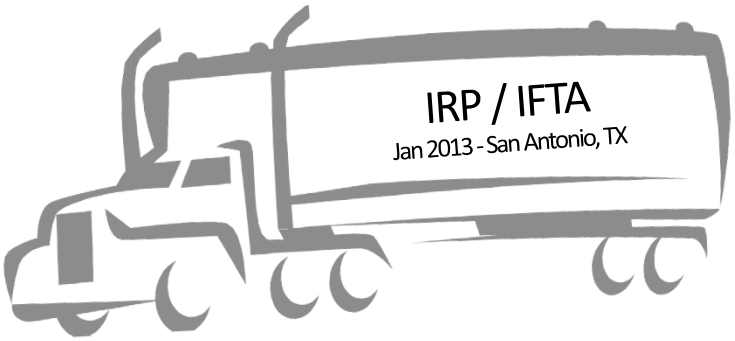
Analyzing Results & Making Adjustments



WHY Analyze

Why is analysis important ?

Common responses:

- **"The numbers speak for themselves… it's simple compare sample with recorded, calculate error rate, project to population, and there it is…audited distance."**

"Any errors that a licensee has made will be accounted for when the error rate is calculated and projected."

Is that really all there is to it?

Types of Errors

Two types of errors

- Isolated & Recurring:

What is the difference…

- Isolated - non-recurring, an exception
- Recurring – an error that is consistently made

So what makes an error isolated and/or recurring?

One is projectable, one is not.

Examples of Errors Isolated or Recurring

Trips ending after the end of the quarter were not included in the summaries.

Is this distance deducted from IVDRs or added to summaries?

All vehicles are registered in CA. However, 4 out of 18 units operate out of the NV terminal, and four others out of the UT terminal. All vehicles have the same operation.

Should the vehicles be included in the sample?

What if the vehicles operate out of multiple terminals

Example #1 – Original Information

	3Q06	4Q06	1Q07	2Q07	TOTAL	JUR %
AZ	-	-	-	-	-	
CA	125,111	126,277	108,973	130,176	490,537	52.428
ID	1,071	-	1,107	124	2,302	0.246
NV	1,603	-	4,676	1,453	7,732	0.826
OR	65,541	73,446	29,790	93,745	262,522	28.058
UT	236	-	1,106	246	1,588	0.170
WA	29,593	33,254	64,109	44,010	170,966	18.272
Total	223,155	232,977	209,761	269,754	935,647	

These are the original summaries as provided by the registrant – from which we will select our sample quarter

Example #1
Selected Quarter

⇩

	3Q06	4Q06	1Q07	2Q07	TOTAL
AZ	-	-	-	-	-
CA	125,111	126,277	108,973	130,176	490,537
ID	1,071	-	1,107	124	2,302
NV	1,603	-	4,676	1,453	7,732
OR	65,541	73,446	29,790	93,745	262,522
UT	236	-	1,106	246	1,588
WA	29,593	33,254	64,109	44,010	170,966
Total	223,155	232,977	209,761	269,754	935,647

Quarterly summaries are broken down by vehicle

Audited Distance without Analysis

	1Q07	IVDRS	+/-	% of Error	Audited Total	Jur %
AZ		1,330	1,330		1,330	0.09375
CA	108,973	135,070	26,097	0.2395	608,011	42.85795
ID	1,107	3,612	2,505	2.2629	7,511	0.52945
NV	4,676	8,886	4,210	0.9003	14,693	1.03572
OR	29,790	77,072	47,282	1.5872	679,191	47.8753
UT	1,106	5,551	4,445	4.0190	7,970	0.56181
WA	64,109	37,483	(26,626)	(0.4153)	99,160	7.04603
TOTAL	209,761	269,004	59,243		1,418,667	

No analysis performed on original summaries or on the calculated results

Analyzing Differences

Where do we start?

	1Q07	IVDRS	+/(-)	% of Error ⇩
AZ		1,330	1,330	
CA	108,973	135,070	17,097	0.2395
ID	1,107	3,612	2,505	2.2629
NV	4,676	8,886	4,210	0.9003
OR	29,790	77,072	47,282	1.5872
UT	1,106	5,551	4,445	4.0190
WA	64,109	37,483	(26,626)	(0.4153)

Error rate percentages –

The first indication that something is amiss - what is acceptable?

