 1), *Coal Rate Guidelines - Nationwide*, the proceeding that established this methodology and before the Surface Transportation Board ("STB") in Ex Parte No. 657 (Sub-No. 1), *Major Issues In Rail Rate Cases*, the proceeding that modified the application of the stand-alone cost test. Mr. Crowley also presented testimony in a number of the annual proceedings at the STB to determine the railroad industry current cost of capital, i.e., STB Ex Parte No. 558, *Railroad Cost of Capital*. He has submitted evidence applying ICC (now the STB) stand-alone cost procedures in numerous rail rate cases. He has also developed and presented numerous calculations utilizing the various formulas employed by the ICC and STB (both Rail Form A and Uniform Railroad Costing System ("URCS")) to develop variable costs for rail common carriers. In this regard, Mr. Crowley was actively involved in the development of the URCS formula, and presented evidence to the ICC analyzing the formula in Ex Parte No. 431, *Adoption of the Uniform Railroad Costing System for Determining Variable Costs for the Purposes of Surcharge and Jurisdictional Threshold Calculations*.

As a result of his extensive economic consulting practice since 1971 and his participating in maximum-rate, rail merger, and rule-making proceedings before the ICC and the STB, Mr. Crowley has become thoroughly familiar with the operations, practices and costs of the rail carriers that move traffic over the major rail routes in the United States.

VERIFICATION

I, Thomas D. Crowley, verify under penalty of perjury that I have read the Opening Evidence of Total Petrochemicals & Refining USA, Inc. in this proceeding that I have sponsored, as described in the foregoing Statement of Qualifications, that I know the contents thereof, and that the same are true and correct. Further, I certify that I am qualified and authorized to file this statement.

Thomas D. Crowley

Executed on February 14, 2014

4. PHILIP H. BURRIS

Mr. Burris is Senior Vice President of L.E. Peabody & Associates, Inc., an economic consulting firm with offices in Alexandria, VA, Tucson, AZ and Glens Falls, NY.

The specific evidence Mr. Burris is co-sponsoring relates to the analysis of joint facilities costs in Part III-C with Brian A. Despard. He is also sponsoring the development of operating statistics, crew requirements, locomotive and freight car requirements, fuel costs, personnel compensation, equipment lease/maintenance costs, operating units cost, training and recruiting costs, ad valorem taxes, loss and damage expenses, insurance costs, intermodal lift costs, automotive handling costs and application of unit costs to operating statistics in Part III-D. Mr. Burris is also sponsoring the evidence related to the identification of land to be acquired through easements and the associated costs of that land (Part III-F-1).

Mr. Burris received his Bachelor of Science in Business Administration from Virginia Polytechnic Institute and State University in 1971. He was awarded a Master of Business Administration, specializing in transportation economics, from American University in 1978. Mr. Burris has worked in the consulting industry for more than 30 years. In addition to his current position as Senior Vice President of L.E. Peabody & Associates, Inc., Mr. Burris has been an employee of the following consulting firms: A. T. Kearney, Wyer Dick & Associates, Inc. and George C. Shaffer & Associates.

Mr. Burris has extensive experience in the field of transportation economics as it pertains to transportation supply alternatives, plant location analysis, regulatory policy and dispute resolution before regulatory agencies as well as state and federal courts. He has designed, directed and executed analyses of the costs of moving various commodities by different modes of transportation including rail, barge, truck, pipeline, ocean and intermodal. He has also performed economic analyses of maximum reasonable rate levels for the movement of coal and other commodities using the Board's CMP methodology, and specifically the stand-alone cost constraint. Mr. Burris has submitted evidence regarding maximum reasonable rate levels using the stand-alone cost constraint to the Board and its predecessor and testified before the Railroad Commission of Texas, the Colorado Public Utilities Commission, the Illinois Commerce Commission, the Public Service Commission of Nevada and various state and federal courts and arbitration panels.

In the public sector, Mr. Burris has performed studies and written draft reports for the Railroad Accounting Principles Board, an independent body created by Congress to establish cost accounting principles for use in implementing the regulatory provisions of the Staggers Act of 1980.

Since 2005, Mr. Burris has served as a member of the Board of Directors of the South Central Florida Express Railroad, a wholly owned subsidiary of United States Sugar Corporation.

VERIFICATION

I, Philip H. Burris, verify under penalty of perjury that I have read the Opening Evidence of Total Petrochemicals & Refining USA, Inc. in this proceeding that I have sponsored, as described in the foregoing Statement of Qualifications, that I know the contents thereof, and that the same are true and correct. Further, I certify that I am qualified and authorized to file this statement.

Philip H. Burris

Executed on February 14, 2014

5. **CHARLES A. STEDMAN**

Mr. Stedman is a Vice President of L. E. Peabody & Associates, Inc., headquartered in Alexandria, VA.

The specific evidence Mr. Stedman is co-sponsoring relates to the development of the SARR system (Part III-B) and the roadbed preparation/earthworks component of the road property investment cost of the SARR, exclusive of culverts, roadbed specifications and yard drainage (Part III-F-2). Mr. Stedman is also sponsoring the development of SARR route and track miles (Part III-B).

Mr. Stedman has been employed by L. E. Peabody & Associates, Inc. since October 1981. Since that time, he has performed and directed numerous extensive projects and analyses undertaken on behalf of utility companies, short line railroads, state and local governments and entrepreneurs. These projects include: (a) participation in the development of variable cost evidence presented to the ICC and the Board in numerous cases; (b) the development of variable costs contained in numerous reports and other analyses presented to clients; (c) the development of stand-alone cost evidence presented to the ICC and the Board in numerous cases; (d) the development of evidence in abandonment cases before the ICC; (e) the development of net liquidation values and rehabilitation costs for interested parties in abandonments and acquisitions; and (f) the preliminary design (including route layout), construction and maintenance costs associated with the construction of a new rail line.

Prior to joining L. E. Peabody & Associates, Inc., Mr. Stedman was employed by the United States Railway Association ("USRA") where he monitored the effectiveness of the operating plan of Consolidated Rail Corporation ("Conrail") using a computer model, participated in data manipulation and analyzed results in order to make projections about Conrail's future operations.

Mr. Stedman also worked as the chief research assistant on a transportation project for the Maryland Department of Transportation and was the co-author of the resulting Report "International Air Cargo Potential at Baltimore-Washington International Airport." Recommendations in this Report were used to increase international air cargo shipment volumes through Baltimore-Washington International Airport. And, as a research assistant for the ICC, Mr. Stedman studied the effect of selected railroad mergers on the national railroad system using a computer model to aid in determining shifts in traffic patterns caused by specific rail mergers.

Mr. Stedman is a graduate of the University of Maryland where he obtained a Bachelor of Arts degree in Political Science with a minor in Business Transportation. He has attended numerous railroad construction and maintenance seminars across the country and is a Certified Track Foreman and a member of the American Railway Engineering and Maintenance-of-Way Association.

Mr. Stedman has conducted several field inspections of eastern and western carriers' rail lines in order to develop and determine the existing and potential operating and economic conditions of these lines. He has also conducted and directed detailed research into the valuation records of major eastern and western railroads. This research entailed, among other things, detailed reviews of both ICC and railroad valuation maps, land acquisition records (including title status and market value) and the ICC's Bureau of Valuation B.V. Form No. 561, commonly referred to as the ICC Engineering Reports.

