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December 9, 2022

The Honorable Cynthia T. Brown
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This submission is the AAR forecast of the first quarter 2023 All-Inclusive Index and Rail Cost Adjustment Factor, filed in Ex Parte No. 290 (Sub-No. 5) (2023-1) *Quarterly Rail Cost Adjustment Factor*. The versions of RCAF-related indices covered in this filing are: the All-Inclusive Index (initiated in the second quarter of 1985), the Unadjusted RCAF (produced since October 1982), the Adjusted RCAF (first published in the second quarter of 1989), and the RCAF-5 (created by the STB in its Ex Parte No. 290 (Sub-No. 7) decision served October 3, 1996). The table below summarizes the first quarter 2023 results and compares to the previous quarter. Both quarters are shown on a 4Q\2022=100 base.

	<u>2022Q4</u>	<u>2023Q1</u>	<u>% Change</u>
All-Inclusive Index	96.8	101.3	4.6
Preliminary RCAF	0.968	1.013	4.6
Forecast Error Adjustment	0.032	-0.003	
RCAF (Unadjusted)	1.000	1.010	1.0
Productivity Adjustment Factor	2.4588	2.4740	
RCAF (Adjusted)	0.407	0.408	0.2
PAF-5	2.5738	2.5898	
RCAF-5	0.389	0.390	0.3

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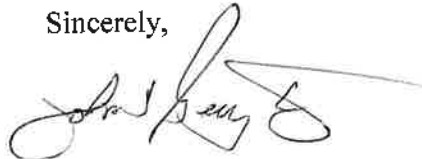
The Staggers Act requires the RCAF to be rebased every five years. The procedure necessary to calculate this rebasing was outlined by the ICC in Ex Parte No. 290 (Sub-No. 5) effective January 1, 1988. The rebasing calculation which will bring the index to the fourth quarter 2022 base is shown on page 1A of the attached filing.

Due to the fact that many people may need to compare the current RCAF to an older version that was calculated using a different base, the AAR has provided Attachment A, which contains historical RCAFs converted to a fourth quarter 2022 base. The AAR's recommended method for converting to another base is shown in the same attachment, as well as factors and indexes necessary to make those calculations.

In its October 3, 1996 decision in Ex Parte No. 290 (Sub-No. 7), Productivity Adjustment - Implementation, the STB noted its intent to publish, in addition to the RCAF (Unadjusted) and RCAF (Adjusted), an RCAF-5 (i.e., a calculation of the productivity adjusted RCAF values as if the agency had always used a 5-year rolling average to calculate the productivity adjustment). In response to a request by STB staff, the AAR is including a calculation of the RCAF-5 in its quarterly RCAF filing. The AAR and its members, however, do not believe the publication of a third RCAF index is required or permitted by the applicable statute (49 U.S.C. § 10708) and do not endorse its publication.

Our quarterly non-proprietary work papers underlying this submission are e-filed herewith, in accordance with the ICC's order in Ex Parte No. 290 (Sub-No. 2), Railroad Cost Recovery Procedures, served February 8, 1990. We have notified Pedro Ramirez, in the STB office handling this proceeding, of our plan to e-file the submission and non-proprietary work papers. A second copy of the submission and non-proprietary work papers, plus selected highly confidential work papers, will be provided to Mr. Ramirez's Data Collection and Auditing Team. All work papers are available for STB inspection. Questions should be directed to me or Kiara Williams (202 639-2327) of this office.

Sincerely,

A handwritten signature in black ink, appearing to read "John T. Gray", with a long horizontal flourish extending to the right.

John T. Gray

Attachments

**First Quarter 2023
All-Inclusive Index**

Ex Parte No. 290 (Sub-No. 5) (2023-1)

**Quarterly Rail Cost Adjustment Factor
Surface Transportation Board**

**Policy and Economics Department
Association of American Railroads**

December 9, 2022

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Introduction

On January 2, 1985, the Interstate Commerce Commission (ICC) adopted the All-Inclusive Index as the basis for the Rail Cost Adjustment Factor (RCAF). The quarterly projection of railroad costs, as documented herein, employs the All-Inclusive Index as required by the regulations. Also presented in this submission is the RCAF, both Adjusted and Unadjusted, as required by the ICC in its decision in Ex Parte No. 290 (Sub-No. 4), Rail Cost Recovery Procedures - Productivity Adjustment, served March 24, 1989. In addition, the AAR has included the RCAF-5, which was instituted by a Surface Transportation Board decision served October 3, 1996 in Ex Parte No. 290 (Sub-No. 7), *Productivity Adjustment - Implementation*. The AAR and its members do not believe the additional productivity-adjusted index is required or permitted by the applicable statute, and do not endorse its publication.

This quarter's projection of railroad costs is for the first quarter 2023. Each year's first quarter calculation utilizes new health and welfare rates, which are listed in Appendix A on page 5. New payroll tax rates and maximum taxable earnings (Tier I, Tier II, and Unemployment Insurance) also become effective January 1, and are listed in Appendix A on page 4. New labor agreements through national negotiations have been added to the Labor Index component.

Rebasing

The statute relating to the Rail Cost Adjustment Factor (49 U.S.C. § 10708) requires the RCAF to be rebased every five years. This means that the new base period will be the fourth quarter of 2022, since the previous base period was the fourth quarter of 2017. The calculations are shown below.

Rebasing the Denominator of the RCAF to the Fourth Quarter 2022	
1. Fourth Quarter 2022 Linked Index	331.3
2. Second Quarter 2022 Linked Index	
Calculated Using Actual Data	324.8
Calculated Using Forecasted Data	<u>313.8</u>
Difference	11.0
3. Fourth Quarter 2022 Linked Index	
Adjusted for Second Quarter 2022 Forecast Error	342.3
Rounding Adjustment to Force 1.000	<u>0.0</u>
New Basing Factor for 2022Q4 = 100	342.3
<small>Note: Linked Indexes on this page refer to the All Inclusive Index, 1980=100 basis.</small>	

Test of Basing Factor Fourth Quarter 2022 = 100	
1. Fourth Quarter 2022 Linked Index (1980 = 100)	331.3
Divided by 2022Q4 Basing Factor	342.3
Fourth Quarter 2022 Linked Index (2022Q4 = 100)	0.968
2. Second Quarter 2022 Linked Index	
Calculated Using Actual Data (1980 = 100)	324.8
Calculated Using Forecasted Data (1980 = 100)	313.8
Divide both by 2022Q4 Basing Factor	342.3
Calculated Using Actual Data (2022Q4 = 100)	0.949
Calculated Using Forecasted Data (2022Q4 = 100)	<u>0.917</u>
Difference (Forecast Error Adjustment)	0.032
3. Fourth Quarter 2022 Linked Index (2022Q4 = 100)	
Adjusted for Second Quarter 2022 Forecast Error	1.000
<small>Note: Fourth Quarter 2022 Linked Index (2022Q4 = 100), after forecast error adjustment, must equal 1.000.</small>	

Rail Cost Adjustment Factor — 2022Q4 Base

Yr/Qtr (Col 1)	Preliminary RCAF (Col 2)	Forecast Error Adjustment (Col. 3)	RCAF (Unad- justed) (Col 4)	Productivity-Adjusted RCAF		STB's 2nd Productivity- Adjusted RCAF (Not endorsed by AAR)	
				Productivity Adjustment Factor (Col 5)	RCAF (Adjusted) (Col 6)	PAF-5 (Col 7)	RCAF-5 (Col 8)
2001 Q1	0.546	0.002	0.548	1.8180	0.301	1.8888	0.290
Q2	0.542	0.002	0.544	1.8305	0.297	1.9050	0.286
Q3	0.546	0.000	0.546	1.8431	0.296	1.9214	0.284
Q4	0.544	0.003	0.547	1.8558	0.295	1.9379	0.282
2002 Q1	0.545	0.000	0.545	1.8686	0.292	1.9513	0.279
Q2	0.538	-0.001	0.537	1.8878	0.284	1.9648	0.273
Q3	0.542	-0.005	0.537	1.9072	0.282	1.9784	0.271
Q4	0.555	0.007	0.562	1.9268	0.292	1.9921	0.282
2003 Q1	0.557	0.003	0.560	1.9466	0.288	2.0126	0.278
Q2	0.568	0.005	0.573	1.9557	0.293	2.0333	0.282
Q3	0.565	0.008	0.573	1.9649	0.292	2.0542	0.279
Q4	0.572	-0.002	0.570	1.9741	0.289	2.0754	0.275
2004 Q1	0.571	0.004	0.575	1.9834	0.290	2.0852	0.276
Q2	0.576	0.004	0.580	1.9943	0.291	2.0950	0.277
Q3	0.592	0.009	0.601	2.0053	0.300	2.1048	0.286
Q4	0.603	0.012	0.615	2.0163	0.305	2.1147	0.291
2005 Q1	0.616	0.005	0.621	2.0274	0.306	2.1263	0.292
Q2	0.628	0.017	0.645	2.0420	0.316	2.1380	0.302
Q3	0.634	0.003	0.637	2.0567	0.310	2.1498	0.296
Q4	0.658	0.007	0.665	2.0715	0.321	2.1616	0.308
2006 Q1	0.654	0.006	0.660	2.0864	0.316	2.1772	0.303
Q2	0.654	0.007	0.661	2.0962	0.315	2.1929	0.301
Q3	0.672	-0.002	0.670	2.1061	0.318	2.2087	0.303
Q4	0.687	0.014	0.701	2.1160	0.331	2.2246	0.315
2007 Q1	0.672	0.006	0.678	2.1259	0.319	2.2351	0.303
Q2	0.672	-0.028	0.644	2.1348	0.302	2.2456	0.287
Q3	0.684	-0.012	0.672	2.1438	0.313	2.2562	0.298
Q4	0.706	0.012	0.718	2.1528	0.334	2.2668	0.317
2008 Q1	0.743	0.010	0.753	2.1618	0.348	2.2763	0.331
Q2	0.762	0.011	0.773	2.1683	0.357	2.2859	0.338
Q3	0.831	-0.006	0.825	2.1748	0.379	2.2955	0.359
Q4	0.830	0.031	0.861	2.1813	0.395	2.3051	0.374
2009 Q1	0.724	0.010	0.734	2.1878	0.335	2.3120	0.317
Q2	0.682	-0.071	0.611	2.1944	0.278	2.3189	0.263
Q3	0.717	-0.043	0.674	2.2010	0.306	2.3259	0.290
Q4	0.717	-0.002	0.715	2.2076	0.324	2.3329	0.306
2010 Q1	0.751	-0.005	0.746	2.2142	0.337	2.3399	0.319
Q2	0.750	0.012	0.762	2.2208	0.343	2.3469	0.325
Q3	0.765	0.002	0.767	2.2275	0.344	2.3539	0.326
Q4	0.768	0.025	0.793	2.2342	0.355	2.3610	0.336
2011 Q1	0.796	-0.010	0.786	2.2409	0.351	2.3681	0.332
Q2	0.831	0.013	0.844	2.2487	0.375	2.3752	0.355
Q3	0.852	0.014	0.866	2.2566	0.384	2.3823	0.364
Q4	0.850	0.019	0.869	2.2645	0.384	2.3894	0.364