Ratio between Jurisdictions

	3Q06	4Q06	1Q07	2Q07
AZ	-	-	-	-
CA	125,111	126,277	108,973	130,176
ID	1,071	-	1,107	124
NV	1,603	-	4,676	1,453
OR	65,541	73,446	29,790	93,745
UT	236	-	1,106	246
WA	29,593	33,254	64,109	44,010

The ratio between OR & WA for the other three quarters is 50-55%

for our test period, the ratio is 215%

Analyzing Differences – Start with the Source

	1Q07	Jan & Feb	Corrected 1Q07
AZ		914	914
CA	108,973	12,054	121,027
ID	1,107	2,899	4,006
NV	4,676	5,114	9,790
OR	29,790	5,960	70,069
UT	1,106	2,842	3,948
WA	64,109	2,517	32,307
TOTAL	209,761	32,300	242,061

Total distance for OR & WA was transposed

Add in distance for two newly acquired vehicles

Analyzing Differences

	ADJ 1Q07	IVDRS	Variance +/-	% of Error	Audited Total	JUR %
AZ	914	1,330	416	0.4551	1,330	0.1229
CA	121,027	135,070	14,043	0.1160	560,908	51.8683
ID	4,006	3,612	(394)	(0.0984)	4,689	0.4336
NV	9,790	8,886	(904)	(0.0923)	11,660	1.0782
OR	70,069	77,072	7,003	0.0999	333,064	27.3084
UT	3,948	5,551	1,603	0.4060	6,229	0.5759
WA	32,307	37,483	5,176	0.1602	161,460	18.6125
TOTAL	242,061	269,004			1,079,340	

The summary totals have been corrected; the results are better…

but are they accurate?

Findings

- Non-apportioned distance for vehicles transferred to non-apportioned fleet - 16,007 miles
- The distance for one vehicle was all allocated to one jurisdiction, despite the vehicle traveling interstate
- One driver only records out of state trips on the trip sheets. The carrier adjusts the reported based on odometer readings - 29,965

EFFECTS OF ADJUSTMENTS ON THE ACCURACY OF RESULTS

	1Q07	Adj	Adj 1Q07	IVDRs	Variance + / (-)	% of Error	Audited Distance	JUR %
AZ	914		914	1,330	416	0.4551	1,330	0.1163
CA	121,027	(21,046)	99,891	126,070	35,089	0.3510	657,301	57.4813
ID	4,006	(437)	3,569	3,612	43	0.0120	5,264	0.4603
NV	9,790	(2,196)	7,594	8,886	1,292	0.1701	15,032	1.3145
OR	70,069	5,622	75,691	77,072	1,381	0.0182	308,267	26.9581
UT	3,948	(786)	3,162	5,551	2,389	0.7555	7,777	0.6801
WA	32,307	2,836	35,143	37,483	2,340	0.0666	148,534	12.9894
	242,061	(16,007)	226,054	260,070	42,950		1,143,504	100.0

Non-apportioned distance is deducted and allocation errors are corrected.

Findings

- The carrier uses monthly trips sheets, which are summarized at the end of each month, and used to compile quarterly summaries. Total and jurisdictional distance is determined by odometer readings. The driver of one unit records all local trips and fuel purchases on a separate trip sheet, causing the odometer readings to overlap and distance to be overstated. Because the odometers are reconciled to the monthly trip sheets and not the quarterly or annual distance, this error was never caught.

EFFECTS OF ADJUSTMENTS ON THE ACCURACY OF RESULTS

	1Q07 Summaries	Unit #3	Adjusted Summaries	Adjusted IVDRs	Variance + / (-)	% of Error	Audited	JUR %
AZ	914		914	1,330	416	0.4551	1,330	0.1301
CA	99,981	(16,757)	116,738	123,888	7,150	0.0612	534,128	52.2335
ID	3,569		3,569	3,612	43	0.0120	5,264	0.5147
NV	7,594		7,594	8,886	1,292	0.1701	15,032	1.4700
OR	75,691	(5,322)	70,369	73,948	3,579	0.0509	312,548	30.5647
UT	3,162		3,162	5,551	2,389	0.7555	7,777	0.7605
WA	35,143	(2,699)	32,444	34,805	2,361	0.0728	146,500	14.3265
	226,054		234,790	252,020	17,230		1,022,578	

Adjustments have been made for isolated errors or the unit has been excluded from the sample. Based on our findings, this is the audited distance

Changes in Error Rates

	Error % #1	Error % #2	Error % #3	Error% #4
AZ		45.51%	45.51%	45.51%
CA	23.95%	11.60%	35.10%	6.12%
ID	226.29%	(9.84%)	1.20%	1.20%
NV	90.03%	(9.232)	17.01%	17.01%
OR	158.72%	9.99%	1.82%	5.09%
UT	402.90%	40.60%	75.55%	75.55%
WA	(41.53%)	16.02%	6.66%	7.28%

