

Docket No. F.D. 30400-10/19/84- PAGES-2822-2880



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BEFORE THE

INTERSTATE COMMERCE COMMISSION

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In the Matter of: :

SANTA FE SOUTHERN PACIFIC CORPORATION : Finance Docket

-- CONTROL -- : 30400 et al.

SOUTHERN PACIFIC TRANSPORTATION :

COMPANY :

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Hearing Room A

12th & Constitution, N.W.

Washington, D.C.

Friday, October 19, 1984

The hearing in the above-entitled matter was convened, pursuant to notice, at 9:00 a.m.

BEFORE:

JAMES E. HOPKINS,

Administrative Law Judge

APPEARANCES AS HERETOFORE NOTED, AND IN ADDITION:

On behalf of the Missouri-Kansas-Texas

Railroad:

MARK T. PRIESING, Esq.

Calland, Kharasch, Morse & Garfinkle

1054 31st Street, N.W.

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JUDGE HOPKINS: Let's go back on the record.

Mr. Kharasch, do you have something you wanted to say?

MR. KHARASCH: First may we enter the appearance of Mark Priesing of our firm on the record, appearing for MKT.

JUDGE HOPKINS: Thank you.

MR. KHARASCH: We will have a procedural discussion, perhaps, at the break, Your Honor, if that's all right with you. Mr. Levy is unavoidably required to attend another proceeding on Monday and we must accommodate him.

JUDGE HOPKINS: Would you want to discuss this at the break?

MR. KHARASCH: Yes, Your Honor.

JUDGE HOPKINS: Let's call the first witness, then.

MR. WILSON: Your Honor, the Applicants' next scheduled witness, Robert Keyes, had a heart attack last Saturday and because of his physical condition is unable to appear and testify. Applicants offer as a substitute witness Dr. David L. Hill. Applicants call Dr. Hill at this time.

(Witness sworn.)

1 Whereupon,

2 DAVID LAWRENCE HILL

3 was called as a witness by counsel for Applicants and,  
4 having been first duly sworn, was examined and testified  
5 as follows:

6 DIRECT EXAMINATION

7 BY MR. WILSON:

8 Q Dr. Hill, could you please state your full  
9 name, your business address, and the company by whom you  
10 are employed?

11 A My name is David Lawrence Hill, business  
12 address Topeka, Kansas, and I'm employed by the  
13 Atchison, Topeka & Santa Fe Railway Company.

14 Q Dr. Hill, what is your present position with  
15 Santa Fe?

16 A Present position is senior research  
17 assistant.

18 Q Dr. Hill, could you please describe your  
19 educational background?

20 A I have a bachelor's in mathematics from  
21 Bucknell University and a master's and a Ph.D. in  
22 statistics from the University of Florida.

23 Q Dr. Hill, have you held any positions as an  
24 educator?

25 A Yes, I was an assistant professor for three



1 years at North Illinois University and taught courses in  
2 statistics and probability.

3 Q Dr. Hill, during your career at Santa Fe did  
4 you participate in the development of sampling plans for  
5 various company purposes?

6 A Yes, I have.

7 Q Dr. Hill, have you participated in the  
8 development of any rail traffic diversion studies  
9 submitted to the ICC?

10 A Yes, I have. I have participate in the  
11 traffic diversion study estimating gains to the Santa Fe  
12 resulting from control of the Toledo, Peoria & Western  
13 Railway, and also in the traffic study estimating losses  
14 to the Santa Fe resulting from the Union Pacific  
15 merger.

16 I submitted verified statements in both of  
17 those proceedings, and my role was to design the  
18 sampling procedures used and to calculate the estimates,  
19 various estimates of revenue gain or loss.

20 Q Sir, would you describe the sampling plan and  
21 the calculations of standard error and confidence  
22 intervals which were performed by Mr. Keyes as work  
23 which was similar in terms of quality to the work which  
24 you performed in the two rail traffic diversion studies  
25 with respect to which you submitted verified

1 statements?

2 A Yes, I would.

3 Q Do you have any changes or modifications you  
4 would like to make to Mr. Keyes' verified statement at  
5 this time?

6 A No, I don't.

7 Q You have read Mr. Keyes' statement and  
8 understard the statement?

9 A Yes.

10 Q Dr. Hill, do you adopt Mr. Keyes' verified  
11 statement as your own?

12 A Yes, I do.

13 Q Is that statement true and correct to the best  
14 of your knowledge and belief?

15 A Yes, it is.

16 MR. WILSON: The witness is available for  
17 cross-examination, Your Honor.

18 JUDGE HOPKINS: Mr. Calhoun?

19 MR. CALHOUN: KCS has no cross-examination of  
20 this witness.

21 JUDGE HOPKINS: Thank you.

22 Mr. Kharasch?

23 CROSS EXAMINATION

24 BY MR. KHARASCH:

25 Q Dr. Hill, did you participate yourself in the



1 diversion study which is described in volume SFSP-14 of  
2 the record by witnesses Keyes, Swain and Guerin?

3 A No, I did not.

4 Q You had no contact with it?

5 A No.

6 Q Did you in the year 1983 participate in the  
7 study which was prepared for the Santa Fe board of  
8 directors on the general subject of possible merger  
9 partners and advantages of merger?

10 A No, I did not.

11 Q Have you ever heard of that study?

12 A No.

13 Q Do you know, with respect to the diversion  
14 study described in volume SFSP-14 in this case, at what  
15 time the study was initiated and at what times various  
16 steps were performed?

17 A No, I don't.

18 Q Let's turn, if we could, to the statement of  
19 Robert Keyes which you have adopted. There is published  
20 from time to time an annual waybill sample, often  
21 perhaps inaccurately referred to as the ICC one percent  
22 sample; is that correct?

23 A I believe so, yes.

24 Q The ICC waybill sample was one of the records  
25 of actual happenings in the year 1982 which was used in

1 this case in preparation of the diversion study; is that  
2 correct?

3 A That's correct.

4 Q The ICC waybill sample purports to sample all  
5 U.S. rail traffic; is that correct?

6 A I believe that's correct.

7 Q The ICC waybill sample has various sampling  
8 rates for what one might call various strata of  
9 traffic?

10 A That's correct.

11 Q At the lowest sampling rate, it picks one in  
12 100?

13 A I'm not sure. I could check on that for you.

14 Q What's the piece of paper handed to you by  
15 counsel that you're referring to?

16 A It's a piece of paper with some notes on it,  
17 and included on that is a description of the sampling  
18 rates and definition of strata used in the ICC waybill  
19 sample.

20 Q With reference to that piece of paper handed  
21 to you by counsel and my previous question, is it  
22 correct that at the lowest sampling rate the ICC waybill  
23 sample takes one in 100?

24 A That's correct.

25 Q And there are certain higher sampling rates



1 for other types of traffic as defined in different  
2 strata of the sample; is that correct?

3 A That's correct.

4 Q What's the highest sampling rate?

5 A I believe the highest is one out of two.

6 Q A preliminary question on page 3 of the Keyes,  
7 adopted by Hill, statement. There are references  
8 sometimes to Southern Pacific and sometimes to SSW,  
9 which is the Cotton Belt, a subsidiary of the Southern  
10 Pacific; is that correct?

11 A I believe so, yes.

12 Q Was SSW traffic sampled to accumulate the base  
13 of actual 1982 movements here?

14 A Yes, it was. The SSW traffic was part of the  
15 files that contain the Southern Pacific traffic.

16 Q If I understand this statement, this  
17 happened: first, there was available as data the ICC  
18 waybill sample, which covered all railroads in the  
19 United States and their traffic; and second, there was  
20 available data from Santa Fe-Southern Pacific, including  
21 SSW traffic, tapes of traffic they carry; is that  
22 correct?

23 A Yes.

24 Q Those two in a way duplicate, in that within  
25 the ICC sample, which is broader, there would have been

1 Santa Fe and Southern Pacific carried movements?

2 A That's correct.

3 Q And therefore, in order to put them together  
4 and not double count, it was necessary to eliminate from  
5 the ICC sample anything that was sampled in the Santa  
6 Fe-SP-SSW sample?

7 A That's correct.

8 Q Now, Dr. Hill, the effect of combining the ICC  
9 waybill sample and the SF-SP railroad samples is that  
10 the data base of actual 1982 movements has a much  
11 heavier sampling of traffic which was touched by the  
12 Santa Fe and the Southern Pacific and a much lighter  
13 sampling of traffic not so touched?

14 A I don't think that's necessarily true by just  
15 combining the two data bases. It would depend on the  
16 sampling rates used.

17 Q All right. Let's take part of the ICC data  
18 base that had a sampling rate of one to 100. Now, what  
19 was left after combination of the two types of samples,  
20 ICC and Applicants' samples, is a collection of data in  
21 which any movement that was not touched in 1982 by the  
22 Applicants was sampled only by the ICC sample?

23 A That's correct.

24 Q In that ICC sample, you said the lowest  
25 sampling rate was one to 100?



1 A That's correct.

2 Q But in the Applicants' samples, SF and SE,  
3 what is the lowest sampling rate?

4 A It's one in ten.

5 Q All right. So in the part of the combined  
6 data that deals with anything touched by the Applicants,  
7 you had ten times as frequent a sample at the lowest  
8 sampling rate as you have in the ICC sample at the  
9 lowest sampling rate?

10 A If you're comparing the sampling rate for the  
11 one strata in the ICC sample, which is one in 100, with  
12 the two strata in the Santa Fe, that's true. But there  
13 are also strata in the ICC sample which were sampled at  
14 a higher rate.

15 Q That's correct.

16 Do you have before you on that slip of paper  
17 the sampling rates in the ICC sample? Perhaps you would  
18 read them in.

19 A Okay. Would you like the definition of the  
20 strata as well?

21 Q Yes.

22 A Okay.

23 MR. CALHOUN: Your Honor, could we ask the  
24 witness to speak up a little louder?

25 JUDGE HOPKINS: Would you speak up a little

1 louder.

2 THE WITNESS: There are two cases. One is  
3 electronic submission by computer and the other is  
4 manual. For the electronic, stratum one, the sampling  
5 rate is one in 40; the definition is one to two cars on  
6 the waybill.

7 Stratum two, the sampling rate is one in 12;  
8 the definition is 3 to 15 cars on the waybill.

9 Stratum three, sampling rate one in four; 16  
10 to 60 cars on the waybill.

11 Stratum four, sampling rate one in three; 61  
12 to 100 cars on the waybill.

13 Stratum five, one in two; more than 100 cars  
14 on the waybill.

15 For the manual side: Stratum six, sampling  
16 rate of one in 100; definition, one to five cars on the  
17 waybill.

18 Stratum seven, sampling rate one in ten; six  
19 to 25 cars on the waybill.

20 Stratum eight, sampling rate one in five; more  
21 than 26 cars on the waybill.

22 There's also a stratum nine, but it was not  
23 relevant for the year 1982.

24 Q In the way the ICC waybill sample and the  
25 Applicants' data samples were put together to make the



1 data base for the 1982 movements in this case, is it  
2 correct that for traffic that was not touched by the  
3 Santa Fe or Southern Pacific systems, that data comes  
4 exclusively from the ICC waybill sample?

5 A Yes, that's correct.

6 Q As to that traffic that was not touched by the  
7 Applicants in 1982, is the data base any more or less  
8 reliable than the ICC waybill sample?

9 A Please repeat that?

10 MR. KHARASCH: Perhaps we'll have it read  
11 back.

12 THE REPORTER: "Q. As to that traffic that  
13 was not touched by the Applicants in 1982, is the data  
14 base any more or less reliable than the ICC waybill  
15 sample?"

16 THE WITNESS: Which data base?

17 BY MR. KHARASCH: (Resuming)

18 Q The data base assembled of 1982 traffic that  
19 is used in the Applicants' diversion study.

20 A Which consists of the ICC waybill sample plus  
21 the Santa Fe and Southern Pacific data?

22 Q Yes. And now the question is, as to the  
23 portion of that data base that deals with traffic not  
24 touched by the Applicants in 1982, is that portion any  
25 more or less reliable than the ICC waybill sample?

1 A They seem to be equivalent.

2 Q Thank you.

3 Let's turn to the revenue allocation  
4 discussion, formula discussion at pages 5 and following  
5 of the Keyes statement. Are you familiar with this  
6 enough to stand cross-examination, Dr. Hill?

7 A I believe so.

8 Q Explain on page 5 at the beginning of the  
9 second paragraph what the reference means when it says,  
10 "With the Staggers Act, there has been a tendency toward  
11 more proportional rates."

12 A I believe that means, with deregulation  
13 there's been less of a tendency for rates to be figured  
14 on old divisions and more of a tendency for railroads to  
15 work out rates between themselves.

16 Q All right. Now, there is a technical meaning  
17 of "proportional rates," which is a particular type of  
18 rate publication. Are you aware of that?

19 A No.

20 Q You don't think the reference is to that  
21 technical meaning of "proportional rates"? That is,  
22 rates which are conditioned on a prior or subsequent  
23 move?

24 A No.

25 Q And the word "proportional" on page 5 does not



1 mean proportional to distance or something like that?  
2 It just means rates set by head to head bargaining?

3 A No. I was reading that as being proportional  
4 to distance.

5 Q To distance. What is the evidence and what is  
6 the source of the evidence for the statement, "With the  
7 Staggers Act, there has been a tendency toward more  
8 proportional rates"?

9 A I don't know.

10 MR. WILSON: Your Honor, for the record, we of  
11 course -- because of the situation here, witnesses Feyff  
12 and Swain can discuss their experience, their personal  
13 experience with this phenomenon for Mr. Kharasch.

14 JUDGE HOPKINS: Thank you.

15 BY MR. KHARASCH: (Resuming)

16 Q What's being described at pages 5 and  
17 following in the statement, Dr. Hill, is a formula for  
18 allocating revenues that estimate what the actual  
19 allocations, that is divisions of revenues, were between  
20 carriers participating in a joint line move; is that  
21 right?

22 A Yes.

23 Q Let's take an origin point and call it C.  
24 Suppose a certain carrier, we will call it railroad X,  
25 serves that origin point exclusively. It's the only

1 railroad serving it. It carries the traffic 20 miles to  
2 a junction where it may be interchanged with a number of  
3 other carriers.

4 Do you have the hypothetical in mind?

5 A Okay, yes, I do.

6 Q Now, that hypothetical actually exists in the  
7 real world, does it not? Let me give you an example.  
8 South of Houston there's a line we have called the  
9 Bayport line which is exclusively served by the Southern  
10 Pacific, and the Bayport line leads up to Houston, which  
11 is a major rail center.

12 And Southern Pacific may in an instance carry  
13 cargo from a point on the Bayport line, which it serves  
14 exclusively, to Houston, where it then may be  
15 interchanged with a number of other carriers.

16 JUDGE HOPKINS: Did you say yes?

17 THE WITNESS: That's fine with me, yes.

18 BY MR. KHARASCH: (Resuming)

19 Q Now, in that circumstance the formula gives a  
20 computation for the assumed division of the joint line  
21 revenue between the Southern Pacific and whatever other  
22 railroad picks it up in Houston and carries it on, is  
23 that right?

24 A Yes.

25 Q Suppose the carrier that exclusively serves



1 the point south of Houston on this Bayport line says to  
2 the other railroads: I demand a higher proportion than  
3 your formula would give. Do you know whether that has  
4 ever happened?

5 A No, I don't.

6 Q Do you know whether, in preparation of this  
7 formula, any attention was paid to looking at  
8 circumstances such as the one we just described?

9 A No, I don't. I think that may be a question  
10 that Mr. Beyff and/or Mr. Swain can answer.

11 Q Let's turn over to page 6 and the nice little  
12 page of figures. Now, if I understand what is being  
13 said there, it is that the people making this diversion  
14 study did have available to them the settled revenues,  
15 so-called, that is, the amount of money that was  
16 actually split between carriers in divisions, for  
17 traffic that was handled by the Santa Fe and Southern  
18 Pacific.

19 A For a portion of that traffic, yes.

20 Q A portion of that traffic. What portion of  
21 that traffic?

22 A Well, I was told that it was not available for  
23 all of the traffic.

24 Q Who told you that, sir?

25 A Dennis Wilson.

1 Q One of the counsel for the Applicants?

2 A Yes, that's correct.

3 Q Excuse me. One of the distinguished counsel  
4 for the Applicants.

5 Let's look at the table together, Dr. Hill, in  
6 the middle of page 7. There seem to be plusses and  
7 minusses entered in three columns on a number of lines  
8 with railroad acronyms. Do you see that?

9 A Yes, I do.

10 Q Please first explain to us what the meaning is  
11 of a plus or a minus. What's the significance of a  
12 plus? What kind of variance?

13 A A plus indicates that the revenue as  
14 determined by the allocation formula is greater than the  
15 revenue as determined by the data available on the  
16 settled revenue. And the percentage is the percentage  
17 of the overstatement.

18 Q These figures of variances must have been  
19 prepared, I assume, by a comparison of formula  
20 predictions with some actual interline settled revenues;  
21 is that correct?

22 A That's correct.

23 Q What actual interline settled revenues were  
24 compared?

25 A You mean what was the source of the settled



1 revenue or what waybills were used?

2 Q Yes. Was a sample used? Were all the SFSP  
3 movements used and their settlements, were some of those  
4 used, say just those that were put in by sample into the  
5 data base, or was there some other selection or sample?

6 A The selection was the Santa Fe-Southern  
7 Pacific waybills that were sampled also had settled  
8 revenue data.

9 Q May we start using the word "universe." Of  
10 the universe of Santa Fe-Southern Pacific actual 1982  
11 movements which were available, some were selected by a  
12 sampling procedure for inclusion in the data base that  
13 we have discussed earlier?

14 A That's correct.

15 Q Those some sometimes had settled revenues and  
16 sometimes did not; is that correct?

17 A That is correct.

18 Q Please tell us what proportion of the selected  
19 for the data base SFSP movements had settled revenues  
20 and which did not.

21 A I do not know the proportion.

22 Q Does it make a difference to you as a  
23 statistician?

24 A No. As far as determining this allocation  
25 formula or as far as the results of the traffic study on

1 diverted revenue, I'm not sure.

2 Q Apparently the table -- I'm sorry. Had you  
3 finished your answer?

4 A Yes.

5 Q Apparently the table was subdivided by  
6 railroads and then it was subdivided for each railroad  
7 with originated, terminated, or overhead traffic. Do  
8 you see that?

9 A Yes, I do.

10 Q Do you know what the -- can I call it -- the  
11 effective sampling rate was of actual 1982 SFSP  
12 movements, what the effective sampling rate was for  
13 those movements reflected in the table?

14 A I'm not sure I quite understand that.

15 Q I'm not quite sure it was put beautifully.

16 In the table there are figures that are based  
17 on a piece, a sample, or at least a selection of Santa  
18 Fe-Southern Pacific movements in 1982.

19 A Yes. I believe "selection" is the more  
20 appropriate term.

21 Q Let's stop there. Why would you call it a  
22 selection instead of a sample?

23 A Okay, because to my knowledge there wasn't an  
24 attempt made to do any statistical sampling relative to  
25 the allocation formula.



1 Q I see that judgments were made to look at  
2 originated, terminated and overhead traffic. I do not  
3 see that there was any attempt to look at traffic, say,  
4 by distance blocks. Was there any effort made to look  
5 at traffic by distance blocks, to see how good a fit you  
6 had from your allocation formula?

7 A Yes, there was.

8 Q By distance blocks? Does that appear in the  
9 statement here?

10 A No, it doesn't.

11 Q Tell me about the attempt to determine the fit  
12 by distance blocks. Who conducted that, Mr. Keyes or  
13 who?

14 A Yes, I believe he was involved. It was  
15 basically just a way of looking in a little more detail  
16 at how the revenue allocation formula performed for this  
17 particular selection of data.