VERIFICATION

I, Charles A. Stedman, verify under penalty of perjury that I have read the Opening Evidence of Total Petrochemicals & Refining USA, Inc. in this proceeding that I have sponsored, as described in the foregoing Statement of Qualifications, that I know the contents thereof, and that the same are true and correct. Further, I certify that I am qualified and authorized to file this statement.

Charles A. Stedman

Executed on February 14, 2014

6. **MICHAEL E. LILLIS**

Mr. Lillis is a Vice President of L.E. Peabody & Associates, Inc., an economic consulting firm that specializes in solving economic, marketing, and transportation problems. The Firm's offices are located at 1501 Duke Street, Suite 200, Alexandria, VA, 22314, 760 E. Pusch View Lane, Tucson, AZ 85737 and 7 Horicon Avenue, Glens Falls, NY 12801.

Mr. Lillis is co-sponsoring the portions of Part III-A related to the development of CSXT traffic data and the selection of the SARR traffic group including the identification of traffic volumes and associated traffic revenues available to the SARR with Thomas D. Crowley.

Mr. Lillis received a Bachelor of Arts degree in economics from the University of Virginia in 1985. He has taken continuing education courses in law at the University of Virginia and has taken numerous graduate courses while enrolled in the MBA program at George Washington University.

Mr. Lillis has been employed by L.E. Peabody & Associates, Inc. since 1995. Prior to joining L. E. Peabody & Associates, Inc., Mr. Lillis worked for Western Fuels Association, Inc., ("WFA") a national fuel supply organization in the electric utility industry. While with WFA, he managed coal supply and rail transportation agreements for shippers that represented the membership of WFA. He organized and presented numerous economic studies and analyses for shippers relating to coal transportation, coal supply and related economic and regulatory problems. Mr. Lillis has negotiated, implemented and monitored both long term and short term coal supply and rail transportation agreements. Mr. Lillis has conducted field trips to coal suppliers in Wyoming's Powder River Basin and New Mexico's San Juan Basin to develop on-site information used in the quantification of contract provisions and the development of operational mine costs.

While at L.E. Peabody & Associates, Inc., Mr. Lillis has participated in studies that utilize various formulas employed by the Surface Transportation Board ("STB") in the development of costs for common carriers, including the Uniform Railroad Costing System ("URCS"). He has developed variable costs for common carriers with particular emphasis on the general purpose costing system for rail carriers. Mr. Lillis has also performed extensive analyses in the area of stand-alone costing including route layout, design and construction costs, traffic and revenue development, forecasting and the development of detailed operating plans for various stand-alone railroads.

As part of his work at L.E. Peabody & Associates, Inc., Mr. Lillis conducted numerous studies for electric utilities regarding least cost alternatives for coal and natural gas delivery to various power plants. These studies included the valuation of existing contractual arrangements for fuel supply and transportation service, the evaluation of alternative fuel sources and transportation options (including trucking coal from nearby railroad locations, rail build-out to a competing railroad and conveyor delivery) and the development of operating characteristics and the associated operating and investment costs for each alternative. He has also developed numerous forecasts of coal prices, natural gas prices, freight rates and general economic indicators for electric utilities.

VERIFICATION

I, Michael E. Lillis, verify under penalty of perjury that I have read the Opening Evidence of Total Petrochemicals & Refining USA, Inc. in this proceeding that I have sponsored, as described in the foregoing Statement of Qualifications, that I know the contents thereof, and that the same are true and correct. Further, I certify that I am qualified and authorized to file this statement.

Michael E. Lillis

Michael E. Lillis

Executed on February 14, 2014

7. **DANIEL L. FAPP**

Mr. Fapp is a Vice President of L.E. Peabody & Associates, Inc., an economic consulting firm that specializes in solving economic, transportation, marketing, and fuel supply problems. The Firm's offices are located at 1501 Duke Street, Suite 200, Alexandria, VA, 22314, 760 E. Pusch View Lane, Tucson, AZ 85737 and 7 Horicon Avenue, Glens Falls, NY 12801.

Mr. Fapp is co-sponsoring the SARR revenue evidence in Part III-A along with the discounted cash flow modeling evidence and stand alone cost results (Part III-G and Part III-H, respectively) with Mr. Thomas D. Crowley. He is also co-sponsoring the RTC modeling component of Part III-C with Timothy D. Crowley and William H. Humphrey.

Mr. Fapp received a Bachelor of Science degree in Business Administration with an option in Marketing (cum laude) from the California State University, Northridge in 1987. In 1993, he received a Master of Business Administration degree specializing in finance and operations management from the University of Arizona's Eller College of Management. Mr. Fapp has lectured in graduate level finance and economics classes discussing corporate capital theory and costs of equity determination, and is a member of the Professional Advisory Council for the Eller School of Management Finance Department at the University of Arizona. He is also a member of Beta Gamma Sigma, the national honor society for collegiate schools of business.

Mr. Fapp has been employed by L. E. Peabody & Associates, Inc. since December 1997. Prior to joining L. E. Peabody & Associates, Inc., he was employed by BHP Copper Inc. in the role of Transportation Manager - Finance and Administration, where he also served as an officer of the three BHP Copper Inc. subsidiary railroads: The San Manual Arizona Railroad, the Magma Arizona Railroad (also known as the BHP Arizona Railroad) and the BHP Nevada Railroad. Mr. Fapp has also held operations management positions with Arizona Lithographers in Tucson, AZ and MCA-Universal Studios in Universal City, CA.

While at BHP Copper Inc., Mr. Fapp was responsible for all financial and administrative functions of the company's transportation group. He also directed the BHP Copper Inc. subsidiary railroads' cost and revenue accounting staff, and managed the San Manuel Arizona Railroad's and BHP Arizona Railroad's dispatchers and dispatching functions ensuring safe and efficient operations. He served on the company's Commercial and Transportation Management Team and the company's Railroad Acquisition Team, where he was responsible for evaluating the acquisition of new railroads, including developing financial and economic assessment models. During his time with MCA-Universal Studios, Mr. Fapp held several operations management positions, including Operations Manager, where his duties included vehicle routing and scheduling, personnel scheduling, forecasting facilities utilization, and designing and performing queuing analyses and simulations.

As part of his work for L.E. Peabody & Associates, Inc., Mr. Fapp has performed and directed numerous projects and analyses undertaken on behalf of utility companies, short line railroads, bulk shippers, and industry and trade associations. Examples of studies which he has organized and/or directed include, traffic, operational and cost analyses in connection with the rail movement of coal, metallic ores, pulp and paper products, and other commodities. He has also analyzed multiple car movements, unit train operations, divisions of through rail rates and switching operations throughout the United States. The nature of these studies enabled him to become familiar with the operating procedures utilized by railroads in the normal course of business.

Since 1997, Mr. Fapp has participated in the development of cost of service analyses for the movement of coal over the major eastern and western coal-hauling railroads. He has conducted on-site studies of switching, detention and line-haul activities relating to the handling of coal. He has also participated in and managed several projects assisting short-line railroads. In these engagements, he assisted short-line railroads in their negotiations with connecting Class I carriers, performed railroad property and business evaluations, and worked on rail line abandonment projects.

Mr. Fapp has been frequently called upon to perform financial analyses and assessments of Class I, Class II and Class III railroad companies. In addition, he has developed various financial models exploring alternative methods of transportation contracting and cost assessment, developed corporate profitability and cost studies, and evaluated capital expenditure requirements. He has also determined the Going Concern Value of privately held freight and passenger railroads, including developing company specific costs of debt and equity for use in discounting future company cash flows.