Beginning 1989Q2, a productivity adjustment was added to the RCAF. What was formerly called the RCAF is now called the "RCAF (Unadjusted)" because it does not have a productivity adjustment. The productivity-adjusted RCAF is called the "RCAF (Adjusted)".

In its October 3, 1996 decision, the Surface Transportation Board added another version of a productivity-adjusted RCAF called the "RCAF-5". This second productivity adjustment factor began being used with the 1997Q1 Rail Cost Adjustment Factor.

Rail Cost Adjustment Factor — 2022Q4 Base

Yr/Qtr (Col 1)	Preliminary RCAF (Col 2)	Forecast Error Adjustment (Col. 3)	RCAF (Unad- justed) (Col 4)	Productivity-Adjusted RCAF		STB's 2nd Productivity- Adjusted RCAF (Not endorsed by AAR)		
				Productivity Adjustment Factor (Col 5)	RCAF (Adjusted) (Col 6)	PAF-5 (Col 7)	RCAF-5 (Col 8)	
2012	Q1	0.846	-0.005	0.841	2.2724	0.370	2.3978	0.351
	Q2	0.868	-0.015	0.853	2.2769	0.375	2.4062	0.355
	Q3	0.846	-0.005	0.841	2.2815	0.369	2.4146	0.348
	Q4	0.874	-0.005	0.869	2.2861	0.380	2.4231	0.359
2013	Q1	0.869	-0.002	0.867	2.2907	0.378	2.4279	0.357
	Q2	0.872	0.003	0.875	2.2957	0.381	2.4328	0.360
	Q3	0.860	-0.011	0.849	2.3008	0.369	2.4377	0.348
	Q4	0.870	-0.022	0.848	2.3059	0.368	2.4426	0.347
2014	Q1	0.856	-0.003	0.853	2.3110	0.369	2.4480	0.348
	Q2	0.867	-0.019	0.848	2.3168	0.366	2.4534	0.346
	Q3	0.865	-0.008	0.857	2.3226	0.369	2.4588	0.349
	Q4	0.857	-0.007	0.850	2.3284	0.365	2.4642	0.345
2015	Q1	0.830	-0.008	0.822	2.3342	0.352	2.4704	0.333
	Q2	0.792	-0.028	0.764	2.3382	0.327	2.4766	0.308
	Q3	0.788	-0.067	0.721	2.3422	0.308	2.4828	0.290
	Q4	0.770	-0.020	0.750	2.3462	0.320	2.4890	0.301
2016	Q1	0.767	-0.016	0.751	2.3502	0.320	2.4932	0.301
	Q2	0.741	-0.011	0.730	2.3584	0.310	2.4974	0.292
	Q3	0.768	-0.036	0.732	2.3667	0.309	2.5016	0.293
	Q4	0.761	0.004	0.765	2.3750	0.322	2.5059	0.305
2017	Q1	0.781	-0.009	0.772	2.3833	0.324	2.5147	0.307
	Q2	0.789	-0.003	0.786	2.3952	0.328	2.5235	0.311
	Q3	0.785	0.000	0.785	2.4072	0.326	2.5323	0.310
	Q4	0.780	-0.008	0.772	2.4192	0.319	2.5412	0.304
2018	Q1	0.802	-0.009	0.793	2.3689	0.335	2.5374	0.313
	Q2	0.803	0.002	0.805	2.3665	0.340	2.5336	0.318
	Q3	0.829	-0.009	0.820	2.3641	0.347	2.5298	0.324
	Q4	0.835	-0.002	0.833	2.3617	0.353	2.5260	0.330
2019	Q1	0.828	-0.010	0.818	2.3593	0.347	2.5235	0.324
	Q2	0.824	-0.002	0.822	2.3621	0.348	2.5210	0.326
	Q3	0.836	-0.020	0.816	2.3649	0.345	2.5185	0.324
	Q4	0.832	-0.001	0.831	2.3677	0.351	2.5160	0.330
2020	Q1	0.823	-0.017	0.806	2.3705	0.340	2.5190	0.320
	Q2	0.817	-0.004	0.813	2.3764	0.342	2.5220	0.322
	Q3	0.770	-0.006	0.764	2.3823	0.321	2.5250	0.303
	Q4	0.781	-0.055	0.726	2.3883	0.304	2.5280	0.287
2021	Q1	0.794	0.011	0.805	2.3943	0.336	2.5343	0.318
	Q2	0.825	-0.006	0.819	2.3991	0.341	2.5406	0.322
	Q3	0.860	0.016	0.876	2.4039	0.364	2.5470	0.344
	Q4	0.871	0.009	0.880	2.4087	0.365	2.5534	0.345
2022	Q1	0.897	-0.005	0.892	2.414	0.370	2.559	0.349
	Q2	0.917	0.008	0.925	2.429	0.381	2.564	0.361
	Q3	0.960	0.005	0.965	2.444	0.395	2.569	0.376
	Q4	0.968	0.032	1.000	2.459	0.407	2.574	0.389
2023	Q1	1.013	-0.003	1.010	2.474	0.408	2.590	0.390

Sample Rebasing Calculations

Preliminary RCAF:

Recommended Method

The All-Inclusive Index (AII) Forecast is divided by the appropriate Basing Factor.

Example calculations (AII and Basing Factors are listed on page 4):

$$2020Q1 \text{ on a 4Q22 basis} = 281.7 / 342.6 = 0.8221697 = 0.822$$

$$2020Q1 \text{ on a 4Q17 basis} = 281.7 / 264.5 = 1.0650284 = 1.065$$

$$2020Q1 \text{ on a 4Q97 basis} = 281.7 / 173.2 = 1.6264434 = 1.626$$

Alternative Method

An alternative method can be used to convert a Preliminary RCAF from one basis to another basis without knowing the All-Inclusive Index. This method will occasionally have small rounding differences, and is not recommended except as a "check" or as an approximation.

New Base Index = (Old Basing Factor / New Basing Factor) x Old Base Index.

Example for converting 2020Q1 on a 4Q17 basis to a 4Q22 basis:

$$(264.5 / 342.6) \times 1.065 = 0.8221478 = 0.822$$

Forecast Error Adjustment:

Recommended Method

1. Use the All-Inclusive Indexes (AII) for the two quarters prior to the quarter to be adjusted.
2. The All Actual is divided by the appropriate Basing Factor and rounded 3 digits after decimal.
3. The All Forecast is divided by the appropriate Basing Factor and rounded.
4. Take the result from step 2 and subtract the result from step 3.

Example calculation for 2020Q1:

$$1. \text{ Use A-I Index from 2 quarters prior, 2019Q3: } 280.4 = \text{Actual, } 286.2 = \text{Forecast}$$

$$2. \text{ Actual} = 280.4 / 342.6 = 0.8183755 = 0.818$$

$$3. \text{ Forecast} = 286.2 / 342.6 = 0.8353034 = 0.835$$

$$4. \text{ Forecast Error} = 0.818 - 0.835 = -0.017$$

Alternative Method

This method has occasional rounding differences, and is not recommended except as a check or an approximation. The new base Forecast Error Adjustment equals:

(Old Basing Factor / New Basing Factor) x Old Forecast Error Adjustment.