18 Q Are the results of that known to you?

19 A Yes. There is a computer printout that  
20 contains that information.

21 Q Did you bring that with you today?

22 A Yes, I did.

23 Q May we see it, please.

24 MR. WILSON: Your Honor, I'm providing counsel  
25 with a copy of work papers from Applicants' document

1 depository, EDK-000017, a 30-page printout which  
2 demonstrates an examination of the divisions formula by  
3 distance blocks.

4 Also, to clarify for the record, on page 6 of  
5 witness Keyes' verified statement the statement does  
6 state that the formula was compared on the basis of  
7 mileage blocks on about the tenth line of that  
8 statement.

9 JUDGE HOPKINS: Thank you.

10 BY MR. KHARASCH: (Resuming)

11 Q The statement at pages 7 and following says  
12 that they find this -- Mr. Keyes, now you, say that you  
13 find this -- a quite satisfactory fit of the formula.  
14 Slight variances were observed.

15 A Yes.

16 Q Is that your opinion?

17 A Yes.

18 Q And let's look down the table. And, being  
19 parochial about it, I see that the fit wasn't very great  
20 for MKT overhead traffic and that the formula seems to  
21 understate by 18 percent.

22 A Well, I would agree that your statement that  
23 the formula for this particular selection of traffic  
24 does understate by 18 percent.

25 Q Could you as a statistician have calculated



1 expected errors or confidence intervals, coefficients of  
2 variation, from use of this mileage application formula  
3 from the data recited in the Keyes statement?

4 A No. As I said before, there wasn't any  
5 attempt to do any -- to make any inference, to make any  
6 probability statements.

7 Q I understand that there were no attempts to  
8 make any probability statements about the revenue  
9 division formula, but that's not my question. My  
10 question is, could probability statements have been made  
11 about the revenue allocation formula?

12 A I suppose they could have been made. They  
13 would not have been appropriate, since there isn't any  
14 statistical basis for them.

15 Q If a scientific proper sample had been made of  
16 actual traffic and actual divisions and then you had  
17 seen how the formula predicted money divisions; then  
18 could you have made a statistician's probability,  
19 confidence interval, error, coefficient of variation  
20 judgment about the reliability of the formula?

21 A Well, I could have made a statement as to how  
22 well the formula or the performance of the formula for  
23 the entire population from which the sample had been  
24 drawn, whatever that might be.

25 Q Suppose, Dr. Hill, a procedure is known from a

1 proper examination of random sample to have a certain  
2 possibility of error in it. And suppose this procedure  
3 is conducted on a new block of data. Then is it correct  
4 that the statistician will say, you have this much  
5 confidence? That is, 19 times out of 20 you will be  
6 within this range when you come out having used the  
7 formula?

8 A I think you'll have to ask that one again.

9 Q I would like to be precise with you and I ask  
10 your cooperation in saying with the precise terms are.  
11 Let's start with the principle that the Applicants could  
12 have made a proper scientific random sample of actual  
13 1982 movements and settled revenues; and they could  
14 have, for those same movement revenue totals shown what  
15 the revenue allocation formula would have predicted. Is  
16 that correct so far? Both of those could have been  
17 done?

18 A Predicted if you used the formula for the  
19 entire universe?

20 Q No. I think -- and you'll have to guide me  
21 carefully in this statistical field. I think we are  
22 confusing two questions. One question a statistician  
23 answers is, he looks at the sample that was taken and he  
24 says -- he looks at the procedure and assures himself  
25 that it was properly random sampled.



1                   Then a statistician may make a judgment that  
2 -- he makes a judgment as to the confidence you have  
3 that the sample is representative of the universe; is  
4 that correct? That's one kind of statistical judgment,  
5 is it not?

6                   A       Well, no, I think if your sampling procedure  
7 is accurate then that's the -- that's not going to make  
8 any assumption or even question whether there's any  
9 degree of representativeness of sample to the universe.

10                  Q       Let's start with a simpler example. We have a  
11 universe of 1,000 people, let's say.

12                  A       Okay.

13                  Q       And you scientifically sample, you draw a  
14 sample of 100 people.

15                  A       Okay.

16                  Q       Suppose our question is what's the average  
17 height of a person. We measure 100 people and find the  
18 average height, given the sampling rate and so on. A  
19 statistician in one area of his work will give a  
20 judgment as to what confidence you may have that the  
21 average height determined by looking at the 100 sample  
22 people is the average height of the entire universe of  
23 people?

24                  A       Well, I'm not sure I'd put it exactly that  
25 way.

1 JUDGE HOPKINS: Why don't you put it your  
2 way.

3 THE WITNESS: Well, what the statistician does  
4 is give essentially, it's a measure of the procedure  
5 that's used to make that estimate. You can make  
6 probability statements about the difference between the  
7 true value and your estimated value and essentially the  
8 distribution of that difference is really what you're  
9 measuring, the true value being the average height of  
10 the 1,000 people that we started with.

11 BY MR. KHARASCH: (Resuming)

12 Q All right, I think I understand that. Now, in  
13 the case we're looking at at page 7 of the statement,  
14 you found certain variances of formula from actual, did  
15 you not?

16 A Yes.

17 Q May a statistician make any judgment as to the  
18 expected error in using a formula in that circumstance?

19 MR. WILSON: Excuse me, Mr. Kharasch. Are you  
20 assuming that the settled revenue numbers are the true  
21 value, the actual --

22 MR. KHARASCH: For this purpose, yes.

23 THE WITNESS: Okay. So the assumption is that  
24 the settled revenues, take that as the true value.

25 BY MR. KHARASCH: (Resuming)



1 Q We have some number of settled revenues here,  
2 maybe 50,000. We don't know.

3 A And what is our population or universe of  
4 interest?

5 Q All movements.

6 A All movements for --

7 Q I don't want to get you off the question that  
8 I wish to ask.

9 I described a sampling of 1,000 people and 100  
10 people in height. I'm saying, when you have a table  
11 that shows on a sample that there is a certain variance  
12 of a formula, in this case a revenue allocation formula,  
13 may the statistician make any professional judgment  
14 about the error expected if that formula is applied to  
15 another piece of the population?

16 A Well, let's see. We need to make a few  
17 assumptions. You're assuming that we're basing this on  
18 a random sample?

19 Q Yes. Now, you told us that in your view the  
20 selection of settled revenues were not a sample. You'd  
21 rather call it a selection because it wasn't a proper  
22 random sample, is that right?

23 A Yes.

24 Q So assume the Applicants made a proper random  
25 sample.

1 A Okay.

2 Q Now, with that assumption, my question is, if  
3 these figures had come from a proper random sample and  
4 you observed these variances, can the statistician make  
5 a professional judgment as to the expected error if that  
6 formula is used again on another piece of the  
7 population, of the universe?

8 A Another piece of data from the population, and  
9 this is the same population from which this sample was  
10 taken?

11 Q Yes.

12 A I believe so, yes, in that case.

13 Q Please give us the technically correct term  
14 for what you would call the making of that type of  
15 judgment.

16 A I'm not sure I'm aware of any technical term.

17 Q It's a judgment as to confidence intervals or  
18 range of error expected, that type of thing?

19 A Well, it's the same thing, yes. You could  
20 make an estimate of how the procedure would perform.

21 Q Now, that was not done in this case, was it?

22 A No, it was not.

23 Q Now, suppose I have a procedure and I have in  
24 my hand an estimate of how well it will perform in the  
25 sense that you just used the term. Suppose that



1 procedure is repeated twice. Does the error increase  
2 because I do it twice?

3 A What error?

4 Q You've said you can make a judgment as to the  
5 error expected. If a procedure has an error, let's say,  
6 well, I may be ten percent more or less within a certain  
7 range of confidence, I may be ten percent more or less.  
8 If that procedure is repeated on a mass of data and it's  
9 repeated a second time -- I want this to be very clear.

10 Let's make a black box here and call it  
11 Procedure P. And you have told us Procedure P applied  
12 to a scientific random sample of data from the universe,  
13 and I can make a judgment that it has an error of plus  
14 or minus ten percent 95 percent of the time, is that  
15 right?

16 A Okay.

17 Q I want you to say, not okay, but yes, that is  
18 what you've told us.

19 A Yes.

20 Q My question to you is, if you repeat Procedure  
21 P twice, what happens to the expected error after you've  
22 done it twice?

23 A Okay. Now, Procedure E is not the procedure  
24 that you used to come up with your statement of  
25 performance, but rather Procedure P is the actual

1 procedure you are measuring?

2 Q No. Procedure F is what I am trying to use in  
3 a very general term, Dr. Hill, as a procedure such as  
4 the little seven-step formula that estimates revenue  
5 allocations.

6 A Okay. So it has nothing to do with what you  
7 go through --

8 Q No. First I have this estimating procedure,  
9 and I see that if I do it on this little sample that I  
10 pull out scientifically, I find that I have ten percent  
11 more or less within a confidence -- 95 percent of the  
12 time I will be within ten percent more or less if I use  
13 procedure F, correct?

14 A Yes.

15 Q Now, I apply that procedure. Now, think of it  
16 just in general, a black box procedure with this known  
17 error, and I do it twice. What happens when I've done  
18 it twice?

19 JUDGE HOPKINS: You mean you do it one more  
20 time or you do it two more times?

21 MR. KHARASCH: No, I do it one more time. I  
22 have done it once on a new set of data and then I do it  
23 again. I do it again.

24 BY MR. KHARASCH: (Resuming)

25 Q Now, is there a confidence interval, an



1 estimate of error, and all the rest that you can make  
2 for two applications of a formula whose one application  
3 has an error of ten percent more or less 95 percent of  
4 the time?

5 A Well, it seems like what you'd have to do is  
6 -- are you saying go back and take the results of both  
7 of those and then go through your procedure to measure,  
8 your statistical procedure to come up with a measure?  
9 Or are you just going to --

10 Q I'll give you something maybe a little  
11 closer. It's an important point, but I'm not sure that  
12 we are communicating precisely.

13 I take a block of data and I apply Procedure P  
14 to it. Let's assume that those blocks of data are, as  
15 in our case here, railroad revenues. I take the block  
16 of data, I apply Procedure P to it, and I end up with a  
17 whole new set of revenues which I now call my Data Set  
18 2.

19 Data Set 2 came after the Procedure 2 was  
20 applied to Data Set 1.

21 MR. WILSON: Excuse me. Are you assuming that  
22 the second block of data is identical in all respects to  
23 the first block of data, or is it different from the  
24 first block of data?

25 MR. KHARASCH: To clarify for counsel and for

1 the witness, more importantly --

2 JUDGE HOPKINS: And for me.

3 MR. KHARASCH: -- and for the judge, what  
4 happens is I have a block of data and I apply a  
5 procedure to it, and that by applying that procedure, it  
6 is the type of procedure we have seen here that  
7 generates estimates, and I will call those estimates a  
8 new block of data, and that is my Data Set 2.

9 BY MR. KHARASCH: (Resuming)

10 Q Do you follow me so far, Dr. Hill?

11 A Yes.

12 Q Now, you told me in my progress from -- to get  
13 Data Set 2, you can make a statistical judgment that  
14 says that will be plus or minus ten percent of the real  
15 world, plus or minus ten percent of the real world 90  
16 percent of the time.

17 MR. WILSON: I think I object to the use of  
18 the words "of the real world," since the comparison  
19 counsel is striving to allude to is a comparison to  
20 settled revenues and there is no basis for the  
21 assumption that settled revenue data is in fact the true  
22 value of --

23 JUDGE HOPKINS: Well, we can take out the real  
24 world and get to the question.

25 MR. KHARASCH: It's a perfectly general



1 question.

2 BY MR. KHARASCH: (Resuming)

3 Q In most general terms, we apply a procedure  
4 and you have been able to make an estimate that the  
5 procedure has certain possible error in it, and by that  
6 procedure I generate a second data set. Going to the  
7 second data set I have, you were able to tell me, a ten  
8 percent more or less, plus or minus range, 95 percent of  
9 the time.

10 Q Okay. That procedure will -- 95 percent of  
11 the time that procedure is applied will be within ten  
12 percent.

Q Right.

2 Now, suppose I take this Data Set 2 which is  
3 the result of the procedure applied once, and I apply  
4 the same procedure again to Data Set 2; that is, I make  
5 another -- in our example here, I make by using  
6 Procedure P, I make an estimate using Data Set 2 as the  
7 input, I make an estimate of what revenue divisions  
8 are.

9 Do you understand what's happening? I'm  
10 taking the data set you produced by applying the  
11 estimates once, and that data set is then going to have  
12 the procedure applied to it, and you are going to  
13 produce a third data set which we will get to in a  
14 minute.

15 Do you understand this?

16 A Yes.

17 Q All right.

18 When I went from Data Set 2 which I generated,  
19 and I applied the procedure to get a Data Set 3, I again  
20 have a 10 percent, more or less, variation 95 percent of  
21 time, do I?

22 A No.

23 Q Why not?

24 A It doesn't make any sense to me to apply the  
25 procedure, that procedure, to the output that is



1 produced when I'm to assume that the input is entirely  
2 different from the output.

3 Q Well, let's assume that certain people -- call  
4 them SFSP -- wanted to conduct a statistical exercise  
5 for this record. And they took a sample of movements in  
6 1982. Let's call that real world.

7 And by a rather elaborate plan, they moved  
8 themselves to a projection of how the real world would  
9 have been in 1982 if eastern route closings had  
10 occurred, let's say.

11 And you, for your purposes may say that they  
12 simply made certain assumptions about the change in the  
13 real world in 1982.

14 In connection with making calculations of what  
15 would have happened in 1982 if eastern railroads had  
16 closed routes, they applied the revenue allocation  
17 formula which we have looked at in your statement.  
18 Right?

19 A Yes.

20 Q Now, at that step, when they applied the  
21 revenue allocation program, if you had made a random  
22 sample here and examined the scientific random sample on  
23 that one step, the eastern route closing step, you could  
24 have made a judgment of the type that there is a 10  
25 percent -- that 95 percent of the time, the error will

1 be plus or minus 10 percent.

2 A Well, in fact, the results of this study  
3 actually take that into account.

4 The way I see it is that that Procedure F, or  
5 a procedure, would be the process that one goes through,  
6 given a waybill, in determining the diverted revenue  
7 from that waybill.

8 Q That's right.

9 A And the results of this study indicate what  
10 would have happened or estimates of the value you would  
11 have gotten, had you applied that procedure to the  
12 entire set of data.

13 Q All right.

14 Now, follow me just as far as the step that  
15 we've just gone through. What would have happened --  
16 what would have happened in the year 1982 if eastern  
17 railroads had closed routes, and in that connection,  
18 they used the revenue allocation formula to make a  
19 judgment about what happens to divisions of revenue  
20 among railroads when movements were changed from what  
21 they really were in 1982 to what they predictably would  
22 have been if eastern railroads had closed routes.

23 A By what would have happened, I wasn't talking  
24 about that. I was just talking about what would have  
25 happened had this procedure been to all movements.



1 Q Yes, right.

2 Now, this procedure -- let me see if you  
3 understand what happened in this eastern route closing,  
4 what we're going to call iteration.

5 The data set, which I have called Data Set 2  
6 in previous talk with you, is the data set -- is a data  
7 set of movements which include movements -- shall we  
8 call them hypothetical movements -- that would have  
9 occurred if eastern route closings had occurred in  
10 1982.

11 Is that your understanding of how the  
12 Applicant's diversion procedure work, the diversion  
13 calculations work?

14 A Yes, that's my understanding.

15 Q Now, this Data Set 2 differs from Data Set 1  
16 which is the original sample input, because certain  
17 hypothetical movements have occurred, have been put into  
18 Data Set 2.

19 A Okay. I'm not sure what the advantage of  
20 considering it in that terms is.

21 Q What term do you prefer? They say we  
22 project. That's why I call it hypothetical. Do you  
23 want to call it projected movements that would have  
24 occurred.

25 A I prefer to think of it in terms of on a

1 waybill by waybill basis. There's a procedure that's  
2 applied to a waybill to measure a diverted revenue.

3 Q Right. And after I have performed this  
4 eastern route closing iteration --

5 A Which is a part of that procedure.

6 Q It's not a part of the revenue allocation  
7 procedure. Let's stop for this.

8 After I have done the eastern route closing  
9 iteration, I now arrive with the Data Set 2 which has  
10 certain movements in it. They are constructed or  
11 hypothetical movements. Is that correct?

12 A Okay. You can think of it in those terms,  
13 yes.

14 Q And those constructed or hypothetical  
15 movements are given revenue allocations by this  
16 Procedure P we have been talking about, which is the  
17 designation we gave to revenue estimations.

18 Is that correct?

19 A Okay.

20 JUDGE HOPKINS: Yes?

21 THE WITNESS: Yes.

22 BY MR. KHARASCH: (Resuming)

23 Q Now we have Data Set 2, and Data Set 2 is  
24 going to be subject to a further hypothetical, and that  
25 further hypothetical is that something else happened in



1 the year 1982, say the UP and the MP railroads merged.

2 Data Set 2 will then be processed into Data  
3 Set 3 in which further hypothetical movements will be  
4 constructed by the projection.

5 Is that right?

6 A Yes.

7 Q The operation of going from Data Set 2 to Data  
8 Set 3 again involves the revenue allocation procedure  
9 that's been -- or formula that's been described in the  
10 Keyes-Hill testimony.

11 A Yes.

12 Q Now, when we went from Data Set 1 to Data Set  
13 2, we had, I thought, a satisfactory understanding  
14 between us that one could have calculated a certain  
15 error. Yes?

16 A Yes.

17 Q And we will assume, for the sake of  
18 simplicity, that that error was calculated so that we  
19 had a 95 percent confidence that the error was plus or  
20 minus 10 percent. Right?

21 A Yes.

22 Q Okay.

23 Now, I am going from Data Set 2 to Data Set 3,  
24 and in that proceeding from Data Set 2 to Data Set 3, I  
25 am going to apply my revenue allocation formula that had

1 that certain error possibility to Data Set 2 in order to  
2 create a Data Set 3.

3 Sir?

4 A Okay, I understand.

5 Q My question to you, as a learned statistician,  
6 Dr. Hill, is: What can I say about Data Set 3 on which  
7 the operation that had a 10 percent plus or minus error  
8 has been repeated twice?

9 A I'm not sure what you could say. I think  
10 probably what you're trying to get at is how to estimate  
11 -- is how that procedure would do at the final end of  
12 that procedure.

13 And I think the best way to have done that is  
14 to have taken -- take the entire -- apply the entire  
15 procedure, and then make your estimate based on that,  
16 rather than trying to, you know, make an estimate for  
17 each particular step, because what you would be doing  
18 then is estimating what would have happened, had you  
19 used the whole procedure on the entire set of data,  
20 based on your sample.

21 Q But I'm not going to use the whole procedure  
22 on the entire set of data just once. I may do it once  
23 to go from Data Set 1 to 2.

24 MR. WILSON: Why don't you let him finish his  
25 answer?



1 THE WITNESS: By "whole procedure," I mean  
2 repeating that. That whole thing means use it once, and  
3 then again, and then again.

4 BY MR. KHARASCH: (Resuming)

5 Q Right.

6 I'm not understanding what you're saying. You  
7 want to use five uses of it as the same as one use of  
8 the formula?

9 A No. I think it would be easier if one was --  
10 if one's objective was to make a statistical inference  
11 on how that -- how the entire procedure would perform.

12 Q Suppose my concentration is -- let me give you  
13 another example, because I need your help, sir.

14 Let's change our example to the ever-popular  
15 projection of how football games come out. And I  
16 observe that in Week 1 of the national football season,  
17 I have three chance out of four of predicting how  
18 football games come out.

19 A Okay.

20 Q Seventy-five percent accurate.

21 A I'm not sure exactly what your --

22 Q At the moment you are just listening to the  
23 question.

24 And I observe, by the application of my  
25 Procedure F, which is football predicting, that by

1 golly, I am right three times out of four.

2 A Okay. Week No. 1.

3 Q In Week No. 1.

4 And I'm going to do what a bookie calls a  
5 parlay. I'm going to combine Week No. 1 and Week  
6 No. 2. Well, I'll make it simpler. I'm going to  
7 combine a game from Week 1 with another game from Week  
8 1. Okay?