His consulting assignments regularly involve working with and determining various facets of railroad financial issues, including cost of capital determinations. In these assignments, Mr. Fapp has calculated railroad capital structures, market values, cost of railroad debt, cost of preferred railroad equity and common railroad equity. He is also well acquainted with and has used the commonly accepted models for determining a firm's cost of equity, including single-stage and multi-stage Discounted Cash Flow models ("DCF"), Capital Asset Pricing Model ("CAPM"), Farma-French Three Factor Model and Arbitrage Pricing Model.

In his tenure with L. E. Peabody & Associates, Inc., Mr. Fapp has assisted in the development and presentation of traffic and revenue forecasts, operating expense forecasts, and DCF, which were presented in numerous proceedings before the STB. He presented evidence applying the STB's stand-alone cost procedures in a number of rail proceedings before the STB. He has also presented evidence before the STB in numerous proceedings, including, but not limited to, Ex Parte No. 661, *Rail Fuel Surcharges,* Ex Parte No. 664, *Methodology To Be Employed In Determining the Rail Road Industry's Cost of Capital,* Ex Parte No. 664 (Sub-No. 1), *Use Of A Multi-Stage Discounted Cash Flow Model In Determining The Railroad Industry's Cost of Capital*, Ex Parte No. 558 (Sub-No. 13), *Railroad Cost of Capital – 2009*, Ex Parte No. 661 (Sub No. 14), *Railroad Cost of Capital – 2010,* and Ex Parte No. 715, *Rate Regulation Reforms.* In addition, his reports have been used as evidence before the Nevada State Tax Commission.

VERIFICATION

I, Daniel L. Fapp, verify under penalty of perjury that I have read the Opening Evidence of Total Petrochemicals & Refining USA, Inc. in this proceeding that I have sponsored, as described in the foregoing Statement of Qualifications, that I know the contents thereof, and that the same are true and correct. Further, I certify that I am qualified and authorized to file this statement.

Daniel L. Fapp

Executed on February 14, 2014

8. ROBERT D. MULHOLLAND

Mr. Mulholland is a Vice President of L.E. Peabody & Associates, Inc., an economic consulting firm that specializes in solving economic, marketing, and transportation problems. The Firm's offices are located at 1501 Duke Street, Suite 200, Alexandria, VA, 22314, 760 E. Pusch View Lane, Tucson, AZ 85737 and 7 Horicon Avenue, Glens Falls, NY 12801.

Mr. Mulholland is sponsoring the development of the base year and peak period train lists in Part III-C with Timothy D. Crowley.

Mr. Mulholland received a Bachelor's degree in Government & Legal Studies from Bowdoin College in 1995. In 2004, he received a Master's degree in Transportation Policy, Operations & Logistics from George Mason University's School of Public Policy. Mr. Mulholland was employed by L.E. Peabody & Associates, Inc. from 1995 through 2004 and rejoined the Firm in 2008.

Mr. Mulholland has directed and conducted economic studies and prepared reports for freight carriers, shippers, federal agencies, the U.S. Congress, and other public bodies dealing with freight transportation and related economic issues. As part of his work for L.E. Peabody & Associates, Inc., Mr. Mulholland has developed evidence containing base year traffic and revenue data and forecasts of those volumes and revenues for hypothetical stand-alone railroads in several Surface Transportation Board ("STB" or "Board") proceedings dealing with the calculation of maximum reasonable rail transportation rates for coal and chemical shippers. Mr. Mulholland has presented written testimony before the STB in an Ex Parte proceeding related to the inclusion of cross-over traffic and the development of revenue divisions for that traffic in rate reasonableness proceedings. He also presented written testimony before the Board in a separate Ex Parte proceeding related to proposed adjustments to the STB's Uniform Railroad Costing System ("URCS") mode. Mr. Mulholland has developed evidence and presented written testimony containing fuel cost calculations for multiple commodities in an STB proceeding dealing with the determination of reasonable practices related to fuel surcharges.

Mr. Mulholland has conducted analyses of historical and forecasted rail transportation rates based on contract and tariff provisions and U.S. Government economic data for use in rail transportation contract negotiations. He has developed studies analyzing delivered fuel prices to electric utilities using Federal Energy Regulatory Commission ("FERC"), Energy Information Administration ("EIA"), and related data. Mr. Mulholland conducted studies forecasting the impact of the Union Pacific-Southern Pacific merger on shippers with reduced access to rail competition following the merger, and developed studies analyzing the impact of the 1997-1998 Union Pacific Railroad service crisis on system traffic flows and transit times. He has organized and directed multiple traffic operations and cost analyses in connection with rail facilities analyses and rate and revenue division analyses.

Mr. Mulholland has developed a series of reports evaluating and critiquing the Federal Railroad Administration's ("FRA") benefit-cost analyses (BCA") related to the implementation of Positive Train Control ("PTC") systems on the Class I carriers' rail systems. He has developed economic and operational studies relative to the rail transportation of coal, grain, chemicals, and crude oil on behalf of various shippers, including analyses of the relative efficiency and costs of railroad operations over multiple routes. He has supported the negotiation of transportation contracts between coal shippers and railroads. He has developed numerous variable cost calculations utilizing the various formulas employed by the STB for the development of variable costs for common carriers, with particular emphasis on the basis and use of the URCS model.

From 2004 to 2006, Mr. Mulholland directed the freight economics and freight infrastructure delivery programs for the Office of Freight Management & Operations of the Federal Highway Administration ("FHWA"). While employed at FHWA, Mr. Mulholland was a member of the United States Department of Transportation ("USDOT") inter-agency working group that drafted the National Freight Policy. In addition, Mr. Mulholland served on the USDOT Freight Gateway Team, a group headed by the Undersecretary for Policy and composed of one representative from each of the surface modal agencies.

From 2006 to 2008, Mr. Mulholland was employed by ICF International, where he directed and conducted numerous analyses of the trucking and rail industries for Federal transportation agencies including the Federal Motor Carrier Safety Administration ("FMCSA"), the FRA, and the FHWA. His work included analyses of the current rail and trucking industries and forecasts of future trends in both industries.

VERIFICATION

I, Robert D. Mulholland, verify under penalty of perjury that I have read the Opening Evidence of Total Petrochemicals & Refining USA, Inc. in this proceeding that I have sponsored, as described in the foregoing Statement of Qualifications, that I know the contents thereof, and that the same are true and correct. Further, I certify that I am qualified and authorized to file this statement.

Robert D. Mulholland

Executed on February 14, 2014

9. TIMOTHY D. CROWLEY

Mr. Crowley is a Vice President of L.E. Peabody & Associates, Inc., an economic consulting firm that specializes in solving economic, marketing, and transportation problems. The Firm's offices are located at 1501 Duke Street, Suite 200, Alexandria, VA, 22314, 760 E. Pusch View Lane, Tucson, AZ 85737 and 7 Horicon Avenue, Glens Falls, NY 12801.