Example for converting 2019Q3 on a 4Q17 basis, which was used for 2020Q1, to a 4Q22 basis:

$$\text{Forecast Error 4Q22 basis} = (264.5 / 342.6) \times -0.022 = -0.0169833 = -0.017$$

RCAF (Unadjusted)

RCAF (Unadjusted) = Preliminary RCAF + Forecast Error Adjustment.

$$\text{Example for 2020Q1, on a 4Q22 basis: } 0.822 + -0.017 = 0.805$$

Productivity Adjustment Factor

Use the Productivity Adjustment Factor as originally calculated for each quarter.

For 2020Q1, the Productivity Adjustment Factor is 2.3705.

RCAF (Adjusted)

RCAF (Adjusted) = RCAF (Unadjusted) / Productivity Adjustment Factor.

$$\text{Example for 2020Q1, on a 4Q22 basis: } 0.805 / 2.3705 = 0.3395908 = 0.340$$

PAF-5

Use the STB's alternative productivity adjustment factor, PAF-5, as originally calculated.

For 2020Q1, the Productivity Adjustment Factor is 2.5190.

RCAF-5

RCAF-5 = RCAF (Unadjusted) / PAF-5

$$\text{Example for 2020Q1, on a 4Q22 basis: } 0.805 / 2.5190 = 0.3195713 = 0.320$$

Indexes & Factors for RCAF

Yr/Qtr	All-Inclusive Index 1980 = 100		Prod. Adj. Factor	PAF-5	Original Basis		Basing Factor	
	Forecast	Actual			Prelim RCAF	Forecast Error		
1991	Q1	151.2	150.1	1.0755	-	1.144	0.001	132.2
	Q2	149.1	148.8	1.0871	-	1.128	0.015	132.2
	Q3	153.0	152.8	1.0988	-	1.157	-0.009	132.2
	Q4	155.5	156.1	1.1107	-	1.176	-0.002	132.2
1992	Q1	154.5	154.1	1.1227	-	1.169	-0.001	132.2
	Q2	152.9	153.7	1.1348	-	1.157	0.005	132.2
	Q3	153.5	154.1	1.1471	-	1.161	-0.003	132.2
	Q4	156.1	156.5	1.1595	-	1.181	0.006	132.2
1993	Q1	158.1	158.4	1.1720	-	1.008	0.004	156.9
	Q2	157.3	157.5	1.1847	-	1.003	0.002	156.9
	Q3	158.6	158.0	1.1975	-	1.011	0.002	156.9
	Q4	160.7	161.0	1.2104	-	1.024	0.001	156.9
1994	Q1	162.1	162.1	1.2253	-	1.033	-0.004	156.9
	Q2	160.4	160.7	1.2404	-	1.022	0.002	156.9
	Q3	164.1	164.6	1.2557	-	1.046	0.000	156.9
	Q4	163.7	164.4	1.2711	-	1.043	0.002	156.9
1995	Q1	165.5	166.2	1.2867	-	1.055	0.003	156.9
	Q2	167.1	167.6	1.3052	-	1.065	0.005	156.9
	Q3	168.8	168.0	1.3240	-	1.076	0.004	156.9
	Q4	168.9	168.2	1.3431	-	1.076	0.003	156.9
1996	Q1	168.0	167.6	1.3624	-	1.071	-0.005	156.9
	Q2	167.4	168.4	1.3820	-	1.067	-0.004	156.9
	Q3	169.0	169.4	1.4019	-	1.077	-0.003	156.9
	Q4	170.4	171.7	1.4221	-	1.086	0.006	156.9
1997	Q1	174.7	174.4	1.4426	1.4733	1.113	0.003	156.9
	Q2	173.7	173.7	1.4603	1.4945	1.107	0.008	156.9
	Q3	174.6	174.4	1.4783	1.5160	1.113	-0.001	156.9
	Q4	173.2	174.2	1.4965	1.5378	1.104	0.000	156.9
1998	Q1	172.7	172.1	1.5149	1.5567	0.997	-0.001	173.2
	Q2	171.5	171.8	1.5503	1.5758	0.990	0.006	173.2
	Q3	173.4	172.9	1.5866	1.5952	1.001	-0.003	173.2
	Q4	173.3	173.2	1.6237	1.6148	1.001	0.002	173.2
1999	Q1	173.0	172.3	1.6617	1.6526	0.999	-0.003	173.2
	Q2	172.1	173.2	1.6850	1.6913	0.994	-0.001	173.2
	Q3	174.2	175.4	1.7086	1.7309	1.006	-0.004	173.2
	Q4	174.1	175.6	1.7325	1.7714	1.005	0.006	173.2
2000	Q1	179.4	179.8	1.7568	1.7962	1.036	0.007	173.2
	Q2	180.3	180.8	1.7719	1.8213	1.041	0.009	173.2
	Q3	181.6	182.5	1.7871	1.8468	1.048	0.002	173.2
	Q4	183.5	184.1	1.8025	1.8727	1.059	0.003	173.2
2001	Q1	186.9	186.8	1.8180	1.8888	1.079	0.006	173.2
	Q2	185.6	186.4	1.8305	1.9050	1.072	0.004	173.2
	Q3	186.9	186.8	1.8431	1.9214	1.079	0.000	173.2
	Q4	186.1	185.7	1.8558	1.9379	1.074	0.004	173.2
2002	Q1	186.4	184.7	1.8686	1.9513	1.076	0.000	173.2
	Q2	184.2	186.4	1.8878	1.9648	1.064	-0.002	173.2
	Q3	185.6	186.4	1.9072	1.9784	1.072	-0.010	173.2
	Q4	189.9	191.7	1.9268	1.9921	1.096	0.012	173.2
2003	Q1	190.6	193.3	1.9466	2.0126	0.992	0.004	192.1
	Q2	194.3	193.6	1.9557	2.0333	1.011	0.009	192.1
	Q3	193.3	194.6	1.9649	2.0542	1.006	0.014	192.1
	Q4	195.9	197.2	1.9741	2.0754	1.020	-0.003	192.1

Indexes & Factors for RCAF

Yr/Qtr	All-Inclusive Index 1980 = 100		Prod. Adj. Factor	PAF-5	Original Basis		Basing Factor
	Forecast	Actual			Prelim RCAF	Forecast Error	
2004 Q1	195.6	198.7	1.9834	2.0852	1.018	0.007	192.1
Q2	197.1	201.3	1.9943	2.0950	1.026	0.007	192.1
Q3	202.6	204.5	2.0053	2.1048	1.055	0.016	192.1
Q4	206.5	212.2	2.0163	2.1147	1.075	0.022	192.1
2005 Q1	210.7	211.9	2.0274	2.1263	1.097	0.010	192.1
Q2	214.9	217.2	2.0420	2.1380	1.119	0.030	192.1
Q3	217.0	219.2	2.0567	2.1498	1.130	0.006	192.1
Q4	225.3	227.8	2.0715	2.1616	1.173	0.012	192.1
2006 Q1	223.9	223.1	2.0864	2.1772	1.166	0.011	192.1
Q2	223.8	228.7	2.0962	2.1929	1.165	0.013	192.1
Q3	230.0	232.0	2.1061	2.2087	1.197	-0.005	192.1
Q4	235.2	225.6	2.1160	2.2246	1.224	0.026	192.1
2007 Q1	229.9	226.0	2.1259	2.2351	1.197	0.011	192.1
Q2	230.0	234.1	2.1348	2.2456	1.197	-0.050	192.1
Q3	234.0	237.7	2.1438	2.2562	1.218	-0.021	192.1
Q4	241.7	245.6	2.1528	2.2668	1.258	0.022	192.1
2008 Q1	254.4	252.3	2.1618	2.2763	1.035	0.015	245.9
Q2	260.9	271.6	2.1683	2.2859	1.061	0.016	245.9
Q3	284.3	287.8	2.1748	2.2955	1.156	-0.009	245.9
Q4	284.1	259.7	2.1813	2.3051	1.155	0.044	245.9
2009 Q1	247.8	233.2	2.1878	2.3120	1.008	0.014	245.9
Q2	233.4	232.8	2.1944 a	2.3189	0.949	-0.099	245.9
Q3	245.3	243.8	2.2010 a	2.3259	0.998	-0.060	245.9
Q4	245.5	249.4	2.2076 a	2.3329	0.998	-0.002	245.9
2010 Q1	256.9	257.6	2.2142 a	2.3399 a	1.045	-0.007	245.9
Q2	256.8	265.3	2.2208	2.3469	1.044	0.016	245.9
Q3	262.0	258.3	2.2275	2.3539	1.065	0.003	245.9
Q4	262.9	267.5	2.2342	2.3610	1.069	0.035	245.9
2011 Q1	272.4	277.4	2.2409	2.3681	1.108	-0.015	245.9
Q2	284.4	291.0	2.2487	2.3752	1.157	0.019	245.9
Q3	291.7	289.8	2.2566	2.3823	1.186	0.020	245.9
Q4	291.0 b	285.7 b	2.2645	2.3894	1.183	0.026	245.9
2012 Q1	289.5 b	288.0 b	2.2724	2.3978	1.177	-0.007	245.9
Q2	297.0 b	295.5 b	2.2769	2.4062	1.208	-0.021	245.9
Q3	289.6 b	289.0 b	2.2815	2.4146	1.178	-0.006	245.9
Q4	299.1 b	300.1 b	2.2861	2.4231	1.216	-0.006	245.9
2013 Q1	297.4 b	293.7 b	2.2907	2.4279	0.999	-0.002	297.6 b
Q2	298.6 b	290.9 b	2.2957	2.4328	1.003	0.003	297.6 b
Q3	294.4 b	293.2	2.3008	2.4377	0.989	-0.012	297.6 b
Q4	297.9 c	291.3	2.3059	2.4426	1.001 b	-0.026	297.6 b
2014 Q1	293.0 d	290.2	2.3110	2.4480	0.985 d	-0.004	297.6
Q2	296.8	294.4	2.3168	2.4534	0.997	-0.022	297.6
Q3	296.1	293.4	2.3226	2.4588	0.995	-0.010	297.6
Q4	293.2	283.9	2.3284	2.4642	0.985	-0.008	297.6

a - restated by STB in Docket No. EP 290 (Sub-No. 4) served January 20, 2012.