9 A Okay.

10 Q My chance, my hypothesis of picking a game  
11 right in Week 1 is three out of four, because I am  
12 pretty sharp.

13 A Okay.

14 Q What is my chance of picking the results of  
15 two games in Week 1 correctly?

16 A Okay. Assuming independence, it would be the  
17 product of the probabilities.

18 Q It would be 9/16ths?

19 A Yes.

20 Q And my chance of picking three games is  
21 27/64ths?

22 A Yes. And the chance of picking n games is  $3/4$   
23 to the nth power.

24 Q Let's go back to our data sets. The Data Set  
25 2 you understand, and I think you agreed with me,



1 contains the hypothetical movements that were not in the  
2 original world of 1982 when we're doing these diversion  
3 estimates -- iterations -- is that right?

4 A Yes, if you want to think about it that way.

5 Q Well, one can not only think about it; if one  
6 were to look at the result of the SFSP diversion study  
7 iteration for eastern route closings, one would find in  
8 the printout, if it existed of that data, some movements  
9 which are hypothetical. They are created by the guess.

10 Is that not correct?

11 A Yes.

12 Q Now, to that Data Set 2, in order to go to  
13 Data Set 3 and add another procedure and add another  
14 guess, what is going to happen if the UP is around? I  
15 will be applying the revenue estimation formula to a  
16 movement which did not occur in 1982. It's not in Data  
17 Set 1, but it has been created, and it's in Data Set 2.

18 Is that correct?

19 A Yes.

20 Q And at that point that I am applying the  
21 formula with a known chance of error to something in  
22 this hypothetical in Data Set 2, do I not have another  
23 plus or minus 10 percent chance of error in transforming  
24 from Data Set 2 to Data Set 3?

25 A I don't think so. If you're trying to say

1 that the example with football is essentially the same  
2 as this --

3 Q I did not claim that. But I give you an  
4 example so you can understand what's going through my  
5 mind, and you can help u.s.

6 A No. I think -- well, one fact that would --  
7 one fact is that the total revenue is fixed, and that if  
8 you -- in the allocation, if you take it away from one  
9 road, you have to give it back to the other, so there is  
10 that constraint.

11 Q But my question to you is, let's look at one  
12 particle of data in Data Set 2, and it is that particle  
13 of data -- this one did not appear in Data Set 1 because  
14 it is a hypothetical move. Yes?

15 A Okay.

16 Q In applying the revenue allocation formula to  
17 that hypothetical move, there is a chance of error, is  
18 there not, because we know that our revenue allocation  
19 formula has a chance of error.

20 Indeed, page 7 shows in a crude way that it  
21 has a chance of error.

22 A Okay. Yes.

23 Q For this --

24 JUDGE HOPKINS: He started to say something  
25 me.



1 THE WITNESS: I think we are confusing that  
2 error with the error we measured when we did the  
3 statistical study at the beginning to see how this  
4 procedure would do.

5 All we were able to determine there is how it  
6 would have done, had we applied it to the entire  
7 population from which we took the sample.

8 Q No. If you will pardon, me, I think I am  
9 confused now, Dr. Hill.

10 The table of variances that appear on page 7  
11 are not sampling variances. They are expressions of the  
12 inaccuracy of the formula -- how good a guess is the  
13 formula. Is that right?

14 A They measure the performance of that formula  
15 in this particular case.

16 Q Right. And the performance of the formula in  
17 this particular case was sometimes only 1 percent off,  
18 and sometimes 18 percent off.

19 A Yes.

20 Q This formula has a certain inaccuracy in it.

21 A Well, I believe Mr. Keyes stated that it was  
22 not perfect.

23 Q Right.

24 Now, that inaccuracy, I believe you have told  
25 us, could be measured by saying, using this formula --

1 could be measured if you had made a scientific random  
2 sample, proper sample -- you could make a judgment that  
3 this formula has such and such a chance of being wrong.

4 A If I said that, I don't believe it was  
5 correct.

6 Q By looking at the application of a formula to  
7 a scientific sample of things that actually happened,  
8 you cannot make a statistical statement as to the error,  
9 possible error of using the formula?

10 Now you've confused me. I thought you said so  
11 earlier.

12 A Well, you can make a statement about possible  
13 error by applying that formula to a sample, the entire  
14 population.

15 Q No. We understand about sampling error. I am  
16 now asking you about formula error. I'm not asking --  
17 and if you want to, you can use any proper term. But  
18 tell me if there is not a term that can be used to  
19 express the chance that an allocation formula is wrong  
20 when applied to any hunk of data.

21 That's why I am using my football term. I  
22 ain't right all the time; I'm only right three times out  
23 of four. That seems to me to have the normal,  
24 non-technical answer that I'm only 75 percent good in  
25 guessing.



1 Now, is there a word, a statistical term or a  
2 statistical judgment, that can be made as a judgment of  
3 how well a formula performs?

4 MR. WILSON: I have an objection to this  
5 question and I think perhaps it could be clarified again  
6 by building into your question the assumption, the  
7 hypothetical assumption that a settled revenue data is  
8 the true value of actual revenue because --

9 JUDGE HOPKINS: Let him finish.

10 MR. WILSON: To me, you can't compare one to  
11 the other. If you don't build an assumption into your  
12 question, it can never be answered and we'll go on for  
13 hours.

14 MR. KHARASCH: I am trying to get terminology  
15 clear by this statement. We've been over it once. I  
16 thought we had an agreement. Now the witness seems to  
17 have changed it.

18 JUDGE HOPKINS: Go ahead and see if we can't  
19 get some agreement.

20 MR. KHARASCH: We will get to settled revenue  
21 and that sort of thing.

22 BY MR. KHARASCH: (Resuming)

23 Q Is there not, and if so, please give us what  
24 your proper terminology is -- it's not for sampling  
25 error estimates, but for errors where you know that an

1 estimation formula, a prediction formula, has certain  
2 chances of not being right when used.

3 A In the case of this allocation formula, what  
4 do you mean by "right"? Seems like you're --

5 Q Now you've just picked up on counsel's  
6 objection. Please assume for the purpose of my question  
7 that settled revenues, which is what is being compared  
8 for the revenues allocated by the revenue allocation  
9 formula -- please assume for the purpose of my question  
10 that settled revenues, which is what this table is  
11 comparing with revenue allocation formulas -- please  
12 assume that settled revenues are correct; they were  
13 correctly settled; those are real data in the real  
14 world.

15 Q Doesn't your page 7 table say that when I  
16 compare settled revenues with predictions by the  
17 formula, there were percentage variations? Yes?

18 A Yes. There was a difference between what you  
19 got with the allocation formula and the settled  
20 revenue.

21 Q Now, is there a proper term to use that  
22 statisticians would use to apply to the chance that the  
23 revenue allocation formula is wrong?

24 A In a given instance?

25 Q Yes, in a given instance of application to



1 10,000 pieces of data. And I don't want to get into  
2 sampling error. I just want to get into the error that  
3 is -- the chance of error that is in the formula.

4 Do you have a term for that?

5 A I'm still not sure of your question. You can  
6 assume for a given instance, you can look to see one  
7 waybill, one movement, to see what the settled revenue,  
8 what the allocation is. It may be right or wrong.

9 If by wrong you mean it is off by cents -- I  
10 mean in the football example, you are either right or  
11 wrong. But here, it's more a matter of degree.

12 Q Suppose the figures I am supplied by a  
13 wonderful thing, a wonderful term that has just become  
14 handy -- non-sampling error. Correct?

15 A Okay.

16 Q Let's try it that way. There are two types of  
17 error in the world so far that we're going to talk  
18 about, and one is the error induced by sampling. We are  
19 not looking at the whole universe. And one is a  
20 non-sampling error.

21 Q Are you familiar with the term "non-sampling  
22 error"?

23 A Yes, I am.

24 Q Is non-sampling error the type of term that  
25 might be applied to an expression of the chance that a

1 revenue allocation formula is correct when applied to  
2 the real world?

3 A I don't think so.

4 Q Let's take the whole universe of all  
5 movements. We've got everything in the railroad  
6 universe that we want to look at, to look at now.

7 A For a given year?

8 Q For a given year; correct. We have your  
9 formula and your formula has shown certain variances  
10 here.

11 A Yes.

12 Q Applying the formula to the universe, there is  
13 a certain chance that we are within some range of being  
14 right or wrong to the whole universe?

15 A And by right or wrong, you mean exactly coming  
16 out with the exact figures? You mean the allocation  
17 amounts matching exactly with the settled revenue  
18 amounts?

19 Q Yes.

20 A Yes, I suppose you could assign a probability  
21 to that event.

22 Q Give me a name for the probability of that  
23 event that relates to this non-sampling error.

24 A Now you're bringing in non-sampling error  
25 again. I don't think that's relevant.



1 Q Just give me a name, Doctor. We don't have to  
2 sit here for minutes, fussing about a name. You said  
3 you could assign a probability of that. We discussed it  
4 on the record.

5 JUDGE HOPKINS: Do you want him to make up a  
6 name, or what?

7 MR. KHARASCH: What does he prefer?

8 JUDGE HOPKINS: Maybe he doesn't prefer  
9 anything. Do you prefer any name?

10 THE WITNESS: Well, probability that the  
11 allocation figures match the actual settled revenue  
12 figures.

13 BY MR. KHARASCH: (Resuming)

14 Q Now, we have that probability in mind. Let's  
15 go back to our data sets. We moved from Data Set 1  
16 which is a sample of railroad moves in 1982, actual, and  
17 we go over to Data Set 2, and in that Data Set 2 we have  
18 used this formula that has a probability of not matching  
19 settled revenues. Correct?

20 A Correct.

21 Q And that probability of not matching settled  
22 revenues give the feeling that in Data Set 2, we may not  
23 be exactly right as to revenues. Correct?

24 A Correct.

25 Q Now, Data Set 2 is different from Data Set 1,

1 and I apply my procedure one more time to reach Data Set  
2 3. Right?

3 A Okay, fine.

4 Q And going from Data Set 2 to Data Set 3, I  
5 have used this formula which again has a probability of  
6 being wrong.

7 Now I am at 3.

8 A Yes.

9 Q Now, what I'm asking you is, having applied  
10 from 1 to 2, I had some error chances, formula only, not  
11 looking at the sample. Then I went from Data Set 2 to  
12 Data Set 3, and I have error chances again.

13 I am asking you, going back to Data Set 1 in  
14 our heads, can I not say that since I have repeated the  
15 procedure twice, and the procedure has an error in it,  
16 that when I have done it twice, I now have a higher  
17 chance of error or a bigger spread of possible result  
18 than I did when I only did it once?

19 A Well, if you assume that your probability is  
20 greater than zero that you will match, and if you're  
21 just talking in terms of the probability when you get to  
22 the end that you match, okay.

23 But then the probability of not matching is  
24 going to be higher, but it doesn't say anything about,  
25 on a qualitative scale, how big the differences are.



1 Q That's right. We haven't put any numbers on  
2 it. The probability of not matching what was done by  
3 using actual revenues has gone up. Correct? It has  
4 increased because I did it twice.

5 A Assuming that that probability is greater than  
6 zero.

7 Q Yes.

8 And then if I go from Data Set 3 to Data Set  
9 4, again -- you say it, Mr. Witness -- what happens then  
10 to the probability of not matching?

11 A The probability of not matching will increase,  
12 assuming the probability of matching is greater than  
13 zero. How does one come about with that magic  
14 probability?

15 Q Now, you say the probability of not matching  
16 is greater than zero. Now, let's look back to your page  
17 7. Does the use of this formula have a greater than  
18 zero probability that it will not make an accurate  
19 prediction?

20 A What do you mean by accurate? Do you mean  
21 match exactly?

22 Q I mean is there a probability that this  
23 formula for revenue allocation will not match settled  
24 revenues that actually occurred?

25 A Yes. I'd say the probably is probably 1.

1 Q Right. The probability is probably very high,  
2 1 meaning certain. Right?

3 A Yes. If you take a set of data, the  
4 allocation formula and the settled revenues are not  
5 going to match exactly.

6 Q What is the probability, let's say, that the  
7 allocation, as compared with the settled revenue would  
8 be within 10 percent?

9 A I have no idea. I don't know how you would  
10 measure 10 percent. You've got 45 numbers down there,  
11 and the various numbers are different, various amounts.  
12 How do you come up with one number to measure that  
13 quality of match, if you will?

14 That would have to be defined first.

15 Q Well, let's say for the MKT, let's look over  
16 at the overhead traffic column. I see an 18 percent  
17 negative variance there.

18 And let's suppose I'm very narrow-minded and  
19 I'm only interested in the quality of match of the MKT  
20 revenue against the predicted revenue.

21 A Okay, fine.

22 Q And I see that because I made an inspection  
23 here, I found that that throws off 18 percent. So you  
24 wouldn't you say -- can you not make a statement that,  
25 gee, if I do this one time, the chance that I will be



1 within 20 percent correct -- all I can say is that I  
2 hope to be within 20 percent.

3 I can make some statement about the chance of  
4 that?

5 A No. If you did this again, you might hit it  
6 exactly.

7 Q I might. And if I did it again, it might be  
8 plus 18.

9 A Yes, that's true.

10 Q In other words, it's a measure of the  
11 reliability of the formula that we're talking about.

12 Q If you're saying that these numbers on this  
13 page measure the reliability of the formula, that's not  
14 true. They just indicate a measure of how well it  
15 performed in this particular case.

16 Q That's right. And you've explained that it  
17 wasn't done, that it wasn't sampled and so on. Correct?

18 A Yes.

19 Q Let's move on a little bit here after these  
20 difficult considerations, Dr. Hill, and let's go to our  
21 question of confidences. And now we're going to talk  
22 about sampling error.

23 A Okay.

24 Q Let's get back on firm ground -- sampling  
25 error. Is there a certain confidence ratio and standard

1 error in the ICC sample, the waybill sample we started  
2 off talking about?

3 A Well, the confidence measure would have to be  
4 -- you would have to specify the particular measure that  
5 you're interested in. There's lot of data on a waybill,  
6 and for each particular quantity that you're interested  
7 in estimating, there would be a separate measure of  
8 error.

9 Q Let's say, for simplicity, that it's reported  
10 revenue. And we're talking only about sampling error at  
11 this time.

12 Can you make confidence judgments about the  
13 revenue in the ICC sample, knowing what the sampling  
14 rates are and the strata and so on?

15 A Yes. Given the information, all the  
16 information in the ICC sample, yes.

17 Q Yes.

18 And then, understand that a more intense  
19 sample, a higher sampling rate sample was drawn for the  
20 SFSP.

21 A Yes.

22 Q Right. And for the SFSP traffic, you could  
23 also make a confidence judgment about how good a match  
24 the sample's characteristics are with the universe's  
25 characteristics.



1 A I'm not sure I'd put it exactly that way.

2 Q Put it right.

3 A Okay. You could determine, you could come up  
4 with a measure of how good the estimate of revenue is,  
5 based on the sample.

6 MR. KHABASCH: Could I have that answer read  
7 back?

8 THE REPORTER: "Q. Okay. You could  
9 determine, you could come up with a measure of how good  
10 the estimate of revenue is, based on the sample."

11 BY MR. KHABASCH: (Resuming)

12 Q And could you come up with a similar estimate  
13 of how good the estimate is, based on the SFSP sample?

14 A Yes.

15 Q Would the estimate be that the estimate of  
16 error is lower for the SFSP sample because it is higher  
17 sampling rate?

18 A Not necessarily.

19 Q Why not?

20 A Well, there are two different sampling plans  
21 used. It would depend on the behavior of that  
22 particular variable as to whether one measurement of  
23 error in one would be better than or smaller than in the  
24 other. And it could be for one quantity, one sample  
25 might be better; for another, the other --

1 Q Let's talk about revenue as the quantity.  
2 We're talking about revenue.

3 A Fine.

4 Q Which sample is better?

5 A I don't know.

6 Q Do you agree with the statement that sample  
7 variability varies inversely with the square root of the  
8 sample size?

9 A Yes.

10 Q If I'm looking only at the traffic which was  
11 not touched by the SF and the SP in 1982, that is, the  
12 traffic reflected only in the ICC sample, is the  
13 estimate of how good the results for that type of  
14 traffic, how good the results of the diversion study  
15 conducted by the Applicants, any different than just  
16 what was in the ICC sample?

17 A No.

18 Q And then they would be -- but it might be that  
19 the SFSP sample being larger might have a lesser  
20 probability of sampling error?

21 A It might be; yes.

22 Q But you don't know that it is?

23 A No.

24 Q But the two are different?

25 A Yes.



1 Q Now, we had some discussions about these Data  
2 Set 1 and Data Set 2 and what happens in Data Set 2.  
3 Some hypothetical movements are created in the data  
4 base. And you understand the Applicant's diversion  
5 procedure followed here, then move from Data Set 2 to  
6 Data Set 3 with another assumption, and that created  
7 some new hypotheticals?

8 A Yes, I understand.

9 Q And is it possible, according to your  
10 understanding, that in moving from -- that a movement  
11 that was created, or a hypothetical movement, when it  
12 got in Data Set 2, was then further hypothetically  
13 changed by the time it got to Data Set 3?

14 A Yes, that's my understanding.

15 Q And then from Data Set 3, we went to Data Set  
16 4, and the same thing could happen.

17 A Yes.

18 Q New hypotheticals were put in. Actual  
19 movements may have disappeared, is that correct, by the  
20 time we get to Data Set 3 or 4?

21 A I'm not sure whether that could have  
22 happened.

23 Q Well, suppose that in what's called the UP/MP  
24 iteration, the messaging by the diversion formula, there  
25 was assured 100 percent diversion of an actual 1982

1 movement to the UP/MP system.

2 Now, wouldn't that, by the time we get to the  
3 data set followed that iteration, would that not mean  
4 that the actual 1982 movement had vanished because it  
5 had all been created hypothetically, moved to the UP?

6 A Well, the movement would still be there.

7 Q The movement would still be there in the data  
8 set?

9 A There's still that -- that waybill would still  
10 be there.

11 Q Oh, it actually occurred in 1982, and that is  
12 in Data Set 1, which is all drawn from 1982. We moved t  
13 the first iteration which said let us assume some  
14 eastern railroad route closings. Right?

15 When those assumptions were made, the actual  
16 movements were changed in accordance with those  
17 assumptions and predictions, and created a movement in  
18 Data Set 2, the result of the eastern railroad closing  
19 iteration, which is a hypothetical movement; that is, it  
20 didn't move to Memphis, and moved to St. Louis or  
21 something like that. Is that correct?

22 A Okay, yes.

23 Q And then in Data Set 2, there has vanished the  
24 actual movement, and it has been replaced by, let's say  
25 -- a movement of 100 cars to St. Louis has been replaced



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1 by a movement of 100 cars to Memphis.

2 JUDGE HOPKINS: Is that correct?

3 THE WITNESS: Yes.

4 BY MR. KHARASCH: (Resuming)

5 Q Or what happened to Data Set 1, the actual  
6 movement in 1981 may have been split. Say it was 100  
7 cars and it moved to 50 cars were left moving to St.  
8 Louis, and 50 cars were, by hypothesis, created a  
9 hypothetical movement to St. Louis.

10 A Okay, yes. That's my understanding. I think  
11 you could get some more detailed answer to those  
12 questions from --

13 Q But we're just examining your understanding of  
14 the procedure. And all I'm saying is, several things  
15 can happen by the time you move from Data Set 1 to Data  
16 Set 2.

17 The original movement may no longer appear,  
18 because it's been replaced totally by another movement.

19 A Yes.

20 Q Or the original movement may have been divided  
21 so that it becomes two movements, and part of it is  
22 left. Correct?

23 A Yes.

24 Q Or it may be in Data Set 2, unchanged.

25 A Yes.



1 Q And then we go from 2 to 3, and even the  
2 hypotheticals that appeared in Data Set 2 have now been  
3 -- made themselves be split and changed into  
4 second-level hypotheticals in Data Set 3.