1. No analysis – before or after .
2. Summaries are corrected
3. Non-Apportioned Distance is excluded & allocation errors are corrected
4. Vehicle taken out of sample

Adjustments & the Accuracy of Results

	Audited [1]	%	Audited [2]	%	Audited [3]	%	Audited [4]	%
AZ	1,330	0.0937	1,330	0.1232	1,330	0.116	1,330	0.1301
CA	608,011	42.858	560,908	51.968	657,301	57.481	534,128	52.234
ID	4,200	0.5295	4,689	0.4345	5,264	0.460	5,264	0.5145
NV	14,693	1.0357	11,660	1.0803	15,032	1.3145	15,032	1.470
OR	679,191	47.875	333,064	30.858	308,267	26.958	312,548	30.565
UT	7,970	0.5618	6,229	0.577	7,777	0.680	7,777	0.761
WA	99,960	7.046	161,460	14.959	148,534	12.989	146,500	14.327
	1,418,667		1,079,340		1,143,504		1,022,578	

1. No analysis – before or after .
2. Summaries are corrected.
3. Non-Apportioned Distance is excluded & allocation errors are corrected
4. All isolated errors have been adjusted, & error rates projected to the population.

Now on a Larger Scale

Isolated v Projected Rates

Analyzing Results and Making Adjustments

- The original sample included 120 units out of a total of 3,150 units operated during the sample quarter.
- The overall sample was determined to be representative of the company's operation.
- Total miles for the audit period:
- 1,000,000,000

Analyzing Results and Making Adjustments

- The original sample produced these results:

- Reported miles sample qtr: 4,016,686
- Audited miles sample qtr: 4,085,861

- Total Miles Error Rate found: 1.72%

Analyzing Results and Making Adjustments

- However….
- Let's take a closer look at the 120 units in the sample.
- 18 units in the sample operated only intra-jurisdictionally. (15%)

Analyzing Results and Making Adjustments

- By removing these 18 units from the results the error rate went up from 1.72% to 1.82%.
- But now what do you do with the miles found from these intra-jurisdictional units? (Discussion)

Analyzing Results and Making Adjustments

- After closer examination…
- The auditors noticed 34 additional units that ran in only two or three jurisdictions. (28%)
- Question: Should they remain in the sample with long haul units or does it skew the results?

Analyzing Results and Making Adjustments

- Decision: These units could not accurately project the error factors for long haul operations. Total distance/fuel for these units were backed out of the sample and the error rates were recomputed.

Analyzing Results and Making Adjustments

- By removing the 34 local operations units from the sample the error rate now went up to 2.02%.
- First the jump went from 1.72% to 1.82% and now to 2.02%.

Analyzing Results and Making Adjustments

- What other interesting factors did the auditors notice with the sample?
- 17 units had results where audited miles was 1,000 or more miles greater than reported miles. (14%)
- 15 units had results where total + or - changes were greater than 5,000 miles.
- In 4 units, the total changes was > 20,000!
- One unit had 46,911 miles in changes!

Analyzing Results and Making Adjustments

- The Auditors decided to try a new approach and isolated the four units with very large errors found.
- What happened when complete? The overall error rate went from 1.72% to 1.60%

Analyzing Results and Making Adjustments

- Although all these changes seem minimal, the next several slides will show what happened to jurisdictions that were affected by the units that were isolated out of the sample.
- Remember – This is a very large company and each 1/10th of one percent total miles error rate is equal to 1.14 million total miles change to the audit period. Not to mention the affect to the MPG if additional fuel is not found.

Error Rates from Original Sample (selected jurisdictions)

Jurisdiction	Reported Miles	Audited Miles	Error Rate
Colorado	67,087	45,927	-31.54
Georgia	99,526	101,204	1.69
Illinois	191,674	194,209	1.32
Louisiana	12,320	13,428	8.99
Maryland	10,035	9,780	-2.54
New Mexico	172,575	194,151	12.50
New York	102,364	103,021	0.64
Oklahoma	164,971	183,213	11.06
Texas	335,522	351,078	4.64
Utah	55,047	37,355	-32.14

Error Rates when operation from Intra-jurisdictional only units Isolated

Jurisdiction	Reported Miles	Audited Miles	Error Rate
Colorado	67,087	45,927	-31.54
Georgia	60,278	61,956	2.78
Illinois	176,930	179,428	1.41
Louisiana	12,320	13,428	8.99
Maryland	10,035	9,780	-2.54
New Mexico	172,575	194,151	12.50
New York	45,064	45,721	1.46
Oklahoma	164,971	183,213	11.06
Texas	284,243	297,855	4.79
Utah	55,047	37,355	-32.14

Error Rates when operation from Intra-jurisdictional only units Isolated

- Only a couple of jurisdictions had any material changes by removing the intra-jurisdictional only units from the sample. GA and NY had the biggest changes, but any jurisdiction where these units were found had some adjustments.
- Other jurisdictions saw no changes because the reported and audited miles did not change.