b - restated by AAR, as directed by STB, in EP No. EP 290 (Sub-No. 5)(2014-1) submitted December 5, 2013. STB approved in Docket No. EP 290 (Sub-No. 5)(2014-1) served December 20, 2013.

c - restated by AAR, as directed by STB, in EP No. EP 290 (Sub-No. 5)(2014-2) submitted March 18, 2014. This caused a change to number that had been restated in 2014-1 submission. STB approved in decision served March 20, 2014.

d - restated by AAR, as directed by STB, in EP No. EP 290 (Sub-No. 5)(2014-2) submitted March 18, 2014. STB approved in Docket No. EP 290 (Sub-No. 5)(2014-2) served March 20, 2014.

Indexes & Factors for RCAF

Yr/Qtr	All-Inclusive Index 1980 = 100		Prod. Adj. Factor	PAF-5	Original Basis		Basing Factor	
	Forecast	Actual			Prelim RCAF	Forecast Error		
2015	Q1	284.2	261.3	2.3342	2.4704	0.955	-0.009	297.6
	Q2	271.0	264.4	2.3382	2.4766	0.911	-0.031	297.6
	Q3	269.7	264.4	2.3422	2.4828	0.906	-0.077	297.6
	Q4	263.4	259.8	2.3462	2.4890	0.885	-0.023	297.6
2016	Q1	262.5	250.1	2.3502	2.4932	0.882	-0.018	297.6
	Q2	253.7	255.0	2.3584	2.4974	0.852	-0.012	297.6
	Q3	263.0	259.7	2.3667	2.5016	0.884	-0.042	297.6
	Q4	260.6	259.5	2.3750	2.5059	0.876	0.005	297.6
2017	Q1	267.4	267.5	2.3833	2.5147	0.899	-0.011	297.6
	Q2	270.1	267.4	2.3952	2.5235	0.908	-0.004	297.6
	Q3	268.7	265.7	2.4072	2.5323	0.903	0.000	297.6
	Q4	267.1	267.7	2.4192	2.5412	0.898	-0.009	297.6
2018	Q1	274.5	271.6	2.3689	2.5374	1.038	-0.011	264.5
	Q2	274.9	274.2	2.3665	2.5336	1.039	0.002	264.5
	Q3	283.6	280.2	2.3641	2.5298	1.072	-0.011	264.5
	Q4	285.9	285.3	2.3617	2.5260	1.081	-0.002	264.5
2019	Q1	283.3	276.6	2.3593	2.5235	1.071	-0.013	264.5
	Q2	282.1	281.8	2.3621	2.5210	1.067	-0.002	264.5
	Q3	286.2	280.4	2.3649	2.5185	1.082	-0.025	264.5
	Q4	284.8	283.4	2.3677	2.5160	1.077	-0.002	264.5
2020	Q1	281.7	279.5	2.3705	2.5190	1.065	-0.022	264.5
	Q2	279.6	261.0	2.3764	2.5220	1.057	-0.006	264.5
	Q3	263.7	267.2	2.3823	2.5250	0.997	-0.008	264.5
	Q4	267.4	265.3	2.3883	2.5280	1.011	-0.070	264.5
2021	Q1	271.7	277.1	2.3943	2.5343	1.038	0.013	264.5
	Q2	282.3	285.4	2.3991	2.5406	1.067	-0.008	264.5
	Q3	294.4	292.8	2.4039	2.5470	1.113	0.021	264.5
	Q4	298.0	300.9	2.4087	2.5534	1.127	0.012	264.5
2022	Q1	306.9	308.8	2.4135	2.5585	1.038	-0.006	264.5
	Q2	313.8	324.8	2.4285	2.5636	1.186	0.011	264.5
	Q3	328.7	327.7	2.4436	2.5687	1.243	0.007	264.5
	Q4	331.3	0.0	2.4588	2.5738	1.253	0.042	264.5
2023	Q1	346.7	0.0	2.4740	2.5898	1.038	-0.004	342.3

Preliminary RCAF = All-Inclusive Index Forecast / Basing Factor
Forecast Error = (A-II Actual/Basing Factor) - (A-II Forecast/Basing Factor)
 where each is rounded to 3 digits after the decimal
 where A-II for forecast error calculation is from 2 quarters earlier
RCAF Unadjusted = Preliminary RCAF less Forecast Error
RCAF Adjusted = RCAF Unadjusted / Productivity Adjustment Factor
RCAF-5 = RCAF Unadjusted / PAF-5

Note: Each RCAF is rounded to 3 digits after the decimal. Productivity Adjustment Factors are always 4 digits after the decimal.

Basing Factors

10/1/80 = 102.7
 10/1/82 = 120.9
 4Q/87 = 132.2
 4Q/92 = 156.9
 4Q/97 = 173.2
 4Q/02 = 192.1
 4Q/07 = 245.9
 4Q/12r = 297.6
 4Q/17 = 264.5
 4Q/22 = 342.3

Index Weights

In the Ex Parte No. 290 (Sub-No. 2) final rules, issued in April 1981, the Interstate Commerce Commission mandated that the weights of each major cost component be updated annually. These "external" weights are calculated using expense data from Schedules 410 and 210 of the R-1 annual report filed with the Surface Transportation Board by the Class I railroads. The weights are typically updated with the fourth quarter projection.

The 2021 (current) and 2020 (previous) weights are shown below. Weights calculated from 2020 data were used for the fourth quarter of 2021 through the third quarter of 2022. Beginning with the fourth quarter of 2022, weights calculated using 2021 data are used. The component with the biggest change in weight was Fuel, which increased by 4.5 percentage points. Labor and Equipment Rents fell by 1 and 0.3 percentage points, respectively. Materials & Supplies was unchanged. The weight for Depreciation decreased 1 percentage point, and Other decreased by 1.9 percentage points.

Weights for RCAF's All-Inclusive Index		
	2021	2020
Labor	31.4 %	32.4 %
Fuel	14.2	9.7
Materials & Supplies	4.5	4.5
Equipment Rents	4.9	5.2
Depreciation	17.5	18.5
Interest	2.4	2.7
Other	25.1	27.0
Total	100.0	100.0

Reweightings of the index is accomplished by calculating both the current quarter (normally the fourth) and prior (normally the third) quarter indexes with the new weights. The relative change between the two quarters is then multiplied times the prior quarter (usually the third) *linked* index. Use of this method ensures that the weight change, by itself, does not cause a change in the level of the All-Inclusive Index.

Internal weights in the labor and equipment rents components are updated at the same time as the external weights. When these weights are changed, they are also linked using the procedure described above in order to eliminate the effect of the change in weighting.

All-Inclusive Index

First Quarter 2023

The components and values of the current and previous All-Inclusive Indexes are shown below. Details of the construction of each component of the index are contained in the Appendices.

	2021 Weights	Forecast		Percent Change
		Previous 2022Q4	Current 2023Q1	
1. Labor	31.4%	479.6	546.0	13.8 %
2. Fuel	14.2%	475.2	467.1	-1.7
3. M&S	4.5%	335.3	328.9	-1.9
4. Equipment Rents	4.9%	253.8	250.1	-1.5
5. Depreciation	17.5%	233.3	234.8	0.6
6. Interest	2.4%	50.1	50.1	0.0
7. Other	25.1%	290.6	280.0	-3.6
8. Weighted Average				
a. 1980 = 100		360.6	377.4	
b. 1980 = 100 (linked)		331.3	346.7 ¹	
c. 4Q22 = 100		96.8	101.3 ²	4.6

Note:

As required every five years, this index has been rebased. In this case, the new basis is 4Q22 = 100 (where 2022Q4 equals 100.0 after the forecast error adjustment). For the purpose of this calculation, 2022Q4 has been recalculated using the 4Q22 base in item 8c. Items 1 through 8b are unchanged. See page 1A and Attachment A in this filing for more detail.

$$\begin{aligned}
 &^1 \text{ Index80} = (\text{Current Index} / \text{Previous Index}) * \text{the Previous Quarter Linked Index} \\
 &= (377.4 / 360.6) \times 331.3 \\
 &= 346.7
 \end{aligned}$$

² To calculate the 4Q22 = 100 index:

$$\begin{aligned}
 &\text{Index4Q22} = (\text{Current Linked Index} / \text{4Q22 Basing Factor}) * 100 \\
 &= 346.7 \text{ divided by } 342.3 \text{ times } 100 \\
 &= 101.3
 \end{aligned}$$

Indexes based on other periods:

- 4Q17 based index = 346.7 / 264.5 x 100 = 131.1
- 4Q12 based index = 346.7 / 297.6 x 100 = 116.5
- 4Q07 based index = 346.7 / 245.9 x 100 = 141.0
- 4Q02 based index = 346.7 / 192.1 x 100 = 180.5
- 4Q97 based index = 346.7 / 173.2 x 100 = 200.2
- 4Q92 based index = 346.7 / 156.9 x 100 = 221.0

Forecast vs. Actual All-Inclusive Index

Third Quarter 2022

Because of data availability, the forecast error adjustment has a two-quarter lag from each filing. As shown below, the third quarter actual index of 95.7 is 0.3 index points below the forecast value of 96.0. Therefore, the forecast error adjustment for first quarter 2023 is -0.3 index points.