5 A Yes, I believe that's true.

6 Q And then we go to Data Set 4 and Data Set 5.  
7 At that point we have done five iterations in the  
8 diversion procedure. Right?

9 A Yes.

10 Q Excuse me; four iterations in the diversion  
11 procedure, which got through to Data Set 5.

12 Okay. Dr. Hill, do you know in Data Set 5,  
13 which is the adjusted data base after four iterations of  
14 procedure, how many actual moves that appeared in Data  
15 Set 1 no longer appear in Data Set 5?

16 It's going to be long question, so listen.

17 Second, do you know how many actual moves that  
18 appeared in Data Set 1 have been reduced so that they're  
19 only half-present in Data Set 5?

20 Do you know how many changes of routings have  
21 been made, how many pieces of movement data have been  
22 changed when they got to Data Set 5?

23 Do you know how many hypothetical moves -- that  
24 is, moves that did not occur in 1982 -- are in Data Set  
25 5, or how many unadjusted moves that really happened in

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1 1982 are still left in Data Set 5?

2 Do you know any of those numbers?

3 A Before I answer that, I just want to make sure  
4 that you realize that the waybills that were in the  
5 original sample haven't changed.

6 Q Data Set 1 is the same as it always was.

7 A Okay. And Data Sets 2, 3, 4, and 5 are  
8 hypothetical data sets that you have defined?

9 Q Yes.

10 A According to your definitions, no. I do not  
11 know the answers to those questions.

12 Q Have you ever looked, in preparation for your  
13 testimony here, Dr. Hill, at a printout of the SFSP  
14 iteration which was based on what we have been calling  
15 Data Set 5 and moved into Data Set 6, which is the  
16 result? That's the diversion.

17 Have you looked at any printouts of these  
18 things?

19 A I don't believe so.

20 Q And have you been shown or told anything that  
21 would in any way help you answer my previous question as  
22 to how many of the movements that are "diverted" by the  
23 SFSP iteration, which is the last iteration of the  
24 diversion procedure, how many of those proposed  
25 movements are hypothetical, how many are remaining



1 unadjusted movements, and so on?

2 A No, I don't believe so.

3 Q Thank you.

4 Let's -- unfortunately -- well, now we're  
5 going to talk about sampling error, and I beg you to  
6 have mercy on me. And if you do not find that my  
7 terminology is correct, please correct the inexpert  
8 terminology.

9 I'm going back to what I find the simplest  
10 example for a sampling error, and I hope it will be.  
11 What we want to measure is height.

12 We have 1,000 people in our universe. We  
13 select 100 by a scientifically proper random sample.

14 A Fine.

15

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1 Q And we measure the height of these 100  
2 people. At that point you can tell us something  
3 statistically about the chance that the average height  
4 in the sample is the average height of the people in the  
5 universe of people?

6 A That is correct.

7 Q And you will calculate your standard errors,  
8 coefficient of variation, confidence intervals and so  
9 on?

10 A That's correct.

11 Q Take your sample of 100 people. I look at  
12 that sample and I say: Thank you, Dr. Hill, for your  
13 instructions how to make a random sample. I think I  
14 will add 25 people at random of the height of so much.  
15 I think I will take out of the sample 25 people who I  
16 don't think ought to be in the sample.

17 Now, here's your sample again. Take out 20  
18 people. Now there's this field, 105 people. I have  
19 taken out 20 people that were in the sample and I have  
20 put in 25 people that are hypothetical people in the  
21 sample.

22 A Okay.

23 Q Now, can you as a statistician calculate the  
24 confidence and your standard error and your coefficient  
25 of variation for a sample which has hypothetical people



1 added and sample people subtracted?

2 A Okay, this is a sample from this new  
3 population we're talking about?

4 Q I'm going to go over this slowly because I  
5 want you to give us a very serious answer to it. There  
6 are 1,000 people in the universe. I go to you and I  
7 receive your best official advice on how to make a  
8 scientific random sampling of people. I select 100. I  
9 select those 100, and for each of those people I write  
10 down their height on a three by five card, and now I  
11 have a pile of 100 three by five cards with heights  
12 written on them of the people who have been selected.

13 A Okay.

14 Q At that point you told us you could tell me,  
15 if I add up those cards and get an average height, what  
16 my coefficient of variation, standard error, and all the  
17 rest is, and I can get an average height from the sample  
18 that matches the universe.

19 Now, sir, I go through my stack of 100 cards,  
20 I take out 20 cards that I judge should be taken out and  
21 throw them away. There are only 80 cards left. And I  
22 add 25 cards of people with heights written on it that I  
23 think ought to be put into the sample.

24 And now I come back to you and I say: Dr.  
25 Hill, what is the chance that the average height of this

1 stack of 105 cards, the average height of the stack of  
2 105 cards, has a standard error or coefficient of  
3 variation or confidence interval that matches the real  
4 universe average height?

5 A It depends how you went about moving and  
6 selecting those, moving and inserting the cards. If you  
7 -- if the same procedure essentially was applied to each  
8 card, then I think you could come up with an estimate of  
9 what your new sample would indicate.

10 Q If the same procedure was followed?

11 A That's right. If you did the same thing, even  
12 if you tossed a coin or something, if you did the same  
13 thing to decide whether to take one out and replace one  
14 and so forth, if you did the identical procedure to each  
15 one of those cards, then yes, I think you could come up  
16 with a new estimate of -- and what you would come up  
17 with is what the result would be had you applied that  
18 same procedure to all 1,000 people.

19 Q The guessing procedure?

20 A The modification.

21 Q The modification procedure. Now, let us  
22 suppose -- well, strike that.

23 The statistician does not, in talking about  
24 sampling error and such, make a judgment about certain  
25 types of things. For example, he does not make a



1 judgment, in our height example, as to how well I  
2 measured the height. If you're talking about sampling  
3 error, you're only talking about error caused by the  
4 sampling, not error in measuring heights of people; is  
5 that correct?

6 A That's correct.

7 Q Your statement, Mr. Keyes' statement that you  
8 adopt, does not make a judgment about how good the  
9 diversion estimates of this, that or the other thing  
10 are; is that correct?

11 A Okay, in the height example it doesn't make a  
12 judgment on how that measurement process was applied to  
13 a particular waybill to get an answer, I don't believe  
14 so. It does not make a judgment about how good that  
15 procedure is.

16 Q That's right. It may be a crazy procedure, it  
17 may be a wonderful procedure, but all you're saying is,  
18 here's a sample and that's all I got?

19 A That's correct.

20 Q Now, I want to go back to our data sets again,  
21 if you don't mind. When I went from the original data  
22 set, which we have called Data Set 1, and I applied my  
23 first iteration of this procedure that you make no  
24 judgment about, I went to Data Set 2, if you had  
25 calculated from the transfer from Data Set 1 to Data Set

1 2, if you had calculated a standard error, coefficient  
2 of variation, and confidence interval for the Data Set 1  
3 to Data Set 2 transformation, would it not have been the  
4 same as table one on the statement here?

5 I don't know that the diversion numbers would  
6 be the same, but the error and so on?

7 A No, not necessarily.

8 Q Well, let's go over that so that we can  
9 understand it. We are dealing, when we went from Data  
10 Set 1 to Data Set 2, with the actual 1982 sample  
11 movements, and then we're dealing with what happened  
12 with the eastern railroad closings, okay. So the number  
13 of sample observations in Data Set 1 is the same as the  
14 sample that was drawn from the ICC and the SFSP; is that  
15 correct?

16 A That's correct, yes.

17 Q Now, the strata in Data Set 1 are the strata  
18 that have been described in the Keyes-Hill statement,  
19 yes?

20 A Yes.

21 Q And we will come out, in moving from Data Set  
22 1 to Data Set 2, with certain charges, changes in  
23 revenue, revenue gains or losses predicted?

24 A Yes.

25 Q Just as your table one has?



1 A Yes.

2 Q So now tell us, please, what will be different  
3 in moving from Data Set 1 to Data Set 2?

4 A Well, the way I look at it is, what you're  
5 doing is you take your measuring procedure which you are  
6 applying to each waybill and modifying that by  
7 essentially leaving off the last steps. So you have a  
8 different procedure that you're applying to each  
9 waybill, and as a result you will likely end up with  
10 different numbers for each waybill.

11 Q Well, we know that what happened between Data  
12 Set 2, which is a result of the first iteration, is not  
13 the same as the result in Data Set 6. But I don't  
14 understand your last answer at all.

15 I am asking you, can you compute the standard  
16 error for moving from Data Set 1 to Data Set 2 the  
17 standard way you compute standard errors when they get  
18 that first iteration?

19 A Well, I think we are getting two standard  
20 errors here. One would be the standard error had you  
21 stopped your measurement procedure and actually locked  
22 at the numbers, the diverted revenue changes that you  
23 got from just that one procedure.

24 If you -- supplied with those figures, yes,  
25 you could have computed a standard error, and that would

1 have measured how well -- it would have measured the  
2 estimate of diverted revenue changes had you used that  
3 modified procedure for the entire universe.

4 Q I'm not talking about a modified procedure. A  
5 procedure was followed by the Applicants in moving from  
6 actual 1982 data about railroad cars and how railroad  
7 cars moved and what revenue was realized, and that  
8 procedure was followed by the Applicants to create a  
9 Data Set 2 that is the result of what they call the  
10 first iteration; is that correct?

11 A Yes.

12 Q Now, at that point you could compute, stop  
13 there, and you could say: What is the -- and we are  
14 talking sampling error here. What is the sampling error  
15 that I'm getting into when I went from 1 to 2, could you  
16 not?

17 A Well, it doesn't have any relation to the  
18 difference between 1 and 2. It deals with what you get  
19 when you do this procedure that results in number 2.

20 Q What you get when you do the procedure that  
21 resulted in Data Set 2, the first iteration had -- you  
22 can make statistical judgments about it and you can tell  
23 us how likely it is that you came out with Data Set 2 if  
24 you proceeded?

25 A Well, how likely your result compares with



1 what you would have gotten had you "computed the Data  
2 Set 2" for the entire universe.

3 Q You would have gotten that by moving from 1 to  
4 2. Would those standard errors or coefficients of  
5 variation be different than for table 1?

6 A I would suspect they would be different.

7 Q Now, I want you to tell us, if you can, in  
8 what way you think they would be different?

9 A Well, that I can't do.

10 Q Well, tell us why it could be different than  
11 Table 1 if we looked only at the first iteration from  
12 real world and moved over to --

13 A Because the numbers that you get, the  
14 procedure results -- does not necessarily result in the  
15 same value. If they did, there wouldn't have been any  
16 reason to continue on. If you take a waybill and apply  
17 the modified procedure and you got X, and then you  
18 applied the rest of the procedure and you still got X,  
19 you might as well forget the rest of the procedure.

20 Q I don't know what you're talking about about  
21 procedures. I'm talking about the calculation. Let's  
22 take the first thing here, okay. The first column that  
23 we are interested in discussing is standard error,  
24 right?

25 A Yes.

1 you might have a height that could vary by half an inch;  
2 is that correct?

3 A Yes, that's correct.

4 Q Also it's possible that people who write  
5 things down on cards or keypunch computers make errors,  
6 too?

7 A That's right.

8 Q Do statisticians ever deal with those types of  
9 errors?

10 A Yes.

11 Q Entry errors or errors in that a data base may  
12 have a chance of being wrong?

13 A Yes.

14 Q Can you give us a name for that type of  
15 statistical dealing and advising and analyzing?

16 A It seems to be in the area of non-sampling  
17 error.

18 Q Non-sampling error. Are any non-sampling  
19 errors included in your Table 1?

20 A Well, I'm not sure there are any.

21 Q I think you ought to be able to answer that  
22 directly. I think you can tell us directly whether  
23 there are any non-sampling errors reflected in the  
24 calculations in Table 1.

25 A No, to my knowledge there aren't any that are



1 reflected by that data there.

2 Q Specifically, are the possibilities of error  
3 as shown by the table on page 7 of the Keyes-Hill  
4 statement reflected in Table 1?

5 MR. WILSON: I object to the question, Your  
6 Honor. I don't think it's been at all established that  
7 the table on page 7 sets forth possibilities of error.  
8 I think the testimony was exactly to the contrary.

9 MR. KHARASCH: The testimony, if we go back to  
10 page 7 --

11 JUDGE HOPKINS: I will allow him to go ahead.

12 BY MR. KHARASCH: (Resuming)

13 Q We will leave the statement in the form of the  
14 possibilities of error indicated by the table on page 7;  
15 were they incorporated in any way in Table 1?

16 A I don't believe that Table 7 indicates error.

17 JUDGE HOPKINS: Excuse me, Mr. Kharasch. I  
18 think we need a recess. How long do you expect to keep  
19 this man on the stand?

20 MR. KHARASCH: Not more than half an hour.

21 JUDGE HOPKINS: We will be in recess for 15  
22 minutes.

23 (Recess.)

24 JUDGE HOPKINS: Back on the record.

25 Mr. Kharasch.

1 MR. KHARASCH: Your Honor, we were handed by  
2 counsel during the previous examination of Dr. Hill a  
3 document called -- a document which shows, after two  
4 preliminary computer-type of pages, differences in  
5 divisions, SFSP combined traffic. And in the upper  
6 right-hand corner it says "DNS Associates, Inc., 1984,  
7 page 1." And it continues through page 30.

8 That appears to have dealt with the subject of  
9 the revenue allocation formula and what is called on  
10 this actual indifference between the revenue allocation  
11 formula and actual settled divisions.

12 And may we have a number reserved at this  
13 point? I will reproduce copies for everybody as soon as  
14 possible. May we have an MKT-C number reserved here,  
15 No. 22?

16 JUDGE HOPKINS: That will be reserved.

17 (The document referred to  
18 was marked Exhibit No.  
19 MKT-C-22 for  
20 identification.)

21 JUDGE HOPKINS: Will this speed it up, I  
22 hope?

23 BY MR. KHARASCH: (Resuming)

24 Turn to page 18 of MKT-C-22, sir. On this  
25 page is shown, under the heading "Southern Pacific



1 Transportation Company," the column showing mileage  
2 blocks, number of records, originated traffic, actual,  
3 and the difference, correct?

4 A Yes.

5 Q For the Southern Pacific Transportation  
6 Company, in the zero to 50 mile block the actual split  
7 was \$18,943,870, correct?

8 A That's correct.

9 Q And then the difference is shown as  
10 \$3,292,232; is that correct?

11 A Negative value, yes.

12 Q And explain again what the negative is, sir.  
13 A Okay. That means that the allocated revenue  
14 was that much less than the actual.

15 Q The allocated by formula revenue is that much  
16 less than the actual?

17 A Yes.

18 Q By "actual" we mean settled revenues as shown  
19 in some proportion we didn't know of the SPSP movements  
20 that were sampled?

21 A Yes. The proportion I have been told is  
22 fairly close to 100 percent, but not quite.

23 Q Okay. And for the SP, if we look in the  
24 50-mile block, the negative variance there is about 15  
25 percent, isn't it?

000400035

1 A The second line?

2 Q Yes.

3 A Which column, the originated?

4 Q Yes.

5 A I'm not sure exactly what the figure is  
6 without calculating it.

7 Q The calculation would be to divide \$3,292,000  
8 by \$18,943,000. Would that give us the percentage  
9 variation in the same sense it is used on page 7 of your  
10 statement?

11 A Back on line 1, yes, that's correct.

12 Q And would you observe with me that for every  
13 mileage block up to 400 miles there appears to be a  
14 negative difference?

15 A Yes, that's correct.

16 Q And would you observe with me that way at the  
17 bottom in the mileage blocks, over 1950 miles there is a  
18 fairly large positive difference?

19 A Yes, that is correct.

20 Q And when you add up all the mileage blocks at  
21 the bottom of the page, you find a difference which is  
22 only \$918,000 out of \$598 million, negative difference?

23 A That is correct.

24 Q That's like a .02 percent of originated  
25 traffic difference?



1 A I believe that's correct.

2 Q And that .02 figure appears on page 7 of your  
3 statement in the table for the SP originated traffic  
4 percentage variation?

5 A That's a negative two-tenths of one percent.

6 Q Right. And within that, for the short mileage  
7 blocks there are uniformly examples of negative  
8 variations that are quite a bit larger in absolute terms  
9 than two-tenths of one percent?

10 A I've looked at the first one. I believe there  
11 are some others that could be so classified, yes.

12 MR. KHARASCH: We don't have to do arithmetic  
13 on the record. The exhibit will be marked as MKT-C-22  
14 as soon as we can get copies made and copies supplied to  
15 everyone.

16 JUDGE HOPKINS: Thank you.

17 BY MR. KHARASCH: (Resuming)

18 Q Now, going back to page 7 for a moment of your  
19 statement, sir, the percentage variations shown there  
20 are percentage variations of what in the printout we  
21 just looked at are called percentage variations from  
22 actual, right?

23 A By "actual" you mean --

24 Q They are --

25 MR. WILSON: Excuse me. Let him finish his

1 answer.

2 THE WITNESS: You mean the settled revenues as  
3 on the files?

4 BY MR. KHARASCH: (Resuming)

5 Q Listen to my question carefully. The  
6 percentage variations shown in this table are percentage  
7 variations from a figure, which figure is shown in  
8 Exhibit MKT-C-22, the printout, under the word  
9 "Actual"?

10 A Yes, that's correct.

11 Q I think you have earlier explained to us that  
12 "actual" means settled revenues?

13 A That's correct.

14 Q Some proportion of the sample?

15 A That is correct.

16 Q Now, are the percentage variations shown in  
17 the table on page 7 or in MKT-C-22 reflected in your  
18 Table 1 as in any way affecting standard errors or  
19 coefficients of variation?

20 A Well, they're reflected in this sense, that  
21 Table 1 there shows the results of using a procedure on  
22 each waybill to determine the diverted revenue by  
23 carrier, and that that procedure does use the revenue  
24 allocation formula on which the figure on page 7 are  
25 based, the same formula.



1 Q Do the figures in Table 1 show what the  
2 results would have been if you had used settled revenues  
3 instead of revenue allocation formula revenues?

4 A No, they do not.

5 Q If settled revenues had been used, would the  
6 figures in Table 1 have been the same as or different  
7 from the figures that do appear in Table 1 using the  
8 revenue allocation formula?

9 A Well, I can't really say for sure that it  
10 would have been different.

11 Q Let us make a hypothetical. Suppose the  
12 revenue allocation formula uniformly was wrong by ten  
13 percent in one direction.

14 A What do you mean by "wrong"?

15 Q Excuse me. Suppose the revenue allocation  
16 formula had a percentage variation of minus ten percent  
17 from the settled revenues, actual. Uniformly in every  
18 example you have a formula that was ten percent wrong.

19 A You mean in every case?

20 Q Yes. If that had been the case, would Table 1  
21 have been wrong if you used settled revenues for revenue  
22 allocation formula?

23 A I'm not sure if it's possible for that formula  
24 to be off negative all the time, since the total  
25 revenues stay constant.

1 Q In your statement you indicate that in the  
2 revenue allocation formula several variations were  
3 fooled with, that it was tested many times.

4 A Yes, that's correct.

5 Q Suppose you used one of the earlier forms of  
6 the revenue allocation formula. Would the results in  
7 Table 1 be the same?

8 A Can't say for sure whether they would or would  
9 not have been the same.

10 Q Does Table 1 in any way in its calculation of  
11 standard error or coefficient of variation include an  
12 allowance for error or variation that might occur by the  
13 revenue allocation formula?

14 A In what sense do you mean error or variation?

15 Q That the revenue allocation formula -- let's  
16 define "error" so that it means that the revenue  
17 allocation formula did not produce by calculation the  
18 result which was equal to the actual settled revenues,  
19 okay.

20 A Okay.

21 Q Now, if you could deal with my question.

22 A The answer to your question would be no.

23 Q The table doesn't take that sort of error into  
24 account?

25 A No, it does not.



1 Q It doesn't take into account the sort of error  
2 that might occur from keypunching. I thought we agreed  
3 on that.