Error Rates when Intra-jurisdictional only and local travel units Isolated

Jurisdiction	Reported Miles	Audited Miles	Error Rate
Colorado	64,691	43,531	-32.71
Georgia	33,789	35,467	4.97
Illinois	166,358	168,812	1.48
Louisiana	12,232	13,340	9.06
Maryland	8,731	8,472	-2.97
New Mexico	170,687	192,263	12.64
New York	18,809	19,466	3.49
Oklahoma	123,637	140,761	13.85
Texas	189,493	201,970	6.58
Utah	54,541	36,849	-32.44

Error Rates when operation from Intra-jurisdictional only units Isolated

- By pulling out the non-IFTA units and units the auditors really couldn't determine audited miles, we are now seeing some greater changes in the error rates. Just from this sampling of jurisdictions, there are four jurisdictions that had their error rate change by 2% or more!

Error Rates when the four units with major errors Isolated out

Jurisdiction	Reported Miles	Audited miles	Error rate
Colorado	52,214	45,182	-13.47
Georgia	99,217	101,050	1.85
Illinois	170,636	171,662	0.60
Louisiana	11,935	13,235	10.89
Maryland	9,548	9,379	-1.77
New Mexico	150,582	158,999	5.59
New York	101,908	102,565	0.64
Oklahoma	142,656	148,890	4.37
Texas	313,027	322,847	3.14
Utah	41,871	35,398	-15.46

Error Rates when the four units with major errors Isolated out

- By isolating the four units from the sample several of these selected jurisdictions saw their error rate significantly change with the biggest change being 18 percentage points!
- However, one jurisdiction did not even see a change with these adjustment.

Error Rates when the four units with major errors Isolated out

- By only removing these four units, the total adjustments to one jurisdiction for the entire audit period will remove about 4,000,000 miles in adjustments!
- In another, this method ADDS about 4,000,000 miles to their operations as compared to not making any isolated adjustments!

Comparison of Error Rates by Adjustment

Jurisdiction	Original Audited	Removal of non-IFTA units	Removal of local and non-IFTA	Removal of four units with largest errors
Colorado	-31.54%	-31.54%	-32.71%	-13.47
Georgia	1.69%	2.78%	4.97%	1.85%
Illinois	1.32%	1.41%	1.48%	0.60%
Louisiana	8.99%	8.99%	9.06%	10.89%
Maryland	-2.54%	-2.54%	-2.97%	-1.77%
New Mexico	12.50%	12.50%	12.64%	5.59%
New York	0.64%	1.46%	3.49%	0.64%
Oklahoma	11.06%	11.06%	13.85%	4.37%
Texas	4.64%	4.79%	6.58%	3.14%
Utah	-32.14	-32.14%	-32.44%	-15.46%
Total Miles Error %	1.72%	1.82%	2.02%	1.60%

Other issues to consider

- In this audit RI was found to have a 52.63% error rate. The sample quarter RI had 36,022 reported miles on the tax return and only 38 reported miles was included for the sample units. It only took 20 additional miles to give RI an increase in distance of 52.63%. If projected, this gives RI an additional 150,000 miles.
- Although 4.25% of the total miles in the sample quarter was selected through the sampled units, only .106% of RI's miles was selected in the sample units.

Other issues to consider

- On the other hand, ND had 20.134% of their 354,780 sample quarter total miles included in the sample quarter.
- Then we have ME with 126,041 miles reported in the sample quarter. The selected sample units represented 0.000% of those miles. VT and SD also had over 50,000 miles in the sample quarter and were not represented in the sample.

Other issues to consider

- Should the sample be examined to ensure each jurisdiction has a representation?
- How much time is needed to be spent on determining a representative sample?
- If units are randomly chosen, can you specifically add one or two units to cover the missing jurisdictions? Can you replace units to balance out the representation?

Conclusion

- In many audits there are multiple valid reasons to isolate out individual sample units from the sample population
- Be aware of your original sample and any adjustments to that sample. Review changes!
- Although your decision to isolate some units may seem small, they can have material effects on the audit!
- Your sample may create unrealistic error rates to project. Analyze the data!