	2020 Weights	Third Quarter 2022		Amt Difference
		Forecast	Actual	
1. Labor	32.4%	472.4	472.4	
2. Fuel	9.7%	459.6	484.4	
3. M&S	4.5%	305.0	305.0	
4. Equipment Rents ¹	5.2%	256.0	251.4	
5. Depreciation	18.5%	233.2	233.7	
6. Interest	2.7%	51.1	51.1	
7. Other	27.0%	302.4	289.7	
 8. Weighted Average				
a. 1980 = 100		350.8	349.7	
b. 1980 = 100 (linked)		328.7	327.7 ²	
c. 4Q22 = 100 ³		96.0	95.7	-0.3

Forecast error \longrightarrow **-0.3 index points**

Note: As required every five years, this index has been rebased. In this case, the new basis is 4Q22 = 100 (where 2022Q4 equals 100.0 after the forecast error adjustment). For the purpose of this calculation, 2022Q4 has been recalculated using the 4Q22 base in item 8c. Items 1 through 8b are unchanged. See page 1A and Attachment A in this filing for more detail.

	2020 Weights	Third Quarter 2022	
		Forecast	Actual
Car-Hire	64.7%	206.5	207.1
Lease Rentals	35.3%	302.4	289.7
Weighted Average		240.4	236.3
Weighted Average (linked)		256.0	251.4

Linked actual index = (actual index / previous actual index) x previous linked actual index.

$$327.7 = 349.7 / 346.6 \times 324.8$$

The 4Q22 based indexes are 1980 based indexes divided by the 4Q22 basing factor (342.3/100).

Other basing factors are: 4Q22 = 264.5; 4Q12 = 297.6; 4Q07 = 245.9; 4Q02 = 192.1; 4Q97 = 173.2; and 4Q92 = 156.9.

Productivity

On February 3, 2022, the Surface Transportation Board served a decision which proposed to adopt 2.5 percent as the geometric average productivity change for the five most recent years available. Their five year rolling geometric average calculation added the year 2020 and removed the year 2015. The components of this average annual value are shown on the following table in ratio format – therefore, 1.025 is the same as an increase of 2.5 percent. Productivity changes are calculated by multiplying each of the five productivity changes together and taking the result to the one-fifth power. The productivity adjustment factors (PAF) for each quarter are calculated by increasing the previous quarter's PAF by quarterly versions of the annual rate, which are the fourth root of the geometric average annual growth rate. The difference between the PAF and the PAF-5 is the timing of the five-year productivity trend.

Comparison of Output, Input, & Productivity			
2016 - 2020			
Year	Output Index (1)	Input Index (2)	Productivity Changes (3)
2016	0.955	0.941	1.015
2017	1.045	0.992	1.053
2018	1.032	1.004	1.028
2019	0.968	0.961	1.007
2020	0.923	0.904	1.021
Average			1.025
Previous Average (2015-2019)			1.008

Calculation of PAF and PAF-5			
For 2016-2020, use fourth root of avg. productivity change = 1.0062			
For 2015-2019, use fourth root of avg. productivity change = 1.0020			
Quarter	Year	PAF	PAF-5
Q1	2022	2.4135	2.5585
Q2	2022	2.4285	2.5636
Q3	2022	2.4436	2.5687
Q4	2022	2.4588	2.5738
Q1	2023	2.4740	2.5898

2015-2019

↖

2016-2020

↖

Rail Cost Adjustment Factor

First Quarter 2023

Four RCAF values are presented in this filing. Two are not modified for productivity (Preliminary RCAF and RCAF Unadjusted), and two incorporate a productivity calculation (RCAF Adjusted and RCAF-5). The All-Inclusive Index and all four RCAF values, plus the percent change for each, are shown below. Note that beginning with the 2023Q1 index, the All-Inclusive Index was rebased to a 2022Q4=100 basis as required in the applicable statute.

	Previous 2022Q4	Current 2023Q1	Percent Change
All-Inclusive Index ¹	96.8	101.3	4.6
Preliminary RCAF ²	0.968	1.013	4.6
Forecast Error Adjustment ³	<u>0.032</u>	<u>-0.003</u>	
RCAF (Unadjusted) ⁴	1.000	1.010	1.0
Productivity Adjustment Factor ⁵	<u>2.4588</u>	<u>2.4740</u>	
RCAF (Adjusted) ⁶	0.407	0.408	0.2
PAF-5 ⁷	2.5738	2.5898	
RCAF-5 ⁸	0.389	0.390	0.3

¹ See All-Inclusive Index on page 3.

² All-Inclusive Index divided by the All-Inclusive Index in the base period (100.0).

³ The current figure is from Forecast vs. Actual All-Inclusive Index in this filing (page 4). The previous quarter figure is shown in a similar section of the previous quarter's filing.

⁴ Preliminary RCAF plus the forecast error adjustment.

⁵ See Productivity on page 5.

⁶ RCAF (Unadjusted) divided by the Productivity Adjustment Factor (PAF).

⁷ See Productivity on page 5.

⁸ RCAF (Unadjusted) divided by the PAF-5.

Appendixes

Labor

First Quarter 2023

The first quarter 2023 Labor Index is 13.8 percent higher than the previous quarter. General wage increases, lump sum payments, and healthcare changes are primarily responsible for this quarter's higher Labor Index.

Wage Rate Index

The Wage Rate Index portion of the Labor Index increased by 29%. Compounded retroactive July 1 wage increases of 14.1 percent and back pay were added to the index.

New National Agreements: The 2020 National Negotiations round concluded between all twelve labor unions and the National Carriers Conference Committee, which includes all Class I Railroads except Canadian Pacific. The new national labor agreements were signed in fourth quarter 2022. The new agreements have three retroactive wage increases of 3 percent, 3.5 percent, and a 7 percent increase (July 2020, July 2021, and July 2022) . A future wage increase of 4.0 percent will be added to the July 2023 index.

Lump Sums: The first quarter lump sum rate remained unchanged from the previous quarter. One amount was fully amortized and removed, and it was replaced by one new similar amount.

Back Pay: Retroactive wage increases caused a large increase in the back pay rate. These wage increases were accompanied by three retroactive \$1000 lump sum payments, which increased the back pay rate to \$7.021. As always, back pay amounts will be removed from the index after they have been amortized for four quarters.¹

Other: In wages, "Other" contains the amortization of incentive compensation payments (similar to lump sums) that one railroad makes each year to its dispatchers, yardmasters, and locomotive engineers. The first quarter rate is relatively the same as last quarter.

¹ Index procedure, decided by the Interstate Commerce Commission in 1988, is to amortize lump sums and/or back pay over four quarters using the rates for 13-week (a.k.a. 3-month) U.S. Treasury bills.

Labor

First Quarter 2023

Supplements Index

The Supplements Index decreased 4 percent this quarter.

Health & Welfare: The Health & Welfare rate decreased 6.5 percent, as a result of the new 2023 rates. This is primarily due to an increase in employee contributions, which was a result for labor agreement changes.

Railroad Retirement: The Railroad Retirement rate increased .8 percent. The maximum taxable earnings for Railroad Retirement's Tier I and Tier II both increased for 2023 and tax rates for employers did not change.

Unemployment Insurance: The Unemployment Insurance rate decreased 24.5 percent, as the result of new unemployment insurance tax rate for 2023. The weighted average Class I railroad rate for 2023 is 7.79 percent, compared to 11.23 percent for 2022. The previous surcharge of 3.5 percent was also reduced to 1.5 percent for 2023.

Other: The "Other" category is a reflection of all other fringe benefits, and currently contains known employer contributions to employee 401(k) accounts and employer contributions to employee stock plans that are recorded as fringe benefits. The first quarter rate is 2.7 cents higher than last quarter.

Labor Index Calculation

As shown in Table A-1 on the next page, the 29 percent increase in the Wage Rate Index and the 4 percent decrease in the Supplements Index combined to cause the Labor Index to be 13.8 percent higher than the previous quarter. The linked first quarter 2023 Labor index is 546, which is 16.3 percent higher than one year ago.