4 A This is true.

5 Q In fact, Table 1 takes all procedures followed  
6 in the diversion study and considers them as one  
7 procedure; is that correct?

8 A That's one way to look at it, yes.

9 Q And considering that as one procedure, what it  
10 is telling us is that if you did this one procedure,  
11 what we will now call P in the black box again, if you  
12 did black box Procedure P and you did it on everything  
13 in the universe -- excuse me. Maybe I should say  
14 population. Everything in the population.

15 A Okay.

16 Q Of railroad traffic in 1982, you're telling  
17 us, applying these procedures all the way to everything  
18 in the population of actual rail traffic in 1982, these  
19 are the chances that the sampling that was performed  
20 would create a standard error, coefficient of variation,  
21 and confidence interval?

22 A Okay. These are the chances that a sample  
23 value would fall within so much of the true value had  
24 you applied Procedure P to the total population.

25 Q In this case Procedure P is each of the six

1 exclusively served, all of those are not dealt with by  
2 Table 1 in any way?

3 A I think I would prefer the term "measuring,"  
4 but yes, that's true; measuring those various factors,  
5 individually it is not dealt with.

6 Q Okay. Now, I want to go back to our  
7 discussion of Data Set 1 and Data Set 2. As we move  
8 from Data Set 1 to Data Set 2, you could have produced  
9 -- a calculation like Table 1 could have been done for  
10 the movement from Data Set 1, the input sample, to the  
11 first output, the first iteration?

12 A Yes.

13 Q It could have been done. It would look a  
14 little different than Table 1, depending on what amounts  
15 of diversion were shown and so on?

16 A That's possible, yes.

17 Q But it could have been in the form of Table 1,  
18 that it would have had a standard error and so on?

19 A Yes.

20 Q Now, in Table 1 do you assume that there is  
21 any error in the individual pieces of data in Data Set  
22 1?

23 A What exactly do you mean by "error"?

24 Q That they have been incorrectly measured or  
25 incorrectly written down or something like that.



1 A The question is, did we make an assumption  
2 that that had happened?

3 Q Yes. Do you have any assumptions that that  
4 had happened?

5 A No.

6 Q Let us get to the stage where we're at a  
7 calculation of a table similar to Table 1 for the  
8 transformation of Data Set 1 to Data Set 2. Now we pick  
9 up Data Set 2 and that's going to be the subject of  
10 another operation when we go to Data Set 3, because  
11 we're going to do some guessing about the UF-MF merger,  
12 okay?

13 A Okay.

14 Q Could you prepare another table similar to  
15 Table 1 for moving from Data Set 2 to Data Set 3?

16 A Yes.

17 Q What is the population that you assume exists  
18 when you prepare such a table for moving from Data Set 2  
19 to Data Set 3?

20 A It would be the original population.

21 Q You go back to the original population?

22 A Yes.

23 Q If Data Set 2 has in it some of these  
24 hypotheticals we discussed --

25 A That's right, but the difference between the

1 two can be determined by applying a procedure to the  
2 original.

3 Q The difference between the two?

4 A You first apply the procedure to get to No. 2  
5 and then apply the procedure to get to No. 3, and you  
6 can take the difference. So you're starting from the  
7 original.

8 Q That's right. But as you told us, if you did  
9 the sort of calculation set forth in Table 1 for  
10 arriving at Data Set 2, you're going to have certain  
11 standard errors and coefficients of variation and  
12 confidence intervals in the data that's in Table 2 --  
13 Data Set 2?

14 A Okay.

15 Q Yes?

16 A Yes.

17 Q Data Set 2 differs from Data Set 1 because in  
18 Data Set 1 we had a sample of actual movements and we  
19 didn't assume that there was any error in our reporting  
20 of those. But in Data Set 2 we had these hypothetical  
21 movements that already have a chance of being wrong.  
22 Well, not wrong, but varying.

23 A Different from what they were, yes.

24 Q Varying, maybe that's a better word. Data Set  
25 2 has data in it that has a chance of varying that's



1 different from the chance of varying for those data that  
2 were in Data Set 1?

3 A Okay, different data sets.

4 Q And Data Set 3 has a chance of varying again  
5 that is different from Data Set 2, because we have done  
6 our procedure again.

7 A Okay, yes.

8 Q And so on to 4 and 5. By the time we're  
9 through with 5, we have done the iterations?

10 A Correct.

11 Q Does your Table 1 reflect the fact that going  
12 from Data Set 2 to Data Set 3 you are dealing with the  
13 set of data in Data Set 2 that had variations that  
14 didn't occur in Data Set 1?

15 A No, it deals with the fact that to get from  
16 the sample to the result we used the one procedure which  
17 may have involved intermediate steps, and you can take a  
18 look at those intermediate steps.

19 Q So you have a procedure which is a complex  
20 procedure and that occurs in five steps, and at a point  
21 in the step you introduce a guess and you write down  
22 "guess," and you say, this guess is within ten percent  
23 right only half the time. We're talking generally now.  
24 We have a complicated procedure of five parts and in one  
25 part you're going to do something that has a chance of

1 being right only half the time, within ten percent only  
2 half the time.

3 Q Can a statistician deal with the effect of  
4 that sort of guess?

5 A I believe so, yes.

6 Q And will that affect the confidence you have  
7 in the result when you have gone through all five steps,  
8 if at step three I've made that sort of guess?

9 A No, I don't believe so, because again you are  
10 realizing that that is part of your measurement  
11 procedure.

12 Q I see. And what you are saying, then, is that  
13 Table 1 simply assumes that whatever was done, however  
14 accurate it was and however much at any step there is a  
15 chance of error, you just assumed that it was done to  
16 everything in the world, everything in the population  
17 that you started with. And then you tell us what the  
18 error was.

19 A Well, I think you'll have to ask that again.

20 Q In other words, what Table 1 says is, I assume  
21 that all the different steps in the procedure are one  
22 step?

23 A That's correct.

24 Q And I assume that, whatever chances of error  
25 or guessing or estimating are in each one of these



1 steps, those same chances of error or guesstimating will  
2 be placed on the world at large, the population at  
3 large, which is what happened in 1982.

4 A Okay, you are assuming that you would carry  
5 out the exact same procedure?

6 Q Yes.

7 A Okay. And of course, in order to characterize  
8 that as error I guess you'd have to come up with  
9 something, some idea of what the true value would be.

10 Q That's right. Well, as one example, we might  
11 have the error in estimating by formula the revenue  
12 divisions, but we know in the real world there were  
13 actual splits of money between railroads.

14 A That's correct. What we don't know, however,  
15 is whether the revenue figures that we have would  
16 accurately reflect the true settled revenue, whatever  
17 that is.

18 Q Whatever that is. But somewhere in the world  
19 there was real settled revenue?

20 A Yes, that's correct.

21 Q And you've participated in earlier ICC cases  
22 and what one uses in previous cases has been real  
23 settled revenues?

24 A No, I don't believe in terms of real --

25 Q Excuse me. Settled revenue. The ICC

1 previously has used settled revenue?

2 A Yes.

3 Q Here you are using a formula.

4 A That's right.

5 Q I'm having this problem and I ask you to  
6 explain it to me in the proper language that a  
7 statistician would use. It seems to me that, if I use  
8 an estimating formula or a guessing formula and I have  
9 examined and say that this guessing formula has certain  
10 percentage variations, that I can make in my own man's  
11 head a judgment by looking at the variations whether  
12 it's a pretty good guess or not.

13 A Okay.

14 Q The statistician has a word for this. That is  
15 a non-sampling error, but it's a kind of -- is that what  
16 it is, in the general field of non-sampling errors?

17 A I'm not sure I'd include it that way. You are  
18 talking about, what you're trying to do is describe a  
19 measurement procedure.

20 Q Right, and one time we look at measurement  
21 procedures by way of sampling and now I want to get away  
22 from sampling and we are back into the non-sampling  
23 field. When I observe large variations in my formula, I  
24 have less confidence in the formula; and when I see  
25 small variations shown on a table such as your page 7, I



1 get better confidence.

2 A Assuming you are comparing your formula to a  
3 better measure of what you're trying to measure.

4 Q Assuming I'm comparing the formula to a better  
5 measure.

6 A Yes.

7 Q Then I have greater or less confidence in the  
8 formula; is that the right way to put it?

9 A No. You would evaluate the formula as better  
10 or not as good.

11 Q Better or not as good because of variation?

12 A Yes.

13 Q Now, my final group of questions has to do  
14 with this thing that's really bothering me as a layman.  
15 I think as a layman that if I have a formula that is  
16 very accurate and I use it to estimate something,  
17 something homely like stock market changes, and I say  
18 for one day this formula is pretty accurate, and if I  
19 get the formula -- it's Monday and if I get the  
20 formula's prediction for Tuesday, I would have, you say,  
21 greater or less confidence, as you put it, yes?

22 A Okay. It might do better and it might do  
23 worse.

24 Q Yes, but I have a certain amount of confidence  
25 because I know what the variations shown in past studies

1 are.

2 A Okay, you have some past experience.

3 Q Now I'm going from Tuesday -- I'm going to  
4 make a guess, taking the Tuesday result and go to  
5 Wednesday.

6 A Okay.

7 Q Right? I feel in my layman's heart that my  
8 guess on Monday by applying my stock market predicting  
9 formula twice in order is not as good a guess as I had  
10 applying it once in order. Am I right in my layman's  
11 heart?

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1 I don't have the same confidence?

2 A You are saying that you are more likely on the  
3 second day as on the first day, or combining the two  
4 days together?

5 Q No, sir. I think you understand what I'm  
6 asking you. Here it is Monday morning, and on Monday  
7 morning I have a certain formula for predicting stock  
8 market price changes, and I say I have a pretty good  
9 confidence in that formula for this prediction for a  
10 one-day interval. So I take Monday and I predict to  
11 Tuesday, and that tells me stock market prices. And  
12 it's still Monday, and I now say well, I will do another  
13 calculation. Let me see what my formula tells me. If I  
14 apply it to Tuesday, I'm going to get Wednesday.

15 In my layman's heart I think that my  
16 prediction on Monday for Tuesday is a little better than  
17 my prediction on Monday from Wednesday applying the  
18 formula twice.

19 A That's possible.

20 Q Isn't there a valid basis for my layman's  
21 feeling about this double prediction?

22 A I'm not sure there is. Your procedure might  
23 be better in two days than just in one day.

24 Q It might be because all of this happens in the  
25 world, but if it's good for one day but it ain't perfect

1 --

2 A Yes.

3 Q -- and then if I do it for two days by taking  
4 the one day's result and do it again, and I do it for  
5 three days, I am beginning as a layman to have less  
6 confidence that I am predicting Friday's stock market  
7 than I did at predicting Tuesday's.

8 A I don't agree that that's necessarily always  
9 the case. It's a little different than the football  
10 example where we assumed that the games were  
11 independent. Here, your predictions are going to be  
12 dependent, because they are based on things happening  
13 close in time.

14 Q Dependent predictions, and in dependent  
15 predictions it is not necessarily the case that doing  
16 the prediction five times is worse or gives you less  
17 confidence than doing it once?

18 A Not necessarily.

19 Q Usually?

20 A It's hard to answer.

21 Q Would you say when you use dependent and are  
22 talking about data sets and these iterations that Data  
23 Set 3 is dependent on Data Set 2, and Data Set 2 is  
24 dependent on Data Set 1?

25 A Yes.



1 Q In fact, it is that dependency of one on the  
2 other that allows you to prepare a table like Table 1 in  
3 your testimony and say this was all one procedure.

4 A Yes.

5 Q I want to ask you a couple of questions, and  
6 I'll be through. MKT-C-22, which is this mileage  
7 distribution, did you or did anybody compare the  
8 distributions in this selection -- I guess we call it  
9 instead of a sample -- in the selection of traffic  
10 through the distributions in the full sample or in the  
11 population?

12 A No, I don't believe so. The selection, as I  
13 said before, was fairly close to the full sample.

14 Q The ICC waybill sample does not show settled  
15 revenues.

16 A That's right.

17 Q Were you called in or was your department at  
18 Santa Fe called in or, if you know, was Dr. Keyes called  
19 in to make any statistical judgments or recommendations  
20 at any time as to the diversion study other than the  
21 calculation of Table 1?

22 A I'm not sure whether -- I was not. I can  
23 answer that for sure.

24 Q And as to our famous table on page 7 -- we've  
25 already had a discussion on that, that the sampling

1 wasr't what you would call a statistician's random  
2 sample and so on.

3 A Well, it was pretty close.

4 Q Oh, it's improved since this morning.

5 A At that time I wasn't sure the extent of how  
6 many of the movements didn't have settled revenues.

7 Q And at other points where procedures were  
8 followed in the diversion studies were there any  
9 references to you or, if you know, to Mr. Keyes for  
10 advice on what procedure should be followed with sound  
11 statistical techniques?

12 A Speaking for myself, no. I'm not sure with  
13 respect to Mr. Keyes.

14 Q Now, we have spoken, sir -- and if I remember,  
15 I think we were talking about a population of people of  
16 different heights, and we drew a hundred people out by  
17 random sample. We have spoken of the removals and  
18 additions of cards which recorded the heights, and you  
19 indicated that you could say something about -- if you  
20 knew what the procedures were for removing and adding  
21 cards, you could say something about what would happen  
22 in the entire population of people of a certain height,  
23 if that procedure was followed.

24 A That's correct.

25 Q Suppose the removal of the cards was based on



1 my personal looking through the deck and saying I think  
2 I will take this card out, and I look at it and I say I  
3 think I will take it out, and I put it aside, and then I  
4 take another card and I write a height on it, and I say  
5 I think I will put it in. At that point could you make  
6 any statistical judgment about the deck of cards  
7 recording heights?

8 A I don't believe so.

9 Q Have you read the testimony of Messrs. Beyff  
10 and Swain and Guerin in this case?

11 A No, I have not.

12 Q Suppose they followed at certain times in  
13 their procedures in the diversion study, they followed  
14 the procedure of looking at something like the, let's  
15 call it the efficiency of an interchange, and they said  
16 well, I think this efficiency should be changed, and  
17 they changed it. In other words, I think this one  
18 should go up, and they changed it, and I think this one  
19 should go down.

20 Q Would that sort of operation in our deck of  
21 cards recording things make it impossible to make a  
22 statistical judgment?

23 A No, because the same procedure was applied to  
24 each and every waybill.

25 Q It was applied to each and every waybill, but

1 what happened to the procedure is that it was a guess.  
2 Say Mr. Reyff hypothetically looked at it and said I  
3 guess this should be 15 and not 30.

4 A Well, I think that's a question you can ask  
5 Mr. Reyff.

6 Q I'm asking you as a statistician. If I looked  
7 at a deck of cards and gave you my impression of what I  
8 should throw out and what I should throw in, that you  
9 can't make a judgment about how representative the deck  
10 of cards is of operations being done on the whole?

11 A That's true. I was assuming that your  
12 decision would vary over time and couldn't be described.

13 Q Or if I reached out in my deck of height cards  
14 and just grabbed in a clump 25 cards of heights measured  
15 in northwest Washington, put them in and took out 25  
16 cards, you again couldn't do anything statistically with  
17 that, could you?

18 A No, unless there was a procedure applied to  
19 all --

20 Q And I'm asking you if there's no procedure for  
21 the grabbing out of cards or procedure for the putting  
22 in of cards, can you make a statistical judgment?

23 A It's done at someone's -- you know, if they go  
24 and take a waybill and examine it based on their whim,  
25 no, but if there is a well established, well defined



1 procedure that is applied, the same procedure to each  
2 and every waybill --

3 Q I see. Well, let's look at -- a waybill will  
4 indicate a railroad route on it, won't it?

5 A I believe so, yes.

6 Q And suppose they look at the route. It will  
7 show a junction, origin, junction, maybe another move,  
8 another junction. That's the way they look?

9 A (Nods affirmatively.)

10 Q Suppose someone says well, I think I will  
11 change this junction on this waybill, but I will not  
12 change the junction on another waybill; and they went  
13 through that sort of thing. How does that affect your  
14 statistical confidence in what happened?

15 A It depends on how the distinction between the  
16 two waybills was defined. If it was based on a  
17 well-defined basis for it -- in this case we'll do this,  
18 but in this case we'll do the other -- no problem.

19 Q All that would have to be carefully written  
20 down.

21 Suppose I took some junction, give it a letter  
22 F and said at F I'm going to change that junction; it  
23 was that sort of thing that was done. Now what has  
24 happened to your statistical --

25 A I don't think there's any problem, as long as

1 that would have been done in each case. If there's a  
2 computer program that's doing this, then it's going to  
3 be consistent.

4 Q Just as long as it's a computer program that  
5 does something.

6 Now, if the computer program is changed from  
7 time to time --

8 A Okay.

9 Q -- then what?

10 A Then you have a different procedure.

11 Q You've got a different procedure.

12 A (Nods affirmatively.)

13 Q And your judgment made on the original  
14 procedure is not the same, your statistical judgment.

15 A The statistical judgment made on the original  
16 one stays as it is.

17 Q And since you consider everything done at each  
18 iteration of this diversion program as all one  
19 procedure, then no matter what changes were made between  
20 Data Sets, 1 to 2 to 3 to 4, you just call that a  
21 procedure. As long as it was written down or could be  
22 written down, we will say that is one procedure, and I  
23 am making my statistical judgment.

24 A That's correct.

25 Q But you are not only not making judgments as



1 to the propriety or validity of what happened, you are  
2 just making a judgment on what happened in the  
3 procedure. You're just making a judgment as to the  
4 statistical comparison the procedure to anything else,  
5 the statistical validity of the results of the procedure  
6 on a sample to the results of the procedure on the  
7 population.

8 A That is correct.

9 Q I am understanding more. And it does not  
10 matter to you in the statistical judgment you're making  
11 that something different happened when you went from  
12 Data Set 1 to 2 and 2 to 3 or 3 to 4, that different  
13 procedures were followed in those iterations?

14 A You mean going from 1 to 2, that's different  
15 from 2 to 3?

16 Q The procedure is different from 2 to 3 or 3 to  
17 4.

18 A No, that does not matter.

19 JUDGE HOPKINS: That's all?

20 MR. KHARASCH: Yes.

21 MR. MAYO: Your Honor, Rio Grande has a few  
22 questions.

23 BY MR. MAYO:

24 Q Dr. Hill, I'm George Mayo. I represent the  
25 Rio Grande. Let's go back to the beginning of your

1 testimony.

2 You employ two strata for purposes of this  
3 diversion analysis, strata 7 and strata 8. Now, in  
4 strata 7 you included waybills for carloads 5 or fewer,  
5 and strata 8 include waybills for carloads of 6 or 8, is  
6 that correct?

7 A I believe that's correct.

8 Q Can you tell me how you arrived at the split  
9 for those two strata in terms of number of carloads on  
10 the waybills?

11 A Well, I didn't arrive at the split, and no, I  
12 cannot tell you how that decision was made.

13 Q Out of strata 8 there was a sampling of 1 out  
14 of every 5 waybills, and in strata 7 there was a  
15 sampling of 1 out of every 10 waybills, is that correct?

16 A That is correct.

17 Q So you took a higher sampling of those  
18 waybills which carried larger numbers of carloads than  
19 you took of the waybills carrying a relatively lower  
20 number of carloads, is that right?

21 A That is correct.

22 Q And that is because waybills showing greater  
23 numbers of carloads have more significance for purposes  
24 of the kind of revenue analysis that you were doing  
25 here, is that right?



1           A     As I said before, I'm not sure of the reason  
2 why it was done.

3           Q     This is a separate question. This goes to the  
4 size of the sample that was taken out of the two  
5 strata. Does it make sense to you that you took sample  
6 1 of 5 of the waybills, having carloads of 6 or greater,  
7 because those waybills are of more significance for  
8 purposes of the kind of analysis that you are trying to  
9 do than waybills having carloads of 5 or fewer?