Mr. Crowley co-sponsored TPI's opening quantitative market dominance evidence in Part II-A with Mr. Thomas D. Crowley. In this part of the Opening Evidence, he is sponsoring the non-road property investment in Part III-E and is coordinating the workpaper production of all electronic files in accordance with the Surface Transportation Board's ("STB") March 12, 2001 decision in Ex Parte No. 347 (Sub-No. 3), *General Procedures For Presenting Evidence in Stand-Alone Cost Rate Cases*. He is also co-sponsoring the RTC modeling component of Part III-C with Mr. Daniel L. Fapp and Mr. William H. Humphrey, the development of the peak train list with Mr. Robert D. Mulholland in Part III-C as well as the roadbed preparation/earthworks component of the road property investment cost of the SARR in Part III-F with Mr. Charles A. Stedman.

Mr. Crowley received a Bachelor of Science degree in Management with a concentration in Finance from Boston College in 2001. He graduated cum laude. He has been employed by L.E. Peabody & Associates, Inc. since 2002.

Mr. Crowley has provided analytical support for both market place and litigation projects sponsored by L. E. Peabody & Associates, Inc. The analytical support included the gathering, review and manipulation of data from the major Class I railroads, the STB and various other government and public sources. Specifically, the analyses conducted by Mr. Crowley have included the development of the transportation costs associated with the movement of chemicals, coal and other products to different destinations located throughout the country.

Mr. Crowley has also assisted in developing the return on road property investment realized by major western railroads for specific sections of rail. These studies were used in variable, avoidable, and stand-alone cost analyses. He has forecasted transportation revenues included in transportation contracts entered into by major companies, taking into account the escalation factors used in specific contracts. Additionally, Mr. Crowley has reviewed virtually all major transportation coal contracts between eastern and western railroads and the major consumers of coal in the United States. The results of this review were presented to the STB.

Mr. Crowley has experience with the STB's Simplified Standards For Rail Rate Cases issued in Ex Parte 646 (Sub No. 1). He has done extensive work with the revised guidelines for non-coal proceedings, which incorporates a three benchmark methodology. The three benchmark methodology includes calculations using revenue shortfall allocation method ("RSAM"), in which Mr. Crowley was trained by members of the STB. Mr. Crowley also has extensive experience with the STB's recently revised full stand alone cost procedures having developed and sponsored evidence in a number of recent maximum reasonable rate cases based on this constraint.

VERIFICATION

I, Timothy D. Crowley, verify under penalty of perjury that I have read the Opening Evidence of Total Petrochemicals & Refining USA, Inc. in this proceeding that I have sponsored, as described in the foregoing Statement of Qualifications, that I know the contents thereof, and that the same are true and correct. Further, I certify that I am qualified and authorized to file this statement.

Timothy D. Crowley

Executed on February 14, 2014

10. SEAN D. NOLAN

Mr. Nolan is a Vice President of L. E. Peabody & Associates, Inc. an economic consulting firm with offices in Alexandria, VA, Tucson, AZ and Glens Falls, NY.

Mr. Nolan is co-sponsoring the forecasting aspects of TPI's Part III-A with Mr. Thomas D. Crowley.

Mr. Nolan received a Bachelor of Arts degree in Psychology with a minor in Economics from Bates College in 1988, and a Master of Business Administration degree from the University of Phoenix in 2006, specializing in managerial accounting. Mr. Nolan first joined the firm of L. E. Peabody & Associates, Inc. in November 1989.

Since 1989, Mr. Nolan participated in the development of cost of service analyses for the movement of coal over the major eastern and western coal-hauling railroads and he has conducted on-site studies of switching, detention and line-haul activities relating to the handling of coal. He has also participated in several projects providing potential build-out opportunities as effective competition in utilities' fuel procurement initiatives. Procurement initiatives have included the purchasing of fuel, transportation services, equipment, and management of inventories. Alternative scenarios have been supported by tailored financial models developed to estimate cost reductions and savings, actual versus budgeted variances, revenue to variable cost of service relationships, cash flows, and break-even and sensitivity analysis.

In his tenure with L. E. Peabody & Associates, Inc., Mr. Nolan collected and analyzed information needed to efficiently calculate rail costs utilizing the Surface Transportation Board's ("STB") Uniform Railroad Costing System ("URCS") to determine the maximum rate a captive shipper should pay based on the STB's constrained market pricing principles, and has supported the development and presentation of traffic and revenue forecasts, operating expense forecasts, and discounted cash-flow models presented in proceedings before the STB.

Mr. Nolan has previously submitted evidence to the STB regarding market dominance issues.

VERIFICATION

I, Sean D. Nolan, verify under penalty of perjury that I have read the Opening Evidence of Total Petrochemicals & Refining USA, Inc. in this proceeding that I have sponsored, as described in the foregoing Statement of Qualifications, that I know the contents thereof, and that the same are true and correct. Further, I certify that I am qualified and authorized to file this statement.

Sean D Nolan

Sean D. Nolan

Executed on February 14, 2014

11. WILLIAM H. HUMPHREY

Mr. Humphrey is a Vice President of L. E. Peabody & Associates, Inc.

Mr. Humphrey is co-sponsoring TPI's Opening evidence in Part III-C related to the simulation of the SARR's operations using the Rail Traffic Controller ("RTC") Model with Daniel L. Fapp and Timothy D. Crowley.

Mr. Humphrey received a Bachelor of Science degree in Sociology with a minor in Computer Science from Boston College in 2001. He has been employed by L. E. Peabody & Associates, Inc. since 2002.

Mr. Humphrey has been the lead programmer for numerous cases utilizing the industry-standard RTC Model to simulate various real-world railroad operations over multiple railroads in all parts of the United States. He was the lead RTC programmer in the first maximum reasonable rate case based on the stand-alone cost constraint that required the use of the RTC Model (*Ottertail v. BNSF*). Mr. Humphrey has extensive experience modeling RTC in rate cases as well as to create and analyze railroad systems for capacity analyses, infrastructure investment analyses, and various other purposes.

Mr. Humphrey has developed Microsoft Visual Studio applications including the Railroad Operations Simulator ("ROS") program used to model railroad operations by using advanced physics models which utilize highly detailed track information, train specific train characteristics, and detailed operational guidelines. He has designed programs that update, analyze, and summarize data originating at the Energy Information Administration. Mr. Humphrey has written programs that organize, analyze, manipulate, and summarize mainframe databases containing various industry data.

Mr. Humphrey has provided analytical support for testimony sponsored by L. E. Peabody & Associates, Inc. through the gathering and manipulation of data originating at the Energy

Information Administration, the Surface Transportation Board, the Federal Railroad Administration and other publicly available sources. Specifically, these analyses include the development of the delivered costs of fuels to electric utilities and development of detailed track statistics for various railroads located throughout the United States. Mr. Humphrey has conducted extensive research which has been used to support both fuel supply and transportation analyses developed by L. E. Peabody & Associates, Inc.

VERIFICATION

I, William H. Humphrey, verify under penalty of perjury that I have read the Opening Evidence of Total Petrochemicals & Refining USA, Inc. in this proceeding that I have sponsored, as described in the foregoing Statement of Qualifications, that I know the contents thereof, and that the same are true and correct. Further, I certify that I am qualified and authorized to file this statement.

William H. Humphrey

Executed on February 14, 2014

12. BRIAN A. DESPARD

Mr. Despard is a Vice President of L. E. Peabody & Associates, Inc. an economic consulting firm with offices in Alexandria, VA, Tucson, AZ and Glens Falls, NY.

Mr. Despard is co-sponsoring TPI's Opening evidence related to the analysis of joint facilities costs in Part III-C Mr. Philip H. Burris.