Labor First Quarter 2023

Table A-1 Labor Index

	2022Q4	2023Q1	Change	
			Percent	Amount
<u>Base Wage</u> – Straight Time & Pay For Time Not Worked	\$44.655	\$50.768	13.7%	\$6.113
Adjustments:				
Lump Sum	0.271	0.271	0.0%	\$0.000
Back Pay	0.013	7.021	53907.7%	\$7.008
Other	0.257	0.259	0.8%	\$0.002
Total Wages	<u>45.196</u>	<u>58.319</u>	29.0%	\$13.123
Health & Welfare Benefits	10.193	9.530	-6.5%	-\$0.663
RR Retirement & Medicare	9.694	9.769	0.8%	\$0.075
Unemployment Insurance	1.162	0.877	-24.5%	-\$0.285
Other	0.162	0.189	16.5%	\$0.027
Total Supplements	<u>\$21.211</u>	<u>\$20.365</u>	-4.0%	-\$0.846
Total Labor (as info only)	\$66.407	\$78.684		
Wage Index¹	386.8	499.1	29.0%	
Supplements Index²	783.9	752.6	-4.0%	
Total labor Index, 2021 Weights ³	504.3	574.1		
Labor Index (linked)⁴	479.6	546.0	13.8%	

¹ 1980 wage rate \$11.685

² 1980 supplements rate \$2.706

³ 2021 weights: wages, supplements 70.4% 29.6%

⁴ 2023Q1 linked Index = 2022Q4 linked x (2023Q1 / 2022Q4)
= 479.6 x 574.1 / 504.3

Labor

First Quarter 2023

Supplement Comparisons**Health and Welfare Rates**

Plan	Railroad Payment Per Employee Per Month				
	2021	2022	2023	Change	
				'21-'22	'22-'23
Group Health & Welfare	\$1,697.55	\$1,856.96	\$1,972.43	9.4%	6.2%
Early Retirement Major Medical	116.94	84.14	65.94	-28.0%	-21.6%
Group Dental	63.67	75.01	69.10	17.8%	-7.9%
Group Vision	8.51	8.51	8.51	0.0%	0.0%
Supplemental Sickness					
Maintenance of Way	39.94	48.22	48.22	20.7%	0.0%
Shop Crafts	87.74	98.52	98.52	12.3%	0.0%
Signalmen	45.05	62.17	62.17	38.0%	0.0%
Yardmasters	60.48	74.61	76.77	23.4%	2.9%

Railroad Retirement and Medicare

	Earnings Base			Employer Rate		
	2021	2022	2023	2021	2022	2023
Tier I	\$142,800	\$147,000	\$160,200	6.20%	6.20%	6.20%
Tier II	106,200	109,200	118,800	13.10%	13.10%	13.10%
Medicare	no limit	no limit	no limit	1.45%	1.45%	1.45%

Unemployment Insurance

Monthly Taxable Earnings Base			Weighted Avg. Class I Rate		
2021	2022	2023	2021	2022	2023
\$1,710	\$1,755	\$1,895	5.69%	11.23%	7.79%

Labor
First Quarter 2023

NATIONAL RAILWAY LABOR CONFERENCE
EMPLOYEE BENEFITS DEPARTMENT

251 - 18th Street, South, Suite 750, Arlington, VA 22202 --- PHONE: (571) 336-7600

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Health Comm. Manager
(571) 336-7625
rrabac@nmrlc.org

November 16, 2022

Ms. Kiara Williams
Director, Financial Reporting
Association of American Railroads
425 Third Street, SW, Suite 1000
Washington, D.C. 20024

Dear Ms. Williams:

The revised employer monthly Payment Rates which are effective January 1, 2023 are as follows:

Railroad Employees National Health & Welfare Plan & National Railway Carriers/United Transportation Union H&W Plan Non-Hospital Road	\$1,972.43
Railroad Employees National Early Retirement Major Medical Benefit Plan Non-Hospital Road	\$ 65.94
Aetna - National Dental Plan	\$ 69.10
The Hartford - Supplemental Sickness Plans	
Shop Craft	\$ 98.52
Signal	\$ 62.17
Maintenance of Way	\$ 48.22
Trustmark - Supplemental Sickness Plans Yardmasters	\$ 76.77
EyeMed - National Vision Plan	\$ 8.51

If you have any questions or need clarification, please contact me.

Very truly yours,

Eureka Norment

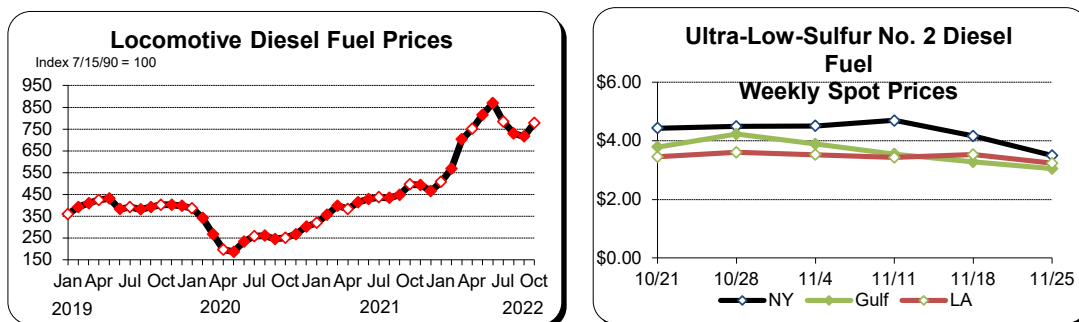
Eureka Norment

cc: Data@aar.org

Fuel First Quarter 2023

The forecast for fuel is based on: (1) a survey of railroad fuel purchasing officers concerning current price and volume levels, (2) expectations of railroad purchasing officers based on their own forecast models and discussions with their major suppliers, and (3) a consensus of petroleum industry experts and general business publications. Fuel purchases are assumed to remain in inventory for 30 days before the fuel is consumed (and therefore expensed). Therefore, prices *paid* in the first month of each quarter are for fuel *expensed* in the second (or middle) month of the quarter, and the middle month expensed is used to represent each quarter.

The average locomotive diesel fuel price hit a low point in May 2020, but has been steadily rising since then. While average prices for locomotive diesel fuel are available only through October 2022, data through four weeks of November are available for related fuel types. According to the Energy Information Administration, the daily spot price as of November 28 for Ultra-Low-Sulfur Diesel Fuel* is an average of 27.6 percent lower than the average for October. The chart below (on left) shows the AAR's Monthly Locomotive Diesel Fuel Price Index through October 2022. The second chart (on right) shows recent spot prices for Ultra-Low-Sulfur No. 2 Diesel Fuel as reported by the Energy Information Administration.



Using information from the EIA, prices towards the end of August are higher than prices that actually occurred in October. Railroads that responded to the AAR's forecast survey expect prices to decrease by January (Q1) compared to prices that actually occurred for October (Q4). The first quarter 2023 forecast is 1.7 percent lower than the previous quarter forecast, and 2.8 percent lower than the prior quarter actual.

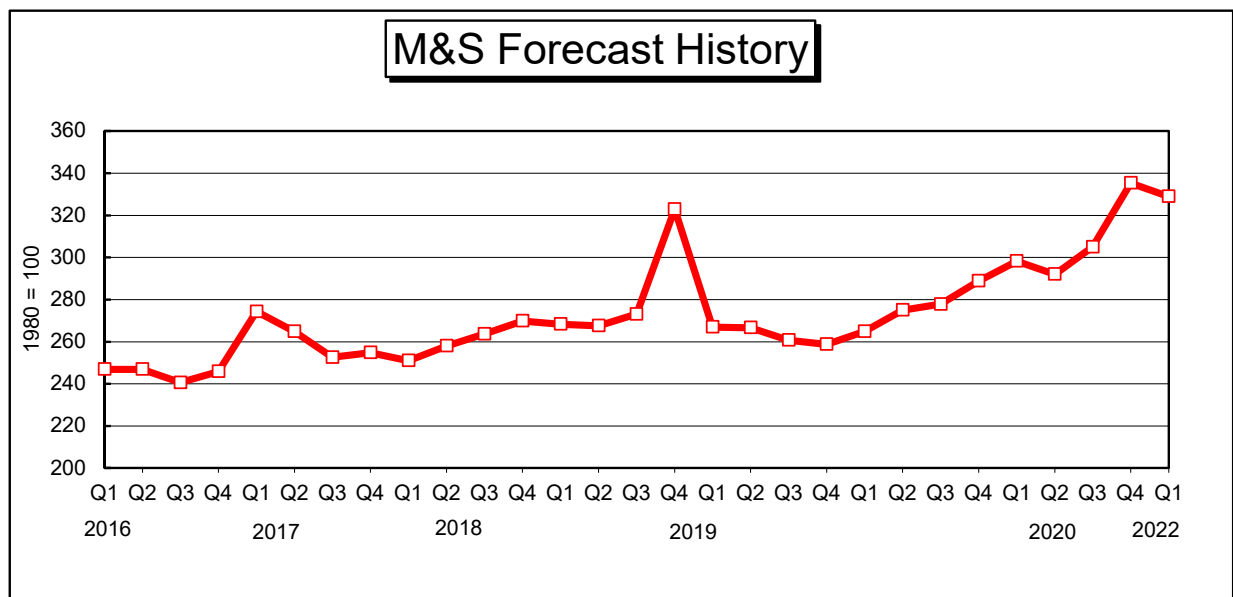
Forecast Fuel Index (1980 = 100)	467.1
Change from previous quarter forecast	-1.7%
Change from previous quarter actual	-2.8%

* Heating oil, Ultra-Low-Sulfur No. 2 Diesel Fuel, and locomotive diesel fuel are part of a group of closely related products, commonly labeled as distillates, that differ mostly by their sulfur content. Because of these similarities, these fuels are produced together and have similar pricing trends.