10          A     No. I think there are several reasons for  
11 different sampling rates.

12          Q     Tell me what the reasons are.

13          A     Well, I guess the basic reason would be to get  
14 a more precise estimate.

15          Q     Is that a reason for having the split? Why  
16 would you get a more precise estimate by using a 1 of 5  
17 sampling for the waybills carrying more cars and 1 of 10  
18 of waybills carrying fewer cars?

19          A     It's a balance between that and the cost of  
20 estimation, the usual assumption being the larger the  
21 sample, the higher the cost. Because otherwise, if  
22 there were no costs, one wouldn't bother to take a  
23 sample in the first place.

24          Q     Why didn't you do it the other way; that is,  
25 taking a sample of 1 of 5 of the waybills carrying fewer

1 cars and 1 of 10 of the waybills carrying more?

2 A Well, I'm not sure -- as I said, I'm not sure  
3 why in this case, but one reason might be that in a  
4 stratified sample, usually you take a larger sample  
5 where you expect a higher variability, and that may have  
6 been the case. The strata with the larger movements,  
7 one might have expected there to be a higher variability  
8 in that strata than there would be in the strata where  
9 you only had 1 to 5 cars.

10 Q And what would that variability be attributed  
11 to?

12 A Well, it may be attributable to the fact that  
13 the waybills in strata 8 could have from 6 to 100 or  
14 more cars in the waybill.

15 Q But tell me how that affects the variability  
16 in your analysis?

17 A Well, it means that in that particular strata  
18 you've got waybills that might have a larger measurement  
19 of revenue because there's a greater number of cars on  
20 the waybill.

21 Q I still don't understand how that affects the  
22 variability in the analysis.

23 A Maybe you could define what you mean by  
24 "variability."

25 Q It's your term.



1           A     Well, in other words, the precision of the  
2 estimate that would be derived from this procedure; in  
3 other words, what's the distribution of the estimates?  
4 How big is that distribution? Does it tend to cluster  
5 around the "true value" or not, or is it widely spread?

6           Q     And you would expect to see a wider spread  
7 with respect to the higher number of carloads per  
8 waybill, is that right?

9           A     It's possible. I'm not sure if that's the  
10 case or not.

11          Q     Isn't that what you just said?

12          A     I'm saying that's a possible reason, that that  
13 may have been the reason it was used, but I don't know  
14 for sure what the reason was.

15          Q     What would be the factors at work that would  
16 create that higher spread?

17          A     Okay. They would be the actual population  
18 values in that strata, basically be having a wider range.

19          Q     You keep throwing in terms. I don't know what  
20 "population values" means. What's that?

21          A     Well, what you're trying to measure, the  
22 diverted revenue value, okay, for each -- essentially  
23 for each waybill in that strata there is a value that  
24 you would get by applying a measurement to that  
25 waybill. And if you look at the set of all those

1 values, if the range is bigger in that set than say in  
2 another set, then you have more variability in that set.

3 Q Would you expect to see a greater variability  
4 in the divisions found with respect to the waybills  
5 carrying more carloads than with the divisions  
6 associated with the waybills carrying lesser numbers of  
7 cars?

8 A I'm not sure what you mean by the divisions  
9 found.

10 Q I'm trying to figure out whether one reason  
11 for taking a higher sampling of waybills having a higher  
12 number of carloads on them is because you would expect  
13 to see that the divisions negotiated with respect to  
14 that traffic might be more variable from waybill to  
15 waybill than you would find with respect to divisions  
16 negotiated with respect to waybills carrying smaller  
17 numbers of carloads.

18 A I think we're saying the same thing.

19 Q You agree with what I just said?

20 A Yes.

21 Q And my question is why that variability? What  
22 factors influence that variability?

23

24

25



1           A     Well, the only thing I can think of is that  
2     the numbers are larger, just assuming that there's a  
3     rough amount of revenue per car, and if you have more  
4     cars on the waybill, then it is likely there may be more  
5     revenue.

6           Q     Could it be that different tests are being  
7     employed for purposes of negotiating the divisions with  
8     respect to very large movements, different standards  
9     being employed by the parties with respect to  
10    calculating those divisions as opposed to calculating  
11    divisions on the smaller movements?

12          A     That may be true, but I'm not sure that that  
13    would lead to higher variability in that strata.

14          Q     If you saw -- if a uniform test were being  
15    employed with respect to smaller movements and diverse  
16    tests were being employed with respect to the larger  
17    movements, wouldn't you expect to see greater  
18    variability with respect to the divisions related to the  
19    larger movements than with respect to the divisions  
20    relating to the smaller movements?

21          A     I'm not sure.

22                 By test, I don't think I'm quite sure what you  
23    mean by the term "test."

24          Q     I'll have to get my question read back to me.  
25    I don't remember the word "test."

1 My question really goes to whether you would  
2 expect to see -- I'm sorry. I do understand.

3 When I say test, I mean the standard factors  
4 that are considered by the parties who are negotiating  
5 the division, and it goes to the question of whether  
6 these parties, for example, are focusing on the specific  
7 commodity that is the subject of the movement, or  
8 focusing on who owns the cars, what kind of cars or the  
9 territories, those kinds of things. Are these factors  
10 playing a greater role in the negotiation of division  
11 with respect to large movements than with respect to the  
12 small movements?

13 A I really can't say for sure because I don't  
14 know how they affect the actual values of the revenue.

15 Q Do you know how the divisions are negotiated?  
16 Do you have experience in that?

17 A No, not in the negotiations.

18 Q So you really don't have any personal exposure  
19 to the way in which the divisions are negotiated with  
20 respect to specific movements, be they large movements  
21 or smaller movements, is that right?

22 A That is correct.

23 Q Page 2 of the statement notes that you were  
24 able to reduce sampling error by increasing the sample  
25 size through supplementing the ICC sample.



1           Did you ever do any specific tests addressed  
2 to whether you had reduced sampling error as a result of  
3 that supplementation?

4           A     I did not do any such tests. I can't say for  
5 sure whether Mr. Keyes did or not.

6           Q     What leads you to the conclusion that you can  
7 reduce sampling error by increasing the sample size?  
8 Isn't it that the larger the sample with respect to the  
9 universe, the greater the likelihood that analyses done  
10 off of that sample will be representative of conclusions  
11 that you would have derived in applying that analysis to  
12 the entire universe, is that right?

13          A     Okay, that's good.

14          Q     Now, you say on page 3 that you deleted all  
15 moves in the ICC file wherever Santa Fe, Southern  
16 Pacific or SSW participated in any part of the move. You  
17 go on to say that this was done to avoid any possibility  
18 of double counting.

19                Do you know how many records were deleted? Do  
20 you have any information with respect to that?

21          A     No, I do not.

22          Q     Now, it's true, isn't it, that the ICC data  
23 that you removed from the sample was broken down between  
24 stratas 1 to 5 reported to the ICC on this computerized  
25 basis, is that right?

1 A That is correct.

2 Q Now, with respect to strata 5, that strata  
3 deals with movements of waybills, with carloads in  
4 excess of -- of 101 or more, is that right?

5 A Yes, that is correct.

6 Q And a sample is taken of that, one out of two  
7 sample is taken of that.

8 A That is correct.

9 MR. WILSON: Excuse me, counsel.

10 For the record, Santa Fe reports its movements  
11 to the ICC waybill sample on a manual basis so that the  
12 strata that would be involved would be stratas 6, 7 and  
13 8 in the ICC waybill sample, just to clarify that.

14 MR. MAYO: Southern Pacific reports on a  
15 computerized basis, is that right?

16 JUDGE HOPKINS: Does anybody know?

17 MR. WILSON: I don't know whether they did in  
18 1982.

19 JUDGE HOPKINS: I'll represent to you and you  
20 can represent to me.

21 MR. WILSON: Apparently they did in 1982.

22 BY MR. MAYO: (Resuming)

23 Q So that at least with respect to the Southern  
24 Pacific data reported to the ICC, you excluded from your  
25 data base Southern Pacific carloads of 101 or over which



1 had been sampled on a one out of two basis, is that  
2 right?

3 A I believe that's correct.

4 Q And then any Southern Pacific carloads,  
5 waybills with carloads of that amount were included in  
6 the universe of traffic, Santa Fe and Southern Pacific  
7 traffic employed from strata 8, and from that strata, a  
8 sample of one out of five was taken, is that right?

9 A That is correct.

10 Q So that you would expect to see a lower  
11 representation of Southern Pacific waybills with  
12 carloads of 101 or more in the strata 9 that you  
13 employed than in strata 5 as reported to the ICC, is  
14 that right?

15 A Okay. I think I would word it a little bit  
16 differently. I think I would expect to see absolute  
17 numbers there would be less, such movements in the Santa  
18 Fe-Southern Pacific than in the ICC.

19 Q And I would like to try to do this a bit on a  
20 shorthand basis because it gets so cumbersome to talk  
21 about it, but if we get hollixed up, you tell me, and we  
22 will try to lay it all out.

23 With respect to Southern Pacific reported data  
24 in strata 4, I take it that strata 4 relates to  
25 carloads, waybill with carloads of 61 to 100, is that

1 right?

2 A That is correct.

3 Q And that is sampled on the basis of one out of  
4 three?

5 A That is correct.

6 Q Now, when the data -- strike that.

7 I take it that you would expect to see a lower  
8 number of waybills, Southern Pacific waybills with  
9 carloads of 61 to 100 in strata 8 of your analysis than  
10 would appear in strata 4 of the ICC's waybill, is that  
11 right?

12 A That is correct, yes.

13 Q And the same can be said with respect to  
14 Southern Pacific waybills having carloads of 16 to 60,  
15 which are reported to the ICC in strata 3 and which are  
16 sampled on the basis of one out of four by comparison to  
17 strata 8 of your analysis which is sampled one out of  
18 five, is that correct?

19 A That is correct.

20 Q And then the relationship flips over, in  
21 essence, as you move further down the ICC strata to  
22 strata 2 and strata 1 where a smaller sampling is taken  
23 by the ICC than was the case with respect to -- really,  
24 it is a combination of your strata 7 and your strata 8.  
25 But in your strata 7 you took one out of five, whereas



1 in ICC strata 2, the sample is one out of 12, and in  
2 strata number 1 is one out of 40, is that right?

3 A That is correct.

4 Q I may have just mispoken. I think your strata  
5 7 is one out of ten.

6 Now, do you know, do you have an opinion as to  
7 why the ICC is interested in obtaining data from  
8 carriers which, with respect to waybills having carloads  
9 of 101 or more are sampled on the basis of one out of  
10 two, but by contrast is really only interested in  
11 obtaining data from carriers with respect to waybills  
12 having carloads of one and two on a sampling basis of  
13 one out of 40.

14 Do you have an opinion as to why the ICC  
15 specifies those different samplings?

16 A No. I do know that that particular sample is  
17 used for a wide variety of purposes, and I can only  
18 assume that they thought that was the best way to  
19 satisfy a wide variety of purposes.

20 Q Isn't it true that the movements of carloads  
21 of 101 and over are more significant for analytical  
22 purposes? Wouldn't you expect them to be more  
23 significant for analytical purposes than movements of  
24 carloads with only one or two?

25 A I don't think that would be true for all

1 purposes. Certain purposes, yes.

2 Q How about for purposes of revenue analysis?

3 A I don't have an opinion.

4 Q Now, you reference on page 6 of your testimony  
5 a sample of almost 140,000 waybills of settled revenue  
6 information that was used in the DNS computer.

7 I take it there were no local movements  
8 included in that sample, is that correct?

9 A I believe that's correct.

10 Q Now, am I right that it is actually a larger  
11 sample that was used to augment the ICC waybill data,  
12 but you're here only referring to -- strike that.

13 Tell me what the reference on page 8 to  
14 441,626 records relates to and how that all compares to  
15 the 140,000 figure on page 6.

16 I kind of lost you. It's in the paragraph,  
17 the next to the last paragraph on the page, the third  
18 line.

19 A Okay.

20 I believe the 441,626 represents the total  
21 sample, which included waybills from the ICC as well as  
22 from the Santa Fe and Southern Pacific.

23 Q And of those records, I take it that roughly  
24 140,000 were sent based on the Southern Pacific records  
25 and the rest were the ICC records?



1           A     Well, I'm not sure whether the local movements  
2 were eliminated from this 140,000. I believe so since --

3           Q     Look at the top of page 3, suggests that each  
4 road include the local traffic. I think I misled you.

5                     Would I be correct in assuming that if local  
6 traffic were there, the roughly 140,000 records would  
7 include the roughly 140,000 interline originated and  
8 terminated records, plus the local, movements of Santa  
9 Fe-Southern Pacific, and then plus the ICC waybill  
10 data?

11          A     Yes, that's correct.

12          Q     Do you know how many local movements there  
13 were that would be included in the 441,000 figure?

14          A     No, I do not.

15          Q     You haven't seen any data which reflects that  
16 in your preparation of this testimony?

17          A     I don't recall having seen any.

18          Q     Do you have any data which shows, of the  
19 140,000 waybills, how many were SP waybills with the  
20 more than five cars, that is, six or more cars?

21          A     I don't believe so, no.

22          Q     And the same thing with respect to Santa Fe,  
23 you haven't seen any breakdown of Santa Fe-Southern  
24 Pacific waybills showing those which are six or more and  
25 those which are five or less?

1 A No, I haven't.

2 Q Pay 6 discusses the trial and error method  
3 employed in arriving at the methodology that you  
4 developed for purpose of the division analysis.

5 Do you know how many iterations were gone  
6 through in that trial and error process?

7 A Not exactly, no.

8 Q You weren't involved in the development of  
9 this methodology, is that correct?

10 A That's right, I was not involved.

11 MR. WILSON: Counsel, Mr. Beyff and Mr. Swain  
12 can address the number of iterations, and you can  
13 address questions along those lines to him.

14 BY MR. MAY(: (Resuming)

15 Q Have you discussed the development of that  
16 methodology with anyone who is directly involved in it  
17 apart from your counsel in the course of preparing for  
18 this testimony?

19 A No, I did not. During the time that it was  
20 developed, or --

21 Q Now or then, any time.

22 A We discussed it with counsel present.

23 Q Was that in preparation for today?

24 A In preparation for this, yes.

25 Q Do you know whether any statistical procedures



1 like regression analysis were employed to assist in  
2 developing this methodology?

3 A To the best of my knowledge, no such  
4 procedures were used.

5 Q You have seen no indication of that in your  
6 preparation for this testimony?

7 A That's right.

8 A Page 8 of the testimony talks about earlier  
9 attempts at measuring likely revenue changes due to  
10 traffic divergence associated with the mergers and  
11 mentions that those attempts relied heavily on manual  
12 processing.

13 Q Have you ever been involved in one of those  
14 so-called manual processing efforts?

15 A Yes, I have.

16 Q And that effort involved an analysis  
17 waybill-by-waybill with respect to how divisions or  
18 movement-by-movement with respect to how divisions would  
19 be negotiated?

20 A Yes.

21 Q And you were involved in making those  
22 decisions?

23 A Not in making the decisions no; in designing  
24 the sample and calculating estimates with respect to  
25 revenue gain or loss and the standard errors associated

1 with those.

2 Q Who was making those decisions?

3 A Traffic experts.

4 Q Traffic experts were sitting down and  
5 examining the movements and deciding how the division  
6 would be negotiated is that right?

7 A That is correct.

8 Q Do you know what factors those people take  
9 into account when they are doing that kind of analysis?

10 A In a general way, yes, but --

11 Q Give me a listing of what you know.

12 A It has to do with differences in the two  
13 routes, the preferences of the shipper, the availability  
14 of equipment.

15 Q Things like the type of commodity?

16 A Yes.

17 Q Might take into account the territory or the  
18 territories in which the movement is occurring and the  
19 relative costs associated with operations in those  
20 territories?

21 MR. WILSON: Your Honor, I object to this line  
22 of questioning. This witness is not a traffic expert.

23 JUDGE HOPKINS: Aren't we going off line?  
24 What is this questioning about?

25 MR. MAYO: Your Honor, it is directed to



1 comparing the manner in which that kind of approach  
2 develops, divisions, by comparisons to the methodology  
3 in this case where divisions were established, focusing  
4 solely upon origination, termination, overhead, movement  
5 and miles, and I am really -- I am pretty satisfied at  
6 this point. I am not going to carry it any further.

7 JUDGE HOPKINS: Good. Thank you.

8 MR. MAYO: And if I wanted to, I wouldn't.

9 JUDGE HOPKINS: Thank you.

10 MR. WILSON: Your Honor, just one point. I  
11 believe the question was asked in terms of diversions  
12 rather than divisions. It was answered in those terms.  
13 I think there is some confusion here.

14 MR. MAYO: I may have misspoken. I meant to  
15 ask all those questions in terms of divisions, so let's  
16 go back and revisit that.

17 JUDGE HOPKINS: I understood them to be  
18 divisions.

19 THE WITNESS: I did not. I took it as  
20 diversions.

21 BY MR. MAYO: (Resuming)

22 Q Then let's go back and talk about, my  
23 understanding on page 8 is that this discussion relates  
24 to the manner in which divisions are calculated for  
25 calculations which are diversion movements.

1 A It appears to me it involves plain and simple  
2 diversion judgments

3 Q So it is your testimony that in the matters in  
4 which you have been involved, decisions as to divisions  
5 are not made by the traffic experts that you referenced  
6 earlier?

7 A That is correct.

8 Q Those people are only making decisions as to  
9 diversions?

10 A That is correct.

11 Q And the divisions are made how?

12 A Well, settled revenues, in the cases I was  
13 involved, the settled revenues was used to determine the  
14 divisions.

15 Q Settled revenue meaning using a methodology  
16 not unlike the methodology employed in this testimony?

17 A No, the actual settled revenues were used, not  
18 an approach that allocated those divisions based on  
19 characteristics of the move.

20 Q These are movements which are diversions for  
21 which there are no settle revenues, I thought.

22 Is that right?

23 A Well, that's possible.

24 Q And my question is how are those divisions  
25 decided?



1 MR. WILSON: Again, I would object to that  
2 question on the grounds that Mr. Beyff can explain that  
3 in detail. This witness is a statistical witness. His  
4 statement speaks to diversion judgments, as I think we  
5 clarified, rather than to divisions in this paragraph.

6 MR. MAYO: I would be glad for him to say that  
7 he doesn't know anything about these things.

8 JUDGE HOPKINS: Why don't you say that?

9 THE WITNESS: Okay.

10 The movement was changed, there was, the  
11 figure on the division was determined, and I'm not sure  
12 exactly how that came about.

13 BY MR. MAYO: (Resuming)

14 Q But you, and before you, Mr. Keyes, were  
15 responsible for developing the methodology for assessing  
16 what the divisions would be for diverted traffic, is  
17 that right in this case?

18 Isn't that what the formula on the bottom of  
19 page 6 is all about?

20

21

22

23

24

25

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1 A Yes, that is true.

2 Q And in developing that formula, to your  
3 knowledge did anyone discuss with traffic people who are  
4 familiar with negotiating divisions how these divisions  
5 are negotiated, what factors are taken into account?

6 A I don't know if such discussions were made or  
7 not. I was not involved.

8 MR. MAYO: Your Honor, I would like to have  
9 marked as Exhibit DRCW-C-17 a multiple-page computer  
10 printout.

11 JUDGE HOPKINS: It will be marked for  
12 identification.

13 (The document referred to  
14 was marked Exhibit No.  
15 DRCW-C-17 for  
16 identification.)

17 BY MR. MAYO: (Resuming)

18 Q Dr. Hill, can you identify this printout as  
19 the work papers which underlie Mr. Keyes' statement and  
20 specifically the table that appears on page 7?

21 A Okay, yes.

22 Q Now, with respect to your statement on page 7  
23 that, "for the aggregate of all railroads" -- I'm  
24 referring to the statement that appears on page 7 that:  
25 "For the aggregate of all railroads on the supplemental

1 sample, originated traffic was overstated by 0.7  
2 percent, terminated traffic was understated by 0.4  
3 percent, and bridge traffic was understated by 0.6  
4 percent."