Mr. Despard earned a Bachelor of Science degree in Economics with a minor in Decision Sciences from George Mason University in 1989. Mr. Despard was employed by L.E. Peabody & Associates, Inc. from 1987 through 1997 and rejoined the Firm in 2013.

Mr. Despard has over 25 years of experience solving economic and marketing challenges related to transportation and energy. He has experience studying and modeling energy markets and regulatory policy for electric utilities and independent power producers. Mr. Despard has submitted testimony in cases before the Interstate Commerce Commission and has been involved in settlement proceedings before the Federal Energy Regulatory Commission.

Mr. Despard has been involved with optimizing value around electric generating assets both as a consultant and as a manager, having assessed and managed value around coal-fired generation and natural gas-fired generation. He has specific experience with, and held oversight responsibility for unit bidding and dispatch, trading, origination, fuel supply and transportation, contract management, regulatory affairs and strategic analysis. Mr. Despard has also led economic studies of power asset options available for meeting compliance with existing and potential SO_2, NO_X and CO_2 emissions requirements.

As an economic consultant, Mr. Despard provided electric utilities with coal supply and coal transportation contract valuation, structuring and negotiation support through the modeling of contract value and risk. He also assessed coal and natural gas markets for electric utility clients. In addition, he supported electric utilities and petrochemical companies in litigation through the economic valuation of fuel supply agreements, rail transportation contracts and regulatory standards.

Prior to rejoining L. E. Peabody & Associates, Inc. in 2013, Mr. Despard was Vice President, Asset Management at Dynegy, Inc. where he managed commercial staff with responsibility for optimizing gross margin from up to 4,000 MW of electric generation assets, including base load coal, natural gas combined-cycle and natural gas peaking assets. His key responsibilities included meeting profitability targets for the portfolio of generating assets through asset optimization and hedging, reporting region profits/losses to senior management, identifying and implementing strategic actions to increase long-term asset values and monitoring/interpreting regulatory policy impacts on profitability. Prior to his work at Dynegy, Mr. Despard was Manager, Financial Analysis at Tennessee Valley Authority ("TVA"), where he managed a team of analysts within the CFO organization that supported corporate decision making through financial analysis of contracts, assets and capital additions. As a fuel supply analyst at TVA, he supported natural gas procurement with evaluation of markets for supply and pipeline transport.

VERIFICATION

I, Brian A. Despard, verify under penalty of perjury that I have read the Opening Evidence of Total Petrochemicals & Refining USA, Inc. in this proceeding that I have sponsored, as described in the foregoing Statement of Qualifications, that I know the contents thereof, and that the same are true and correct. Further, I certify that I am qualified and authorized to file this statement.

Brian A. Despard

Executed on February 14, 2014

13. GARY V. HUNTER

Mr. Hunter is the Chairman and Chief Executive Office of Railroad Industries Incorporated ("RII"), a full-service transportation and rail consulting firm that assists railroads, shippers, cities, states, investors, individuals, banks and other clients with planning and development projects involving all aspects of management and operations. His business address is 1575 Delucchi Lane, Reno, NV, 89502.

Mr. Hunter is co-sponsoring the portions of TPI's Opening Evidence that relate to the TPIRR's General and Administrative ("G&A") personnel and expenses (Part III-D).

Mr. Hunter founded RII in 1983. Since that time he has conducted branch line analyses and equipment utilization analyses; developed operating plans; conducted market development, transportation costing, and intermodal analyses; engaged in merger studies; developed short line railroads; and performed financial analyses for various railroad clients.

Prior to founding RRI, Mr. Hunter was employed by the Arkansas Midland Railroad. He served as Arkansas Midland's General Manager from 1993 to 1994. As General Manager, Mr. Hunter was responsible for the short line's overall operation, including its 131 miles of track, 37 employees, and 21,000 annual carloads. Numerous departments, such as the maintenance-of-way, maintenance-of-equipment, operations, marketing and agency departments (essentially all departments involved in performing G&A functions), reported to Mr. Hunter. Additionally, Mr. Hunter was responsible for all purchasing activities and real estate transactions.

Prior to joining Arkansas Midland, Mr. Hunter was a consultant for Transportation Marketing Services, Inc. from 1987 to 1989. As a consultant, Mr. Hunter was responsible for achieving the firm's revenue and profit objectives, as directed by the President. His duties included market development, strategic planning, equipment analysis, physical distribution analysis, branch line acquisition analysis, competitive analysis, market research, contract rate negotiations, sales development, operations analysis, financial analysis, and business plan development. Additionally, Mr. Hunter prepared testimony, traffic and revenue projections diversion estimates, and traffic flow analyses for the Anschutz Corporation and Rio Grande Industries in their acquisition of the Southern Pacific Transportation Company ("SP"). He also assisted Philip Anschutz in developing the staffing plan (both operating and G&A) for the combined SP and Denver & Rio Grande Western systems after their merger.

From 1981 to 1987, Mr. Hunter worked in the SP's Marketing Service Department, Intermodal Department, and Market Planning Department. In the Marketing Services Department, Mr. Hunter was responsible for achieving revenue and profit objectives as directed by the Assistant Vice President – Marketing Services. He developed agreements with other railroads; cultivated a network of short-haul TOFC trains; and evaluated the competitive environment and implications for the corporation. In the Intermodal Department, Mr. Hunter was responsible for special studies on all aspects of domestic and international TOFC and container traffic as directed by the Assistant Vice President-Intermodal. He engaged in contract development and negotiations, cost development and analysis; and market and pricing development and analysis. In the Market Planning Department, Mr. Hunter was responsible for the market development and pricing of the aggregate and cement commodities. His duties included forecasting and analyzing product markets aimed at expanding market share, reducing operating costs, and increasing profit margin. Additional responsibilities included contract negotiations, cost analysis and development, and equipment allocation and acquisition decisions. Mr. Hunter also became Group Manager of marketing programs, in which capacity he was responsible for special projects, feasibility studies, merger work, branch line analysis, and worked closely with the marketing organization.

In 1976, Mr. Hunter joined the Western Pacific Railroad's Transportation Department where he worked until 1981. Jobs included Assistant Trainmaster and Trainmaster, and he also was the Operating Department's Budget Officer. His responsibilities at Western Pacific included projecting and monitoring an annual system operating budget of $70 million; conducting in-depth analyses of operating expenses; coordinating with line managers to determine individual terminal and districts with overall system forecasts; presenting budget variances to the Vice President-Operations and providing guidelines and requirements for programming departmental reports.

Mr. Hunter received his Bachelor of Arts degree in Business, Transportation, and Real Estate from San Francisco State University in 1976. He received his Master's Degree in Business Administration ("MBA") from San Francisco State University in 1979 and was selected as MBA "Alumnus of the Year" in 1980.

VERIFICATION

I, Gary V. Hunter, verify under penalty of perjury that I have read the Opening Evidence of Total Petrochemicals & Refining USA that I am sponsoring, as described in the foregoing Statement of Qualifications, that I know the contents thereof, and that the same are true and correct based on my knowledge, information, and belief. Further, I certify that I am qualified and authorized to file this statement.

Gary V. Hunter

Executed on February 14, 2014

14. JOSEPH A. KRUZICH

Mr. Kruzich is President of J&A Business Consulting, Inc., a firm specializing in information technology and communications. His business address is 209 Violet Drive, Sanibel, FL 33957.