Materials & Supplies First Quarter 2023

The first quarter 2023 Materials & Supplies Index decreased 1.9 percent from the previous quarter. Prices decreased for Forest Products and Metal Products.

2023Q1	Materials & Supplies Index =	328.9
2022Q4	Materials & Supplies Index =	<u>335.3</u>
	Difference	-6.3 basis points or -1.9 %



Equipment Rents

First Quarter 2023

The Equipment Rents Index consists of two components – car hire and lease rentals. The methodologies used to create these two components, and the final Equipment Rents Index, are explained below.

Car Hire

The car hire component is indexed using data from the Car Hire Accounting Rate Master (CHARM) file. Car hire rates for the forecast quarter are estimated based on data for active freight cars using the most recent data available. For the first quarter, December 1 of the previous year is typically used. For the second, third and fourth quarters; March 1, June 1, and September 1 are usually used, respectively. Using data retrieved from the latest CHARM file, an average rate per car is developed. Next, those average rates are grouped into four car type categories to create an overall summary of car hire rates. The summary rates are then compared from quarter to quarter, and weighted, to determine the Car Hire Index.

Lease Rentals

The lease rentals portion of the Equipment Rents Index uses the Producer Price Index for Industrial Commodities less Fuel and Related Products and Power (PPI-LF). The Commission adopted this surrogate in its decision served March 13, 1987. The AAR uses six years of historical data to derive its forecast for the PPI-LF. The forecast is used not only for lease rentals, but also for the "Other" component of the All-Inclusive Index. Appendix G discusses the forecast in more detail.

Equipment Rents Index Calculation

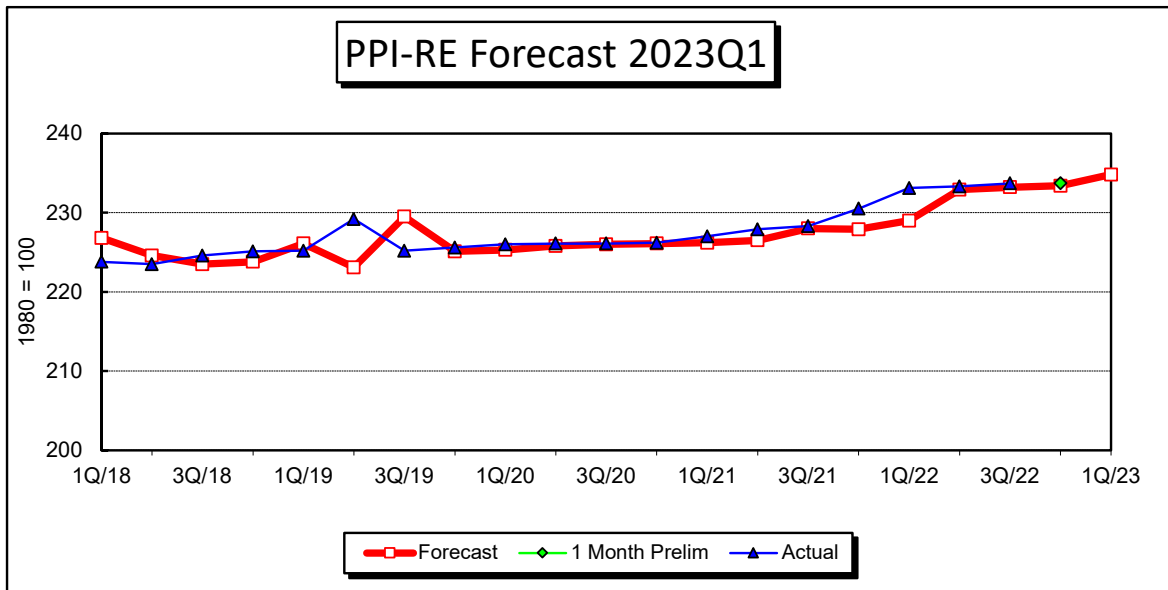
The table below calculates the Equipment Rents Index. The first quarter Car Hire portion of the Index increased 1.3 percent because of higher rates for privately-owned cars. A 3.6 percent decrease for the projected PPI-LF (See Appendix G) used as a proxy for Lease Rentals, combined with the 1.3 percent increase for Car Hire, caused the Equipment Rents Index to fall 0.7 percent.

	2021	2022Q4	2023Q1	Percent
	Weight			Change
Car Hire	68.1%	209.5	209.5	0.0 %
Lease Rentals	31.9%	290.6	280.0	-3.6
Weighted Average		235.4	232.0	-1.4
Weighted Average (Linked)		253.8	250.1	-1.5

Depreciation First Quarter 2023

The Producer Price Index for Railroad Equipment (PPI-RE) is used to index depreciation expense. The PPI-RE is forecast using an ARIMA (Auto-Regressive Integrated Moving Average) process where a statistical package picks the model that best fits the historical data set (see next page), and that model is then used for the forecast. The historical data set contains 6 years of monthly data (a sample size of 72), where the most recent available data point is the first month of the quarter prior to the forecast quarter. For a first quarter forecast, the most recent month of data available would be for October of the prior year. For a second quarter forecast, January would normally be the most recent period available. April and July would be the most recent months available for third and fourth quarter forecasts, respectively. The output from the forecast model is shown on page 2 of this appendix on a 1982=100 basis. The figure forecast by the model is 0.64% (rounds to 0.6) higher than the previous quarter's forecast.

Forecast of Depreciation Index (1982=100)	212.3
Forecast of Depreciation Index (1980=100)	234.8
Change from previous quarter forecast	0.6% = 0.64%
Change from actual first month of previous quarter	0.5% = 0.47%
Change from same quarter of prior year (actual)	0.7%



Depreciation First Quarter 2023

PPI RAILROAD EQUIPMENT

Expert Analysis

Using rule-based logic I have narrowed down the choice to exponential smoothing or Box-Jenkins. I will perform an out-of-sample test to select between these two approaches.

The cumulative MAD for Exponential smoothing was 2.66 and for Box-Jenkins was 2.16. The rolling out-of-sample test used a maximum horizon of 12 and generated 78 forecasts for each method.

Based on the lower MAD, I will use Box-Jenkins.

Model Details

Expert selection

Box-Jenkins

ARIMA(0, 1, 0)

Within-Sample Statistics

Sample size	72	No. parameters	0
Mean	204.93	Std. deviation	3.03
R-square	0.92	Adj. R-square	0.92
Durbin-Watson	2.2	Ljung-Box(18)	17.2 P=0.49
Forecast error	0.87	BIC	0.87
MAPE	0.22	SMAPE	0.22
RMSE	0.87	MAD	0.45
MAD/Mean Ratio	0		

Actual Values for the Most Recent 6 Periods:

Actual

2022-May	210.9
2022-Jun	211.0
2022-Jul	211
2022-Aug	211.7
2022-Sep	212.2
2022-Oct	212.3

Forecasted Values

	2.5 Lower	Forecast	97.5 Upper
Date	2.5 Lower	Forecast	97.5 Upper
2022-Nov	210.588	212.300	214.012
2022-Dec	209.878	212.300	214.722
2023-Jan	209.334	212.300	215.266
2023-Feb	208.875	212.300	215.725
2023-Mar	208.471	212.300	216.129
QTR AVG	208.893	212.300	215.707

Interest First Quarter 2023

The Interstate Commerce Commission, in its decision served February 28, 1989, revised the All-Inclusive Index methodology to include a specific interest component, which is to track changes in the average interest rate from year to year. The interest rate is essentially the embedded cost of debt, i.e., total interest expense divided by average total long term debt.

The interest rate is calculated for the most recent year and used until the next year's figures are finalized. The source data are from a summary of the annual reports (Form R-1) submitted by each of the Class I railroads. Although the data set is received at the end of March, it is not used until the September filing. This enables data to be entered into a database and reviewed – and any revisions made, if necessary, before the data are used in the Index. The current Interest Index is based on 2021 data, and was updated in the Q4 filing submitted on September 2, 2022. The Interest Index based on 2021 decreased from 51.1 in 2020 to 50.1 in 2021, and is the lowest in recent history.

The R-1 source for interest expense is Schedule 210, column b. The lines currently used are listed below. The source for average total debt is Schedule 200. The sums of data from columns b and c (ending and beginning balances) are combined and divided by 2 to compute an average balance. The line numbers listed below account for the line number changes effective beginning with the 2016 annual report.