5 And my question is whether those figures were  
6 taken from the data which appears at page 64 of  
7 DRGW-C-17. This is not a trick question. I'm just  
8 trying to tie down who's responsible for producing what  
9 figures.

10 I believe if you look at the total line on  
11 that page, it supports the figures I have just recited.

12 A Yes.

13 Q At page 7 you show Rio Grande to be plus 1.7  
14 percent for its originated traffic.

15 MR. WILSON: Excuse me, counsel. What page is  
16 that?

17 MR. MAYO: This is on page 7 of the  
18 testimony.

19 BY MR. MAYO: (Resuming)

20 Q Now look at page 18 of DRGW-C-17. And again,  
21 I am simply trying to confirm these calculations. Is  
22 the source of that 1.7 percent the 723 records showing  
23 46,251 -- I'm sorry, strike that -- 46,251,772 in actual  
24 revenues, with projected revenues being \$807,668?

25 A I believe if you're asking the same thing



1 about the DERGW, yes.

2 Q Yes.

3 Now, if you look at the percentage variation  
4 in values on page 7 and you go back and again look at  
5 page 64 of ERGW-C-17, I take it that those percentage  
6 variations are really just a sum of all the plusses and  
7 minusses from the revenue differences for each type of  
8 traffic shown on page 64, is that right?

9 A Do you want to repeat that again?

10 Q The question is, with respect to the data  
11 shown in the table on page 7, the percentage variations,  
12 that those variations represent simply a summing of the  
13 plusses and minusses of the revenue differences for each  
14 type of traffic.

15 A For each type of traffic? You mean you're  
16 comparing page 7 with page 64?

17 Q Right. It's just a summing of the plusses and  
18 minusses of the difference column on page 64.

19 A Okay. If you mean -- I'm still not sure of  
20 the question.

21 Q The question is --

22 A If you took the differences that were used to  
23 produce the figures on page 7 and summed those up, you  
24 would get the difference that appears on the bottom of  
25 page 64?

1 Q The aggregate figures which immediately  
2 precede the table.

3 A Yes, I believe that's correct.

4 Q Just to make absolutely clear what I  
5 understood your response to Mr. Kharasch's question to  
6 be, you made no statistical analysis of the variation of  
7 the projected revenues versus the actual revenues using  
8 the data underlying the table on page 7, is that right?

9 A That is correct.

10 Q It could have been a variance analysis that  
11 could have been done with respect to those data, but it  
12 was not done, is that right?

13 A That's correct.

14 Q Do you know whether the division of revenue  
15 reflected in the waybills assigned to strata eight show  
16 a pattern that is similar to the pattern in the waybills  
17 assigned to strata seven?

18 A No, I don't.

19 Q To your knowledge, no analysis has been done  
20 of that?

21 A That is correct.

22 Q Now, on page 9 you describe the techniques  
23 used to compute standard errors. Doesn't this  
24 computation of standard error assume that revenue change  
25 on a particular waybill is precise and that it is not



1 subject to any variation?

2 A By "variation" do you mean that if you  
3 measured it again you would get a different value?

4 Q Yes.

5 A That is correct.

6 Q And if the revenue change on a waybill were  
7 subject to variation, wouldn't that affect the  
8 calculation of standard error?

9 A It may or it may not. That variation -- it's  
10 possible that, depending on the nature of the variation,  
11 it could be accounted for by the sampling procedure.

12 Q So where the sampling procedure is responsible  
13 for the variation, it would not affect the standard  
14 error in the calculation, is that right?

15 A I'm saying that if there was a variation, if  
16 your measurement procedure tended not to give the same  
17 results over time, depending on the nature of that  
18 deviation, that may be taken into account by your  
19 measurement of standard error. It may measure that; it  
20 may not.

21 MR. MAYO: Thank you. I have no further  
22 questions.

23 JUDGE HOPKINS: Mr. Wilson?

24 MR. WILSON: I have some redirect.

25 REDIRECT EXAMINATION

1 BY MR. WILSON:

2 Q First, Dr. Hill, during Mr. Kharasch's  
3 cross-examination there was a long line of questions  
4 about going from various data sets. I would ask you one  
5 question, I think, in response to that. Did making the  
6 base case adjustments which were made in the rail  
7 traffic diversion study affect in any way the quality of  
8 the sample data base which was used for the SFSP  
9 diversion study iteration?

10 A No, it did not.

11 Q You also had a long discussion about page 7,  
12 the information set forth on page 7. My first question  
13 in relation to that line of cross-examination: Do you  
14 believe it would be proper to assume that the settled  
15 revenue data is a correct measure of the true value of  
16 the various railroads' revenues?

17 A No, I do not believe that that is necessarily  
18 proper.

19 Q Do you know whether the revenue allocation  
20 formula used in this case did a better or a worse job of  
21 estimating the true revenue than would the use of  
22 settled revenue data?

23 A No, I don't know.

24 Q So it is possible that the use of the revenue  
25 allocation formula indeed does a better job of



1 estimating true revenue than would have been the case if  
2 you had used settled revenue data?

3 A That's possible.

4 Q You also discussed with Mr. Kharasch the fact  
5 that as you move from data set to data set the  
6 probability of not matching exactly settled revenues  
7 when you are using this revenue allocation formula would  
8 increase. To what extent would the probability of not  
9 matching increase?

10 A Well, I would say that it wouldn't increase  
11 very much, because it's already pretty high to start  
12 with, and the probability of getting an exact match is  
13 pretty close to one, as you said before, and it's going  
14 to stay that way.

15 Q To what extent would the magnitude of any  
16 error or any -- to what extent would the magnitude of  
17 any difference between the projected revenue and the  
18 revenue allocation formula and the true value of the  
19 actual settled revenues, to what extent would that  
20 change as you move from one data set adjustment to  
21 another data set adjustment?

22 A That's hard to say.

23 Q It could go up or down?

24 A That's right.

25 Q Okay. In cross-examination by counsel for Eio

1 Grande, the question came up as to divisions for  
2 movements with a number of cars in them. Do you have  
3 any basis for saying that divisions, as opposed to the  
4 actual amount received by the railroads, that the  
5 divisions formula itself would be any more variable for  
6 large shipments than for small shipments?

7 A You're talking about the allocation formula?

8 Q No, I'm talking about the actual divisions  
9 between railroads, not the allocation formula's estimate  
10 of those divisions, but the actual divisions between  
11 railroads. Do you have any basis for assuming that the  
12 way in which those divisions are developed for large  
13 shipments would be any different from the way in which  
14 those divisions are developed for small shipments?

15 A No.

16 MR. KHARASCH: I object because this witness  
17 -- I object to the question and move to strike the  
18 answer that's been given on the ground --

19 JUDGE HOPKINS: Are you objecting to something  
20 that was asked by the other counsel?

21 MR. KHARASCH: No. This witness testified  
22 earlier that he had no knowledge of the way divisions  
23 were actually negotiated. What's the use of the  
24 question asking --

25 JUDGE HOPKINS: That is true and I will grant



1 the motion.

2 MR. WILSON: The problem was there was a  
3 question and answer in the record in which Mr. Hill did  
4 make a statement about the variability of divisions for  
5 large shipments, and I wanted to clarify that in fact  
6 that statement -- he didn't really have a basis for  
7 making that statement.

8 If counsel is willing to stipulate to that, so  
9 that we don't see it in brief, I'd be perfectly  
10 satisfied.

11 JUDGE HOPKINS: I think everyone agrees.

12 MR. MAYO: I'm sorry, Your Honor. Is that a  
13 question?

14 MR. WILSON: Are you willing to stipulate that  
15 Dr. Hill has no basis for assuming that variability of  
16 divisions on large shipments is any different?

17 MR. MAYO: No, I'm not going to stipulate to  
18 that. I will take the record as it stands.

19 MR. WILSON: You see, the problem is the  
20 record as it stands contains a statement that needs to  
21 be clarified.

22 JUDGE HOPKINS: Well, he tried to clarify it.  
23 Go ahead and try to clarify it on that basis.

24 BY MR. WILSON: (Resuming)

25 Q Do you have any basis for assuming that

1 divisions for large shipments, the basis for divisions  
2 for large shipments would be any different at all than  
3 the basis for divisions for small shipments?

4 A No, I don't.

5 Q Did you make any statistical test to indicate  
6 and to attempt to validate how good a job the revenue  
7 allocation formula did in estimating revenue allocated  
8 between railroads?

9 A Okay. I tried to confirm a simple test that  
10 Mr. Keyes had made in looking to see, comparing the  
11 rankings of the railroads based upon the settled revenue  
12 and the allocation formula, to see how close they were.

13 Q What were the results of that test?

14 A Well, the results were that the rankings were  
15 fairly close. The only difference was among the lower  
16 six of the 15 I looked at.

17 Q Did you have a specific number result from  
18 that test?

19 A Well, the ranked coefficient of correlation  
20 was about .97.

21 Q Would you describe what that means for the  
22 record?

23 A Well, it's a measure of the relationship  
24 between the two ranks, how like they are.

25 JUDGE HOPKINS: Do you want to talk now,



1 before he finishes with the question?

2 MR. KHARASCH: I move to strike the last  
3 question and answer on the ground that: one, it's  
4 lunchtime; and two, it is plainly -- he is putting in a  
5 new study that is not in the direct testimony and does  
6 not relate to the redirect, which was directed only to  
7 any study that was in the record.

8 JUDGE HOPKINS: Mr. Wilson, this seems to be  
9 an entirely new line. It could have been brought out  
10 before.

11 MR. WILSON: There were questions, by Ric  
12 Grande particularly, about whether there were  
13 statistical tests done in the process of developing the  
14 formula and what statistical tests had been done. This  
15 is a statistical test done by Dr. Hill after the formula  
16 had been developed, because unfortunately Mr. Keyes  
17 could not be here.

18 Mr. Keyes could have testified that he did the  
19 statistical test and the coefficient of rank  
20 correlation, which by the way we supplied the results to  
21 Rio Grande in answer to a discovery request about two  
22 months ago. And all we are doing is trying to clarify  
23 for the record that a test was made which validates that  
24 the formula does do a very good job of estimating  
25 divisions between railroads.

1 JUDGE HOPKINS: Why didn't you ask him this  
2 question yourself in the beginning?

3 MR. WILSON: Well, I think it's directly  
4 related to the cross-examination by Ric Grande.

5 JUDGE HOPKINS: I'm going to grant the motion  
6 to strike. You are getting into an entirely new line of  
7 questioning that wasn't brought out previously.

8 MR. WILSON: How far back do we go on the  
9 striking?

10 JUDGE HOPKINS: All about this particular  
11 subject that you got into. Now, it's difficult for me  
12 to get back into the individual items.

13 MR. WILSON: Just the last test, the last two  
14 or three questions? I'm trying to understand.

15 JUDGE HOPKINS: You mean you're going to ask  
16 the same questions again, or what are you saying?

17 MR. WILSON: No, I'm not. I'm just trying to  
18 understand what we have in the record.

19 JUDGE HOPKINS: I think one of the reasons Mr.  
20 Kharasch had is it is lunchtime, and that's a good  
21 reason.

22 MR. WILSON: That's all the redirect I have.

23 JUDGE HOPKINS: Anything further?

24 MR. KHARASCH: Yes on the redirect,  
25 unfortunately.



1 JUDGE HOPKINS: Go ahead. How much time?

2 MR. KHARASCH: Three minutes. I'm with you  
3 entirely, Your Honor.

4 RECROSS EXAMINATION

5 BY MR. KHARASCH:

6 Q Dr. Hill, you gave some sort of answer on  
7 redirect to Mr. Wilson that making the base case  
8 adjustments, by which I took it you meant these  
9 iterations that got from data set to data set, did not  
10 affect the quality of the data base used to make the  
11 final diversion estimate for the SFSP merger. Have I  
12 recited what you said to Mr. Wilson?

13 A Yes.

14 Q What the heck do you mean -- excuse me. What  
15 do you mean by "quality of the data base"?

16 A That would mean the nature of the sample and  
17 the inferences that you can make from the sample.

18 Q The nature of the sample. Is it not true that  
19 after the fifth iteration, that Data Set 6 has a lot of  
20 stuff in it that did not actually happen in 1982?

21 A I'm not sure I can answer that.

22 Q It has hypothetical movements that did not  
23 actually occur in 1982 in Data Set 6?

24 A I don't know if they occurred or not.

25 Q You just told me this morning at great length

1 that you agreed that when you went from Data Sets 1 to 2  
2 to 3 the procedure of diversion analysis created  
3 hypothetical movements. Don't you recall that  
4 testimony?

5 A Yes.

6 Q All right. Therefore, by the time you get to  
7 the final adjusted base case, it's called -- that's the  
8 final data set -- you had created a whole lot of  
9 hypothetical movements, isn't that correct? And that is  
10 a difference from what you started with in the actual  
11 world, yes?

12 A That hypothetical data set, yes, is different  
13 from the original data set that we started with.

14 Q That's right. And that in your terms does not  
15 affect its quality, that it is full of hypotheticals?

16 A No. I'm talking about the quality of the  
17 sample.

18 Q The quality of the sample is not affected by  
19 the fact that at the end the data set is full of a lot  
20 of hypotheticals, is that your testimony?

21 A That's my testimony.

22 Q I think I'll leave it with that.

23 JUDGE HOPKINS: Thank you.

24 BY MR. KHAPASCH: (Resuming)

25 Q Now, you said, in connection with talking



1 about progression from data sets to data sets using your  
2 revenue allocation formula, that you thought it was such  
3 a dandy formula that it's probability was pretty close  
4 to one, the magnitude of difference would not increase  
5 much, on redirect. Do you recall that?

6 A I don't believe that's what I said.

7 Q Say it again, quickly?

8 A I think I said that the magnitude -- the  
9 probability of getting an exact match on any iteration  
10 is close to one. Therefore, the probability of getting  
11 an exact match doing a sequence of iterations is also  
12 close to one.

13 Q So if the probability in the first match is  
14 .9, then the probability in the second match is .9  
15 squared, and so on? Is that what you mean?

16 A Yes.

17 Q And if the probability were .9 in the first  
18 iteration, then by the time we did six iterations it  
19 would be .9 to the sixth power?

20 A Sixth power, which is not close to one, but I  
21 am assuming a higher probability.

22 JUDGE HOPKINS: Is that all, Mr. Kharasch?

23 MR. KHARASCH: Yes.

24 JUDGE HOPKINS: Any further questions?

25 MR. MAYO: No, Your Honor.

1 MR. WILSON: I move the admission of the  
2 verified statement of Robert Keyes, Your Honor.

3 MR. WAYO: I move the admission of DRGW-C-17.

4 MR. KHARASCH: I move MKT-C-22.

5 JUDGE HOPKINS: I haven't even seen it yet.  
6 Remember, you have to give it to us.

7 I'll accept them in evidence.

8 (The documents previously  
9 marked Exhibit Nos. MKT-C-22  
10 and DRGW-C-17 for  
11 identification were received  
12 in evidence.)

13 JUDGE HOPKINS: Off the record.

14 (Discussion off the record.)

15 JUDGE HOPKINS: We'll be in recess until 2:00  
16 o'clock.

17 (Whereupon, at 1:00 p.m., the hearing in the  
18 above-entitled matter was recessed, to reconvene at 2:00  
19 p.m. the same day.)  
20  
21  
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## AFTERNOON SESSION

(2:00 p.m.)

1  
2  
3 JUDGE HOPKINS: Let's go back on the record.  
4 Mr. Wilson.

5 MR. WILSON: Your Honor, as a preliminary  
6 matter I would request from counsel that those counsel  
7 seeking to cross-examine the traffic diversion study  
8 witnesses on specific movements or pages from the 15  
9 boxes of work papers over along the side of the hearing  
10 room, to the extent possible notify us in advance. We  
11 have received some advance notification from Mr.  
12 Kharasch and we received late last night notification  
13 from Union Pacific of some movements.

14 However, Katy and Ric Grande -- I'm sorry --  
15 Rio Grande and KCS and others are also listed to  
16 cross-examine these witnesses, and we would appreciate,  
17 to the extent possible, receiving some notifications of  
18 those movements so that we could expedite the hearing.

19 JUDGE HOPKINS: It looks like they wouldn't be  
20 taking them anyway until Monday, is that right?

21 MR. WILSON: Well, that's true.

22 JUDGE HOPKINS: Call the next witness.

23 MR. WILSON: Your Honor, Applicants call as  
24 their next witness Mr. Newton Swain.

25 (Witness sworn.)

1 Whereupon,

2 NEWTON D. SWAIN

3 was called as a witness by counsel for Applicants and,  
4 having been first duly sworn, was examined and testified  
5 as follows:

6 DIRECT EXAMINATION

7 BY MR. WILSON:

8 Q Mr. Swain, could you please state your name,  
9 your title, and the firm with whom you are employed?

10 A My name is Newton D. Swain. I am Vice  
11 President of DNS Associates.

12 Q Was your firm commissioned to undertake a  
13 study in connection with the Santa Fe-Southern Pacific  
14 rail merger?

15 A Yes, it was.

16 Q In connection with that study, did you prepare  
17 a 15-page verified statement signed by you on the 16th  
18 of March, 1984?

19 A Yes, I did.

20 MR. WILSON: For the record, Your Honor, that  
21 statement appears in volume SFSP-14.

22 BY MR. WILSON: (Resuming)

23 Q Mr. Swain, did you also participate in the  
24 preparation of a document entitled "SFSP-31, Rail  
25 Traffic Diversion Study, Summary of Procedures"?

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1 A Yes, I did.

2 Q Did you verify that document as your  
3 testimony, as well as Mr. Reyff's, in August of 1984?

4 A Yes, I did.

5 Q Sir, do you have any corrections or  
6 modifications which you would like to make to either of  
7 those statements at this time?

8 A I have two small corrections to my statement.  
9 Page 3 at the fourth line from the top, the statement  
10 that says, "The network contains approximately 18,700  
11 line segments." I'd like to change the 18,700 to  
12 18,500.

13 And on the next line is a typographical  
14 error. It says "connection nodes," m-o-d-e-s. I'd like  
15 to change that to "connection nodes," n-o-d-e-s.

16 Q Are there any other changes you would like to  
17 make to your statement at this time?

18 A No, those are the extent of my changes.

19 Q Do you have any changes to Exhibit SFSP-31 you  
20 would like to make?

21 A No, I don't.

22 Q With those changes you mentioned, is your  
23 verified statement in Exhibit SFSP-31 true and correct  
24 to the best of your knowledge and belief?

25 A Yes, it is.

1 MR. WILSON: The witness is available for  
2 cross-examination.

3 JUDGE HOPKINS: Mr. Levy.

4 CROSS EXAMINATION

5 BY MR. LEVY:

6 Q Mr. Swain, my name is Gegg Levy, appearing on  
7 behalf of the Union Pacific and Missouri Pacific. As  
8 you will soon find out, Mr. Swain, my questions today  
9 are really not of an adversarial nature. They are  
10 really designed for discovery purposes, to determine how  
11 your model has worked in the context of this study and  
12 to answer some questions that we have thus far been  
13 unable to answer on the basis of the materials that the  
14 Applicants have provided to us.

15 Let me start, though, by asking you whether,  
16 prior to your firm's engagement for purposes of this  
17 proceeding, you had done any studies of -- any studies  
18 for either Santa Fe or Southern Pacific of traffic flows  
19 or likely diversion results for any type of  
20 transaction?

21 A We have never done any such studies.

22 Q In the course of your engagement in connection  
23 with this proceeding, or engagements, did you do any  
24 studies other than the studies that had been submitted  
25 as part of the Santa Fe-Southern Pacific application in



1 this proceeding?

2 A No, we did not.

3 Q Have you done any such study since the  
4 submission of the Santa Fe-Southern Pacific application  
5 in this proceeding?