Mr. Kruzich is sponsoring evidence related to the SARR's information technology capital (hardware) and personnel requirements and other expenses for the SARR (Part III-D).

Mr. Kruzich has 38 years of experience in railroad accounting, executive administration and information technology. He began his railroad career with the Chicago, Burlington and Quincy Railroad in 1963 as a tax accountant and was promoted to an internal auditor in 1965. In June of 1968, he joined the Atchison, Topeka and Santa Fe Railroad ("ATSF") as a manager of work control procedures. His job responsibilities included reviewing various work procedures and providing recommendations on how the work processes could be improved to achieve a high degree of efficiency. This position provided him an opportunity to become very familiar with various work processes involved in running a railroad.

From 1973 through 1994, Mr. Kruzich held various positions of increasing responsibility at ATSF and its parent. As Acting Controller of Santa Fe Air Freight Company and head of industrial engineering at ATSF he performed various efficiency studies in the operating, engineering and mechanical departments. Mr. Kruzich also held the position of Director of Budgets for the entire ATSF operating department including engineering, mechanical, transportation and all support groups, and as such was responsible for coordination of all information technology issues with the Information Systems Department that related to the Operating Department. He was responsible for all administration duties related to the Vice President of Operations office as General Director of Administration and as Assistant to the President of ATSF. As Assistant Vice President of Administration in the Information

Technology Group he oversaw all budget, administration, special studies and corporate measurements systems. These positions provided him with the opportunity to manage a complete process in developing new systems from beginning to end.

In 1995, Mr. Kruzich joined the Kansas City Southern Railway as Vice President of Administration, where he designed profitability, corporate measurement, revenue forecasting and corporate policy systems. In January 1997, he was promoted to Vice President Telecommunications and CIO. As CIO, Mr. Kruzich led the effort in developing the state-of-the-art railroad transportation system known as MCS ("Management Control System"). This system uses some of the most advanced technology such as MQ workflow, Citrix Metaframe, the latest version of Visual Basic and many other technologies and is designed around the business process.

In January 2000, Mr. Kruzich left the Kansas City Southern Railway and formed Forging Ahead Associates, LLC, recently renamed J&A Business Consulting, Inc. This company provides state-of-the-art services in the areas of strategic planning and the development of web sites and e-business initiatives, evaluates the benefits of outsourcing information technology and business processes, and works with clients to make the initial contacts in developing global market opportunities.

Mr. Kruzich graduated from Northeast Missouri State University (Truman University) in 1962 with a Bachelor of Science degree in Business. In 1984, he received a Masters of Business Administration in Finance from the Keller Graduate School of Management in Chicago, Illinois.

VERIFICATION

I, Joseph A. Kruzich, verify under penalty of perjury that I have read the Opening Evidence of Total Petrochemicals & Refining USA, Inc. in this proceeding that I have sponsored, as described in the foregoing Statement of Qualifications, that I know the contents thereof, and that the same are true and correct. Further, I certify that I am qualified and authorized to file this statement.

Joseph A. Kruzich

Executed on February 03, 2014

15. **KEVIN N. LINDSEY P.E.**

Mr. Lindsay is currently the Director of Engineering – Structural Projects for Crouch Engineering, P.C. His business address is 428 Wilson Pike Circle, Brentwood, TN 37027. Crouch Engineering is a consulting firm providing high quality railway engineering and planning services to railroads, governmental agencies and private industry.

Mr. Lindsey is co-sponsoring TPI's Opening Evidence along with Mr. Harvey A. Crouch in Part III-D-5 and Exhibit III-D-3 relating to the SARR maintenance-of-way-plan and annual expenses, and the portion of Part III-F relating to the SARR's bridge design, bridge inspection needs and bridge repair costs.

Mr. Lindsey received a Bachelor of Science degree in Civil Engineering with an emphasis in Structures from Tennessee Technological University in 2000. Mr. Lindsey has nearly two decades of experience as Project Manager, Project Engineer, and Director of Engineering – Structures, for Crouch Engineering. He has inspected thousands of railroad bridges, managed bridge safety plans for many railroads, designed may concrete and steel railroad bridges, and reviewed and critiqued plans for compliance with the company's design standards.

Mr. Lindsey conducts annual bridge inspections, develops load ratings, bridge reports and plans and executes railroad bridge rehabilitation and replacement programs for many railroads across the U.S. He was the Project Manager for inspecting and load rating over 300 bridges on the New England Central Railroad, and is the Project Manager for annual bridge inspection and rehabilitation programs for ten (10) Railroad Authorities in Tennessee.

Mr. Lindsey has designed numerous reinforced concrete, pre-stressed concrete, and steel railroad bridges, including deck girder and through plate girder bridges, and has worked on design and rehabilitation for hundreds of timber, steel and concrete bridges, predominantly in the eastern United States, but also in western states for shortline and Class 1 railroads. He has conducted many emergency bridge inspections that required quick response time, evaluation, and rapid turnaround on design and construction. He has designed many concrete and steel highway bridges over railroads. Mr. Lindsey is a licensed professional engineer registered in the following states: Arkansas, Alabama, Colorado, Indiana, Illinois, Louisiana, Mississippi, Missouri, Montana, New Jersey, New Mexico, New York, North Carolina, Ohio, Pennsylvania, South Carolina, Texas, Tennessee, Vermont, and Washington.

VERIFICATION

I, Kevin N. Lindsey, verify under penalty of perjury that I have read the Opening Evidence of Total Petrochemicals & Refining USA, Inc. in this proceeding that I have sponsored, as described in the foregoing Statement of Qualifications, that I know the contents thereof, and that the same are true and correct. Further, I certify that I am qualified and authorized to file this statement.

Kevin N. Lindsey

Executed on February 14, 2014

16. JERRY H. HARRIS, JR., P.E.

Mr. Harris is currently the Director of Engineering – Rail Projects for Crouch Engineering, P.C. His business address is 428 Wilson Pike Circle, Brentwood, TN 37027. Crouch Engineering is a consulting firm providing high quality railway engineering and planning services to railroads, governmental agencies and private industry.

Mr. Harris is co-sponsoring the TPI Opening Evidence along with Mr. Harvey A. Crouch in Part III-F related to track and roadbed costs and calculations.

Mr. Harris received a Bachelor of Science in Transportation Engineering from the Tennessee Technological University in 1997. Mr. Harris has over 15 years railroad engineering experience as Project Manager, Project Engineer, and Director of Engineering for Crouch Engineering. He has been responsible for the survey, design, permitting, and construction of many railroad capacity projects and industrial development track projects for local governments and private industry.

Mr. Harris has performed railroad topographic surveys, participated in new railroad track facility design and planning for local governments including construction cost estimates, planning for industrial development corridors, new facilities and industrial parks, investigation and resolution of right-of-way encroachment issues.

Mr. Harris serves as the lead track designer for Crouch Engineering and has been responsible for roadway and railroad roadbed design on many projects for Shortline and Class 1 railroads throughout the United States. Mr. Harris is a licensed professional engineer registered in the following states: Tennessee, Iowa, Virginia, Rhode Island, Georgia, Idaho, Alabama, Louisiana, New Jersey, Delaware, New York, Wisconsin, and North Dakota.

VERIFICATION

I, Jerry H. Harris, Jr., verify under penalty of perjury that I have read the Opening Evidence of Total Petrochemicals & Refining USA, Inc. in this proceeding that I have sponsored, as described in the foregoing Statement of Qualifications, that I know the contents thereof, and that the same are true and correct. Further, I certify that I am qualified and authorized to file this statement.