Interest Expense (Schedule 210)

Line	
42	Total Fixed Charges
44	Contingent Interest
less	
22	Release of Premium on Funded Debt

Average Total Debt (Schedule 200)

Line	
29	Current Liabilities, Loans and Notes Payable
38	Equipment Obligations and Other Long Term Debt Due Within One Year
40	Non-Current Liabilities: Funded Debt Unmatured
41	Non-Current Liabilities: Equipment Obligations
42	Non-Current Liabilities: Capitalized Lease Obligations
43	Non-Current Liabilities: Debt in Default
44	Non-Current Liabilities: Accounts Payable: Affiliated Companies
45	Non-Current Liabilities: Unamortized Debt Premium

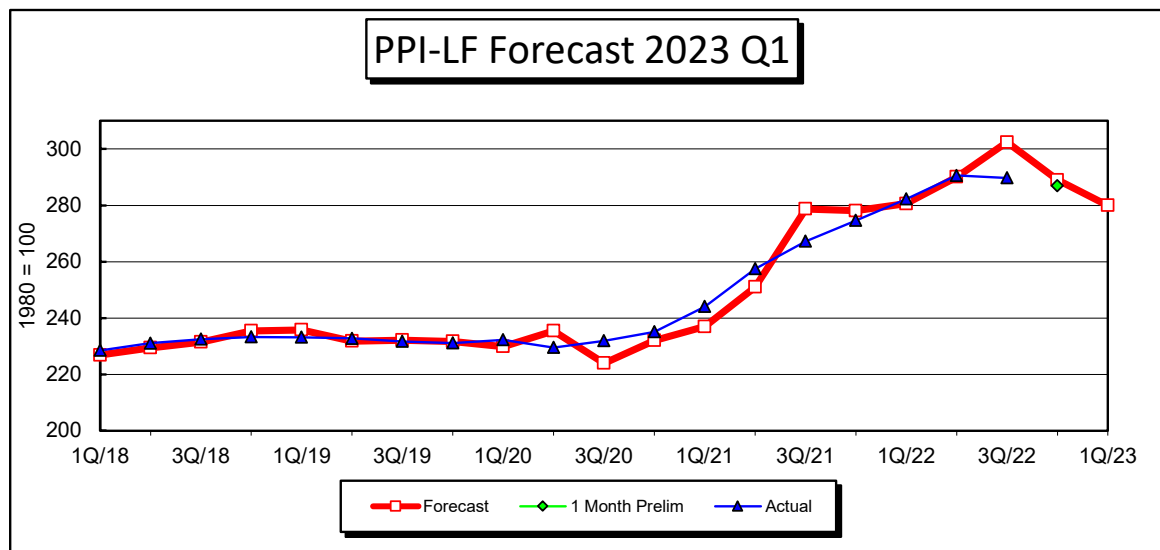
2021	Interest Rate	3.93%
1980	Interest Rate	7.85%
2023Q1	Interest Index	50.1
2022Q4	Interest Index	50.1
	Percent Change	0.0%

Other Expenses First Quarter 2023

The Producer Price Index for Industrial Commodities less Fuels and Related Products and Power (PPI-LF) is used to index purchased services, casualties and insurance, loss and damage, taxes (other than income and payroll), general and administrative expenses, and lease rentals. These expenses, when grouped together, are usually called "Other" expenses.

Like the PPI-RE, the PPI-LF is forecast using an ARIMA process on 6 years of monthly data (a sample size of 72) with the most recent available monthly data being the first month of the quarter prior to the forecast quarter. For a first quarter forecast, the most recent month of data available would be for October of the prior year. For a second quarter forecast, January would normally be the most recent month available. April and July would be the most recent months available for third and fourth quarter forecasts, respectively. The output from the forecast model is shown on page 2 of this appendix for 1982=100. The figure forecast by the model is 3.6 percent lower than the prior quarter forecast.

Forecast of Other Expense Index (1982=100)	249.8
Forecast of Other Expense Index (1980=100)	280.0
Change from previous quarter forecast	-3.6%
Change from actual first month of previous quarter	-2.4%
Change from same quarter of prior year (actual)	-0.8%



Other Expenses First Quarter 2023

**PPI INDUSTRIAL COMMODITIES LESS FUEL
AND RELATED PRODUCTS AND POWER**

Expert Analysis

Using rule-based logic I have narrowed down the choice to exponential smoothing or Box-Jenkins. I will perform an out-of-sample test to select between these two approaches.

The cumulative MAD for Exponential smoothing was 2.61 and for Box-Jenkins was 3.34. The rolling out-of-sample test used a maximum horizon of 12 and generated 78 forecasts for each method.

Based on the lower MAD, I will use Exponential Smoothing.

Model Details

Expert selection

**Multiplicative Winters: Linear trend, Multiplicative seasonality
LM(0.939, 0.998, 0.999)**

Confidence limits proportional to indexes and level

Component	Smoothing Wgt		Final Value
Level	0.941		255.7
Trend	0.9996		-1.509
Seasonal	1		
Seasonal Indexes			
Jan - Mar	1.002	0.9992	1
Apr - Jun	0.999	0.9994	0.9994
Jul - Sep	0.9996	1	0.9999
Oct - Dec	1.001	1.001	0.9998

Within-Sample Statistics

Sample size	72	No. parameters	3
Mean	216.59	Std. deviation	19.98
R-square	1	Adj. R-square	1
Durbin-Watson	1.8	Ljung-Box(18)	19.0 P=0.61
Forecast error	0.76	BIC	0.81
MAPE	0.25	SMAPE	0.25
RMSE	0.74	MAD	0.54
MAD/Mean Ratio	0		

Actual Values for the Most Recent 6 Periods:

Actual

2022-May	260.1
2022-Jun	260.4
2022-Jul	259.5
2022-Aug	258.6
2022-Sep	257.2
2022-Oct	255.9

Forecasted Values

Date	2.5 Lower	Forecast	97.5 Upper
2022-Nov	252.529	254.339	256.149
2022-Dec	248.789	252.646	256.504
2023-Jan	246.502	251.648	256.794
2023-Feb	243.322	249.495	255.668
2023-Mar	241.157	248.206	255.255
QTR AVG	243.660	249.783	255.906

Railroad and Union Abbreviations

First Quarter 2023

Railroads

BLE	Bessemer & Lake Erie Railroad (Part of CN's Grand Trunk Corp.)
BNSF	BNSF Railway Company
CC	Chicago, Central & Pacific (Part of CN's Grand Trunk Corp. Sometimes noted as CC&P.)
CN	Canadian National Railway (Commonly known as CN, owns Grand Trunk Corporation.)
CNGT	AAR's abbreviation for Grand Trunk Corporation (Almost all of CN's U.S. operations.)
CP	Canadian Pacific (Also noted as CPR. Owns the U.S. Class I railroad Soo Line.)
CPSL	AAR's abbreviation for Soo Line Corporation (CP's U.S. operations including SOO, D&H, and DME.)
CSX	CSX Transportation
D&H	Delaware & Hudson (Part of Canadian Pacific's U.S. operations, included beginning 2011Q4.)
DME	Dakota, Minnesota & Eastern (Part of Canadian Pacific's U.S. operations, included beginning 2011Q4.)
CMQ	Central Maine & Quebec (Part of Canadian Pacific's U.S. operations, included beginning 2021Q4.)
GTW	Grand Trunk Western Railroad (Part of CN's Grand Trunk Corp.)
IC	Illinois Central Railroad (Part of CN's Grand Trunk Corp.)
KCS	Kansas City Southern Railway
NS	Norfolk Southern Combined Railroad Subsidiaries (a.k.a. Norfolk Southern Railway or NS Rail)
SOO	Soo Line Railroad (The largest part of Canadian Pacific's U.S. operations.)
UP	Union Pacific Railroad
WC	Wisconsin Central and subsidiaries (Part of CN's Grand Trunk Corp.)

Major Unions Involved with Railroads

ATDA	American Train Dispatchers Association
BLET	Brotherhood of Locomotive Engineers and Trainmen Div. of the International Brotherhood of Teamsters
BMWED	Brotherhood of Maintenance of Way Employees Division of the International Brotherhood of Teamsters
BRS	Brotherhood of Railroad Signalmen
IAM	International Association of Machinists and Aerospace Workers
IBBM	International Brotherhood of Boilermakers, Iron Ship Builders, Blacksmiths, Forgers & Helpers
IBEW	International Brotherhood of Electrical Workers
NCFO	National Conference of Firemen and Oilers
SMART-TD	International Association of Sheet Metal, Air, Rail, and Transportation Workers - Transportation Division*
SMART-MD	International Association of Sheet Metal, Air, Rail, and Transportation Workers - Mechanical Division**
TCU	Transportation Communication International Union
TCU-Carmen	Brotherhood of Railway Carmen Division of the Transportation Communications International Union

Predecessor Unions (Some AAR databases use these old abbreviations.)

BLE	Brotherhood of Locomotive Engineers (predecessor to BLET)
BMWE	Brotherhood of Maintenance of Way Employees (predecessor to BMWED)
BRC	Brotherhood of Railway Carmen (predecessor to TCU-Carmen)
IBFO	International Brotherhood of Firemen and Oilers (predecessor to NCFO)
SMW	Sheet Metal Workers' International Association (see SMART-MD)
UTU	United Transportation Union (merged into SMART)
UTU-YMD	United Transportation Union Yardmaster Department (see SMART-TD)

* Represents employees formerly represented by the UTU (conductors and brakemen) and also has a separate yardmasters department.

** Represents employees formerly represented by the SMW (steel workers)