Jerry H. Harris, Jr.

Executed on February 14, 2014

17. <u>VICTOR F. GRAPPONE</u>

Mr. Grappone is President of Grappone Technologies P.E. P.C., a consulting firm that specializes in rail signaling and communications including train control systems, technical support and systems integration. His business address is 20 Jerusalem Avenue, Suite 201, Hicksville, NY 11801.

Mr. Grappone developed and is sponsoring, TPI's Opening Evidence with respect to the stand-alone railroad's SARR signal and communications systems as set forth in Parts III-B and III-F. Mr. Grappone is also sponsoring, jointly with TPI Witness Harvey Crouch, the portion of the SARR maintenance-of-way plan relating to Communications & Signals Department personnel as set forth in Part III-D.

Mr. Grappone has over 35 years of experience with railroad and transit signal and communications systems. His career in this field began in 1978, when he was hired by the Long Island Rail Road ("LIRR") as a Junior Engineer. In early 1981, Mr. Grappone was appointed Assistant Supervisor-Signals for the LIRR, where he was involved in the direct supervision of approximately 50 signal construction employees engaged in the installation and revision of signal systems as part of the LIRR's capital program. His responsibilities included task scheduling, personnel evaluation, on-site supervision and material ordering.

In mid-1984, Mr. Grappone was named Staff Engineer-Projects for the LIRR. In this position he was responsible for providing technical support for signal projects. In early 1987, Mr. Grappone was appointed to the position of Signal Circuit Designer for the LIRR, a position he held until late 1995. As Signal Circuit Designer, Mr. Grappone managed the technical aspects of the LIRR's recently-completed computer-based system that controlled the signal system at Penn Station (New York) and in the adjacent territory. This position also involved the direct supervision of a design team consisting of Signal Circuit Designers, Assistant Signal Circuit

Designers and Draftsmen. In this position Mr. Grappone was also responsible for the application of new technology to signal systems. Specific tasks included:

- Development of specifications for vital microprocessor-based systems for signal applications;
- Implementation of formalized procedures for performing FRA-mandated tests for signal systems;
- Development of a PC-based graphical control system; and
- Implementation of the first use of programmable logic controllers (PLC's) for the supervisory control functions.

From late 1995 to early 2001, Mr. Grappone held other positions involving signal and communications controls systems at the LIRR, including Acting Engineer – Signal Design, Project Manager responsible for developing and implementing a corporate signal strategy to direct all LIRR signaling efforts over a 20-year period, Principal Engineer – Signal Maintenance and Construction, and Principal Engineer – Communications Based Train Control ("CBTC"). In the latter position Mr. Grappone was responsible for the management and technical direction of the LIRR's CBTC program. In all of these positions, Mr. Grappone was responsible for signal and communications matters involving LIRR's lines that had heavy volumes of both passenger and freight rail traffic.

In May of 2001, Mr. Grappone left the LIRR and formed his own consulting firm, Grappone Technologies, Inc. GTI was reincorporated as Grappone Technologies PE PC in 2007. Major projects Mr. Grappone and his firm have undertaken include:

- Signal design for the New York City Transit Canarsie Line CBTC project, Auxiliary Wayside System.
- Design of office route verification logic for New York City's ATS (Automatic Train Supervision) project.

- Signal circuit checking for the reconfiguration of Harold interlocking on the Long Island Rail Road under the East Side Access project.

- Preparation of specifications and provision of technical and field support for other signal and communications projects for heavy rail and light rail transit systems in the Northeast.

- Circuit design for signal system revisions associated with the reconstruction of five stations on New York City Transit's Brighton Line.

During the course of his consulting work Mr. Grappone has applied for and obtained two patents involving train control systems, including U.S. Patent #6,381,506 for a programmable logic controller-based vital interlocking system (issued April 30, 2002) and U.S. Patent #6,655,639 for a broken rail detector for Positive Train Control (PTC)/CBTC applications (issued December 2, 2003).

Mr. Grappone has been a member of the Eastern Signal Engineers Association since June 1999 (inactive member since June 2001). He is presently a member of the Institute of Electrical and Electronics Engineers, Rapid Transit Vehicle Interface Committee Working Group 2: CBTC; the Communications-Based Train Control User Group; and the FRA's Rail Safety Advisory Committee, Positive Train Control Working Group.

Mr. Grappone obtained a B.S. degree in Electrical Engineering from Rensselaer Polytechnic Institute in 1978.

VERIFICATION

I, Victor F. Grappone, verify under penalty of perjury that I have read the Opening Evidence of Total Petrochemicals & Refining USA, Inc. in this proceeding that I have sponsored, as described in the foregoing Statement of Qualifications, that I know the contents thereof, and that the same are true and correct. Further, I certify that I am qualified and authorized to file this statement.

Victor F. Grappone

Executed on February 14, 2014

18. JAMES R. HOELSCHER

Mr. Hoelscher is an electrical engineer and President of Hoelscher Consulting, LLC, an engineering consulting firm that specializes in railway signaling, track circuits and positive train control ("PTC"). The Firm's offices are located at 19 Brentfield Circle, Rochester, New York 14617.

Mr. Hoelscher developed and is sponsoring TPI's Opening Evidence with respect to the stand-alone railroad's SARR signal and communications systems, specifically PTC requirements, as set forth in Parts III-B and III-F.

Mr. Hoelscher is a graduate of Rochester Institute of Technology from which he obtained a Bachelor of Science Electrical Engineering (1971) and a Master of Science Electrical Engineering (1977). He started his career in 1970 at General Railway Signal Company which became Alstom Signaling where he was employed for almost 34 years. He then spent over five (5) years with Safetran Systems Corp. before starting Hoelscher Consulting, LLC in 2010. He is a member of the American Railway Engineering Association, the Institute of Railway Signal Engineers, and the Institute of Electrical and Electronics Engineers. Mr. Hoelscher has received six (6) U.S. patents.

As an engineer in the field of railway signaling, Mr. Hoelscher has designed track circuits, failsafe inputs and outputs for processor based control systems as well as developed the concepts for communications based or PTC systems. Mr. Hoelscher was the systems engineer for the Advanced Civil Speed Enforcement System ("ACSES") used by Amtrak, which has received type approval from the Federal Railroad Administration ("FRA") as a PTC system. Mr. Hoelscher participated in the technical working group for the Rail Safety Advisory Committee ("RSAC") which advised the FRA on the production of 49 CFR 236 Subpart H (regulations for microprocessor based products used in railway safety systems) and 49 CFR 236 Subpart I (regulations required as a result of the Rail Safety Improvement Act of 2008 ("RSIA"). Mr. Hoelscher also served as chairperson for the development of IEEE Standard 1483 – Safety Verification of Processors Used in Rail/Transit Systems.

Mr. Hoelscher is currently providing consulting services to develop the FRA Subpart I safety documents for the new train control system being installed on the Port Authority Trans Hudson ("PATH") system. In addition, Mr. Hoelscher teaches the PTC portion of a two (2) day seminar offered by the University of Wisconsin.

As a result of his extensive experience in railway signaling since 1970 and his participation in RSAC and with the development of ACSES, Mr. Hoelscher is thoroughly familiar with the development and testing of systems throughout the U.S. that meet the definition of a PTC system in RSIA.

VERIFICATION

I, James R. Hoelscher, verify under penalty of perjury that I have read the Opening Evidence of Total Petrochemicals & Refining USA, Inc. in this proceeding that I have sponsored, as described in the foregoing Statement of Qualifications, that I know the contents thereof, and that the same are true and correct. Further, I certify that I am qualified and authorized to file this statement.

James R. Hoelscher

Executed on February 14, 2014

19. RICHARD R. HARPS, MAI, CRE

Mr. Harps is President of Harps & Harps, Inc., a Real Estate Valuation and Consulting firm. His business address is 1111 14th Street, NW, Suite 600, Washington, DC 20005.

Mr. Harps, in conjunction with John Pinto, Elizabeth Vandermause and Daniel Vandermause, is sponsoring the land valuation evidence in Part III-F-1.

Mr. Harps has over 35 years of experience as a real estate appraiser and consultant. He holds the MAI designation from the Appraisal Institute, the CRE designation from the Counselors of Real Estate. Mr. Harps is a certified general real estate appraiser in Virginia and the District of Columbia.

Mr. Harps was President of the Washington, DC Association of Realtors in 1985, was a member of the Executive Committee of National Association of Realtors for 1986 and 1987 and is a member of the General Comprehensive Examination Panel of the Appraisal Institute. Mr. Harps was also President of the Washington DC Metropolitan Chapter of the Appraisal Institute in 1994, and member and past President of the Real Estate Counseling Group of America.

Mr. Harps conducted a valuation of the World Bank multi-building complex in Washington, DC, performed valuations of large multi-property ownership for estate tax purposes and valued surface and underground easements for acquisition by the Washington Metropolitan Area Transit Authority. He valued and consulted with the General Services Administration on the disposition of over 500,000 sq. ft. of air rights situated above rail yards in the District of Columbia. Mr. Harps has been qualified as an expert witness on real estate appraisal matters in both Federal and District of Columbia courts.

VERIFICATION

I, Richard R. Harps, verify under penalty of perjury that I have read the Opening Evidence of Total Petrochemicals & Refining USA, Inc. in this proceeding that I have sponsored, as described in the foregoing Statement of Qualifications, that I know the contents thereof, and that the same are true and correct. Further, I certify that I am qualified and authorized to file this statement.

Richard R. Harps

Executed on February 14, 2014

20. JOHN G. PINTO

Mr. Pinto is Founder and President of Rail Trac Associates, a Real Estate Valuation and Consulting firm. His business address is 1111 14th Street, NW, Suite 600, Washington, DC 20005.

Mr. Pinto, in conjunction with Richard Harps, Elizabeth Vandermause and Daniel Vandermause is sponsoring the land valuation evidence in Part III-F-1.

Mr. Pinto has over 45 years of experience as a real estate appraiser and consultant. He holds the CRE designation. Mr. Pinto is a licensed Certified General Real Estate Appraiser in Delaware, New York, Georgia, and the District of Columbia.

Mr. Pinto has performed real estate appraisals related to railroad property and rights-of-way for government agencies, railroads, transit authorities and private sector entities. Recent clients include: the District of Columbia Department of Transportation; Florida East Coast Railroad; Rail America; Washington Metropolitan Transportation Authority; Southeastern Pennsylvania Transportation Authority; Maryland State Highway Administration; New Jersey Transit Access Tunnel Project; Virginia Port Authority; Hampton Roads Transit Authority; New York Susquehanna & Western Railway; and the Federal Railroad Administration ("FRA").

Among other projects, Mr. Pinto was Manager, Project Land Requirements for the Northeast Corridor Improvement Program, involving the rehabilitation of the Amtrak System from Washington, DC to Boston, MA; and, on behalf of the FRA, the transfer of the Alaska Railroad to the State of Alaska; The Surface Transportation Board for the analysis of the Merger of the Union Pacific and Southern Pacific Railroads and the Acquisition of Conrail by CSX and Norfolk Southern.

Mr. Pinto is qualified as an expert in real estate appraisal in Federal courts in Connecticut, New York, Maryland and New Jersey and in State courts in Pennsylvania, New Jersey, Rhode Island, New York and Connecticut.

VERIFICATION

I, John G. Pinto, verify under penalty of perjury that I have read the Opening Evidence of Total Petrochemicals & Refining USA, Inc. in this proceeding that I have sponsored, as described in the foregoing Statement of Qualifications, that I know the contents thereof, and that the same are true and correct. Further, I certify that I am qualified and authorized to file this statement.

John G. Pinto

Executed on February 4, 2014

21. ELIZABETH W. VANDERMAUSE

Elizabeth Vandermause is President of Merit Real Estate Analysis, a Real Estate Valuation and Consulting firm located at 2409 Hannon Court, Ellicott City, Maryland 21042.

Ms. Vandermause, in conjunction with Richard Harps, John Pinto and Daniel Vandermause, is sponsoring the land valuation evidence in Part III-F-1.

Ms. Vandermause has over 31 years of experience in real estate appraisal, consulting and real estate sales, including land acquisition for builders and developers. Her appraisal and consulting experience includes appraisals for transportation authorities including the Washington Metropolitan Area Transit Authority (WMATA). She holds the MAI designation from the Appraisal Institute and is a Certified General licensed real estate appraiser in the State of Maryland and the District of Columbia.

Ms. Vandermause is qualified as an expert in Federal and Baltimore Circuit courts and has provided expert testimony in an arbitration proceeding.

VERIFICATION

I, Elizabeth W. Vandermause, verify under penalty of perjury that I have read the Opening Evidence of Total Petrochemicals & Refining USA, Inc. in this proceeding that I have sponsored, as described in the foregoing Statement of Qualifications, that I know the contents thereof, and that the same are true and correct. Further, I certify that I am qualified and authorized to file this statement.

Elizabeth W. Vandermause

Executed on February 14, 2014

22. DANIEL VANDERMAUSE

Daniel C. Vandermause is Vice President of Merit Real Estate Analysis, a Real Estate Valuation and Consulting firm located at 2409 Hannon Court, Ellicott City, Maryland 21042.

Mr. Vandermause, in conjunction with Richard Harps, John Pinto and Elizabeth Vandermause, is sponsoring the land valuation evidence in Part III-F-1.

Mr. Vandermause has 23 years of experience in real estate appraisal, consulting and real estate sales, including land assembly and acquisition for commercial and residential developers. His appraisal and consulting experience includes a broad variety of residential/commercial/ industrial property types in both Maryland and the District of Columbia. Mr. Vandermause is a licensed appraiser in Maryland and the District of Columbia.

Mr. Vandermause also has 16 years of experience in railroad transportation, including CSX Transportation, Fruit Growers Express, Chessie System, Norfolk Southern Railway and Southern Railway System. Mr. Vandermause's rail industry experience includes freight car utilization and distribution, cash flow analysis for freight car purchases, railroad cost and pricing analysis, market research, and computer systems design for equipment utilization and distribution. Mr. Vandermause authored the freight car utilization portion of the Norfolk Southern merger application before the Interstate Commerce Commission.

VERIFICATION

I, Daniel C. Vandermause, verify under penalty of perjury that I have read the Opening Evidence of Total Petrochemicals & Refining USA, Inc. in this proceeding that I have sponsored, as described in the foregoing Statement of Qualifications, that I know the contents thereof, and that the same are true and correct. Further, I certify that I am qualified and authorized to file this statement.

Daniel C. Vandermause

Executed on February 14, 2014