6 A Any such studies for the Applicants?

7 Q Yes.

8 A No, we have not.

9 Q Have you done any studies of the Applicant's  
10 transactions for anybody else?

11 A No, we have not.

12 Q Mr. Swain, can you tell me in what  
13 circumstances the model that your firm has developed  
14 will refuse to process or refuse to flow a bad record?

15 A What do you mean by "bad record"?

16 Q Maybe that's a question I should ask you. At  
17 some point in your verified statement -- and I may not  
18 be able to come up with the location immediately -- you  
19 say that the model actually processed or flowed 98 or 99  
20 percent of the records. The term you used is "routed"  
21 and it appears on page 10 of your verified statement --  
22 that over 99 percent of the carloads routed or the  
23 carloads in the sample were routed by the model.

24 What determined or what distinguished the  
25 small fraction of carloads that were not routed by the

1 model?

2 A The carloads that we couldn't route with the  
3 model generally either had a bad freight station  
4 accounting code or bad SPLC which was not connected to  
5 the network.

6 Q Tell me what you mean by the term "SPLC"?

7 A SPLC is a standard point location code, which  
8 was in all of the records and is a method for locating  
9 the origin and destination. There were some records  
10 that had junctions that did not use standard Rule 26C  
11 junction abbreviations or where the junction was blank.  
12 We could not route that traffic.

13 There were some cases where we could not  
14 identify the railroad, one of the railroads in the  
15 route, because the railroad was not in the AAR's master  
16 list of railroads. It was generally data problems which  
17 caused us to not be able to identify how to route either  
18 the origin, the destination, or junctions on the  
19 network, which caused us not to route traffic.

20 Q Do you know whether your model routed traffic  
21 for which junction information was missing in the file  
22 1?

23 A I'm not sure I understand. In the file 1?

24 Q In file 1, in the initial input to the model.  
25 If junction information were missing, were the



1 circumstances in which the model would route the traffic  
2 rather than refuse to route the traffic? \*

3 A If the junction information was missing?

4 Q Yes.

5 A Let me think about that.

6 Q And my next question will be, even if you do  
7 not know, how do you expect the model would have treated  
8 that traffic if it routed it?

9 A Well, there were some cases in the initial  
10 data where we had routing information in two parts of  
11 the record, and in the early stages of the process, in  
12 the deregulation phase, we were able to route those  
13 cars. In the second phase and subsequent phases, that  
14 traffic was not routed.

15 Now, those carloads were carloads which had --  
16 there was routing information in the first part of the  
17 record and there was routing information in what I call  
18 the second part of the record.

19 Q Why don't you define for me what you mean by  
20 the first part and the second part?

21 A The first part of the record would be like a  
22 header record which listed the origin, destination,  
23 originating junction, offgoing junction, and railroads,  
24 origin railroad, destination railroad. Later in the  
25 record, what I call the second part of the record, the

1 complete routed movement was there.

2 Q So let me just take an example. Suppose you  
3 had a movement, westbound movement originating in Omaha  
4 and ending in the Bay Area in California, for which you  
5 had a routing Union Pacific-Southern Pacific, without  
6 identification of Cedar as the junction.

7 A Without the identification of the junction, we  
8 would not have been able to route that.

9 Q And it's your testimony that the model did not  
10 route that traffic?

11 A If I understand what you said -- and I was  
12 thinking about my previous answer when you started your  
13 question -- you had a route with an origin, a  
14 destination, a junction, but there was no junction  
15 information in the record. We could not route that.

16 Q Is it possible, Mr. Swain, in certain  
17 circumstances, in the absence of a junction, junction  
18 information, the model would treat the carrier that  
19 moves the traffic before the junction as the terminating  
20 carrier, regardless of whether that carrier actually  
21 terminated the traffic on the other side of the  
22 junction?

23 Have I been clear?

24 A Repeat it, please.

25 Q What I'm concerned about is a situation where



1 you have no junction information, and the question is,  
2 would the model in any circumstance treat the carrier on  
3 the origin side of the junction as the terminating  
4 carrier because of the absence of junction information,  
5 treat it as both the origin and terminating carrier?

6 A That was the situation I was alluding to  
7 earlier on. We had cases where we did not have records  
8 -- we had records that did not have routing information  
9 in the second part of the record. In the deregulation  
10 phase, where we just used the first part of the  
11 information, we went through that phase and on some key  
12 records where there was no routing information we  
13 thought that it was local traffic and did substitute the  
14 origin carrier for the destination carrier.

15 Q And your understanding is that the model  
16 shaped those results --

17 A We made those records, in effect, local  
18 movements.

19 Q For the deregulation iteration?

20 A Subsequent to the deregulation iteration. It  
21 happened in the deregulation iteration.

22 Q So for subsequent iterations the model would  
23 refuse to route the traffic?

24 A No. They would be handled as local  
25 movements.

1 Q Local to the origin carrier?

2 A Local to the origin carrier.

3 Q Regardless of whether the origin carrier  
4 served the destination?

5 A That's correct, and many of those records are  
6 included in the bad data.

7 Q I understand.

8 Did you or any of your colleagues make any  
9 effort to determine how many movements were affected by  
10 this problem?

11 A There were a few thousand.

12 Q Do you have any idea how much revenue was  
13 affected by this problem?

14 A No, we do not.

15 Q On page 3 of your verified statement, Mr.  
16 Swain, you note that since the network was originally  
17 developed, it has been updated by your firm's various  
18 client users to reflect subsequent line abandonments,  
19 line construction, and changes in line classification.

20 Does DNS independently make any effort to  
21 update its network, aside from the updating that is  
22 undertaken by its clients?

23 A Well, we generally use the network in  
24 conjunction with client activities, and so one and the  
25 other go hand in hand. We work with the clients and we



1 jointly update the network.

2 Q So this is done on an ad hoc basis?

3 A Right. This is done on a periodic basis,  
4 because the network is being continually used by our  
5 clients.

6 Q As I understand it, for abandonments, for  
7 instance, the trade press will occasionally report  
8 abandonments. Is any effort made to reflect those  
9 abandonments immediately on your model?

10 A No.

11 Q Do you know to what extent the Applicants in  
12 this case made an effort to update your network for  
13 abandonments, line construction, changes in line  
14 classification that would not be local to their new  
15 system?

16 A Both the SF and the Santa Fe people looked at  
17 not only their traffic or their networks, their  
18 railroads, but they also looked at some of the other  
19 line segments and some of the other railroads in the  
20 western territory.

21 One line that comes to mind is a Missouri  
22 Pacific line that was recently upgraded in Arkansas and  
23 Tennessee. I've forgotten the name of the line, but  
24 there was an effort to look at the line segments of  
25 other carriers.

1 Q Do you have any records, are you familiar with  
2 any records, that demonstrate the extent to which  
3 modifications were made to the network to reflect --

4 A Those records are in the work papers.

5 Q Were they your records?

6 A They probably are in my work papers, yes.  
7 There are work papers that show all of the line segment  
8 changes that were made throughout the process.

9 Q And is that on a computer printout?

10 A It's on a computer printout.

11 Q Mr. Swain, did you or any of your colleagues  
12 prepare any reports on the distribution of records among  
13 the 45,000 diversions in the diversion matrix?

14 A I recall no such report, no.

15 Q Did you keep any logs of reports that were  
16 generated?

17 A In what sense?

18 Q This is now a general question. I'm  
19 interested in whether, during the course of the study,  
20 before the study, after the study, did you or anyone  
21 else in your firm or anybody else that you are aware of,  
22 keep a log of the reports that were generated by the  
23 computer that the Applicants were using for testing the  
24 model, testing or implementing the model?

25 A We kept reports of all of the impedance



1 charges.

2 Q No, that wasn't the question. The question is  
3 did you keep a log of the reports that were generated?

4 A To my knowledge, no, we did not keep a log.

5 Q Did you keep all the reports that were  
6 generated?

7 A All of the test samples and all of the test  
8 samples that we looked at, no.

9 Q Test samples would be one example.

10 A No, we did not keep copies of all of that.

11 Q At whose instruction or direction were  
12 decisions made to dispose of test samples and other  
13 reports that were generated?

14 A I don't recall anybody ever making that  
15 decision. The nature of the process is such that it's a  
16 computer producing lots and lots of paper which people  
17 evaluate. At one point we were in a conference room  
18 that had computer printouts all over the place, and we  
19 just made a decision that we needed the space and we got  
20 rid of it.

21 Q Do you recall whether you generated a final  
22 diversion detail report for the DRGW trackage rights  
23 iteration?

24 A Yes, we did.

25 Q Do you recall whether that report was

1 retained?

2 A A copy of the report was retained, yes.

3 Q Do you know whether that report was in the  
4 work papers?

5 A My recollection is that it is in the work  
6 papers.

7 MR. LEVY: Your Honor, with your permission, I  
8 would like to ask counsel for the Applicants. We have  
9 asked them on numerous occasions to produce that report  
10 to us in the past. My understanding is that at one  
11 point there was an acknowledgment that it was not in the  
12 depository.

13 We have yet to see it, despite repeated  
14 requests. It is of some importance in our ability to  
15 evaluate the model. If it is in the work papers, if  
16 it's in the room, I'd like to have it this afternoon.

17 MR. WILSON: I don't think it's in the work  
18 papers. We had checked that in response to your  
19 request.

20 MR. LEVY: So does it no longer exist?

21 MR. WILSON: I don't know.

22 THE WITNESS: My recollection is that we have  
23 a copy in Lexington and I was sure there was a copy in  
24 the work papers in Chicago.

25 MR. LEVY: Well, I had hoped not to put this



1 question in an adversarial posture. But after repeated  
2 requests, it may be necessary, if there is such a copy,  
3 for us to come back and raise additional questions. I  
4 know that is not your fault, but we would like that  
5 Tuesday morning at the latest if it exists.

6 JUDGE HOPKINS: Can you provide it, Mr.  
7 Swain?

8 THE WITNESS: I can make a phone call at the  
9 break and call my office in Lexington and verify that  
10 I'm correct. I think I am.

11 JUDGE HOPKINS: And if you are correct?

12 THE WITNESS: Certainly, we will.

13 BY MR. LEVY: (Resuming)

14 Q Did anyone ask you, Mr. Swain, at any time if  
15 that diversion report was in your possession? I'm  
16 talking about the last two or three weeks.

17 A I don't recall being asked, no.

18 MR. LEVY: Your Honor, I will simply note for  
19 the record that I hope that we will not need to raise  
20 additional questions about that report. That is a key  
21 element of our analysis. Once we have it, it may be  
22 necessary for us to --

23 JUDGE HOPKINS: I hope you don't have to --

24 MR. WILSON: For the record, Your Honor, we  
25 have checked with the DNS office and I don't think there

1 is a report, but we'll find out.

2 MR. LEVY: Let me ask a couple of more  
3 questions just to follow this up.

4 BY MR. LEVY: (Resuming)

5 Q Does the computer have the capability to  
6 generate another such report?

7 A That I'm going to have to check on.

8 Q Do you have any idea why such a report would  
9 not have been retained?

10 A No, I have no idea.

11 Q Do you know which diversion matrix was used  
12 for that iteration of the model? Did you use the UP  
13 merger diversion matrix or did you use the SFSP  
14 diversion matrix?

15 A We used essentially the same diversion matrix  
16 as was used in the FRS diversion and in the SFSP  
17 diversion. The one exception with the Rio Grande  
18 trackage rights merger was the addition of the cells in  
19 the matrix to reflect back that certain stations on the  
20 West Coast not served by the Rio Grande would be  
21 considered as open stations.

22 Q By open stations, do you mean open and served  
23 or open but not served?

24 A My recollection is hazy on whether it was open  
25 and served. I think in some cases we did -- for



1 instance, in the case of captive railroads that were  
2 only served by one of the merging carriers, by the SF, I  
3 think those stations were considered served stations.

4 Q And those were the only stations --

5 A I'm not sure of that.

6 Q Perhaps you could check on that and supply us  
7 with the answer to that question as well.

8 A Okay.

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1 Q Do you still have in your possession, Mr.  
2 Swain, a copy of that matrix?

3 A I think a copy of that matrix should be in the  
4 work papers, yes.

5 MR. LEVY: I see a knowing grin, Mr. Wilson.  
6 Can you pull it out of your pocket?

7 MR. WILSON: I think it's right here.

8 MR. LEVY: Can I see it? I promise to give it  
9 back.

10 BY MR. LEVY: (Resuming)

11 Q Mr. Swain, when junction impedances were  
12 adjusted on the model did you or anyone else produce any  
13 reports that confirmed that the adjustments that you  
14 made affected only the flows that you intended to affect  
15 when you made the adjustments?

16 A Well, the evaluation process was such that we  
17 made the impedance changes, reduced sample output and  
18 looked at the sample output, checked those flows that we  
19 were particularly interested in.

20 Q Go ahead. I'm sorry.

21 A That's the way the process went.

22 Q Now, I'm not concerned about the flows that  
23 you wanted to massage by the adjustment. What I'm  
24 concerned about are the other flows that might have been  
25 affected by the adjustment.



1           A     At the same time we were, of course, looking  
2 for the creation of flows that were not what the final  
3 evaluators thought would be reasonable diversions. So  
4 we also looked for other flows which might have been  
5 affected by the impedance changes, but which were not  
6 intended.

7           Q     How did you look for those flows? On the test  
8 runs?

9           A     On the test runs.

10          Q     And looking at the "sample" movements.

11          A     That's right.

12          Q     How were those test runs generated?

13          A     The test runs were generally a sample of 1 out  
14 of 15 for the case of the diverted movements, or 1 out  
15 of 100 or 1 out of 150 of the nondiverted moves, making  
16 sure that we had at least the first 100 occurrences of  
17 every diversion and nondiversion rule.

18          Q     Well, when you say sample -- I don't want to  
19 get into the morass that we were in this morning -- but  
20 you don't mean a random statistical sample.

21          A     It was every fifteenth record, and every one  
22 hundred and fiftieth record, subject to the caveat that  
23 until we accumulated a hundred examples of every reason  
24 code, we would keep drawing records until we got that.

25          Q     Do your work papers include instructions to

1 the computer to select from the universe "sample  
2 movements" on that basis?

3 A I'm not positive, but my recollection is that  
4 on the sample output itself, it may show what that was.  
5 I think it does.

6 Q Is there something you can look at that would  
7 allow you to confirm that?

8 A Not without going through those work papers.

9 Q And it's your testimony that that was the  
10 basis upon which all of the test runs were done?

11 A Well, there was also a second process where we  
12 would select sample movements from the larger sample,  
13 individual movements, and test them, because we could  
14 test them very quickly.

15 Q And how was that process conducted?

16 A Well, that process was we would identify the  
17 movements that we wanted by their waybill number, we  
18 would draw those movements out of the larger sample, and  
19 then we would run them through the diversion process,  
20 apply the diversion rules, and we could do that on a  
21 much faster basis and get the results.

22 Q That was in addition to the test runs.

23 A That was in addition to the test runs with the  
24 larger sample, yes.

25 Q And as far as you know, all of the sample



1 checks, records of all of those sample checks were  
2 retained in the work papers?

3 A Some of the sample checks were retained in the  
4 work papers. I can't verify that all of them were.

5 Q What criteria were used for distinguishing the  
6 ones that were retained from the ones that were not  
7 retained?

8 A I don't recall that there was any criteria.

9 Q What criteria were used to distinguish the  
10 test runs that were retained from the test runs that  
11 were not retained, or did you intend to answer that  
12 question by your last answer as well?

13 A No. At the end of each iteration there was a  
14 run produced which all of the final evaluators looked  
15 at, and this final run was saved in every case.

16 Q I'm not interested in the final runs. I'm  
17 interested in the intermediate runs that you used and  
18 the evaluators use to make the adjustments that  
19 ultimately yielded the final run that you retained.

20 A Well, the intermediate runs were just that,  
21 intermediate runs where we tested our logic, we tested  
22 our diversion rules. They don't represent the final  
23 output of our work.

24 Q I'm not accusing and I don't mean to be  
25 accusing by that. I just want to know what the facts

1 are.

2 JUDGE HOPKINS: Don't both of you talk at the  
3 same time. I think the Reporter is having trouble here,  
4 and I don't blame her. Let's do it one at a time. Let  
5 him finish his answer before you start another question.

6 MR. LEVY: Yes, sir.

7 THE WITNESS: Some of them were kept, and some  
8 were not, and there was no pattern.

9 BY MR. LEVY: (Resuming)

10 Q Would the intermediate test runs allow a  
11 person schooled in computer models to determine on an  
12 adjustment-by-adjustment basis the method by which you  
13 adjusted the model to develop the ultimate results?  
14 Would they have provided an audit trail of your  
15 procedures?

16 A They would have provided an audit trail  
17 showing how our thinking was shaped as we went through  
18 this process. As we made our judgments, looked at the  
19 data, looked at the results of our decisions, saw  
20 whether or not the computer was doing what we wanted it  
21 to do, further thinking through the process, the logic,  
22 the things that we wanted to accomplish.

23 Q And as I understand it, such an audit trail is  
24 not available in the work papers that have been made  
25 available to rictestants in this case?



1           A       Well, there's an audit trail to the extent  
2       that you can go from iteration to iteration and see  
3       exactly what we did. There are all of these sample  
4       movements. We have examples of both the diverted  
5       movements and the nondiverted movements which show  
6       pretty well exactly what we did.

7           Q       Let me ask the question again, and perhaps I  
8       can be more precise. As I understand it, within each  
9       iteration there is no basis upon which one can  
10      reconstruct the adjustments that you and your colleagues  
11      made to the model in order to develop the final test run  
12      for that iteration. There is no audit trail available  
13      within the iterations?

14          A       There is no audit trail in the same sense that  
15      there would be no audit trail if a manual study had been  
16      done.

17          Q       Mr. Swain, what criteria are used by the model  
18      to collapse records on the diversion details? And by  
19      "collapse" I mean to group similar movements.

20          A       My recollection is that records of the same  
21      origin, destination, shipper, consignee, seven-digit  
22      commodity code, car type were collapsed.

23          Q       The movements would have to be identical for  
24      each of those variables in order for the records to be  
25      collapsed?

1           A     Yes, that's my recollection. There may be  
2 some differences, but that's my recollection right now.

3           Q     On each of the last pages of your diversion  
4 detail there's a summary data set forth that I don't  
5 intend to introduce as an exhibit, but just to show you  
6 as an example, you'll see on the top line there in the  
7 summary data it reads "route records," and there are  
8 other references to records down that column.

9                     Can you tell me what the term "records" means  
10 in that context?

11                     (Pause.)

12           A     I tell you, I'd rather answer that later  
13 rather than give you a wrong answer.

14           Q     That would be fine with me. You can keep that  
15 sheet if it's helpful for you. Let me ask you a similar  
16 question. On some of the -- on the diversion detail  
17 there's a category for loads on the header. Are you  
18 familiar with that category?

19           A     Yes, I am.

20           Q     Could you tell me what the term "loads" means  
21 when it is used to refer to TOFC or COFC traffic?

22           A     It means loaded cars.

23           Q     And that definition was used consistently?

24           A     Yes.

25           Q     So that if a carload had one trailer or one



1 container, it would be treated the same as a carload  
2 that had two trailers or two containers?

3 A No. It would have been counted as half a car.

4 Q Oh, half a car. Okay.

5 A Roughly half a car.

6 Q Now, you've piqued my interest there. What do  
7 you mean by roughly half a car?

8 A There's a complicated algorithm for  
9 determining how many trailers there are in a car and how  
10 many cars those trailers are allocated to, and it's  
11 approximately one-half of a car per trailer. It's not  
12 exactly.

13 Q Can you tell me in very general, nontechnical  
14 terms what that algorithm is intended to accomplish?

15 A Well, this is done primarily for costing  
16 purposes. It's intended for costing purposes to  
17 replicate exactly how many cars, how many trailers are  
18 in fact on each car, so that when the movement is  
19 costed, we accurately reflect the car costs and the  
20 trailer costs.

21 Q And what is the source of the information that  
22 is used for making that calculation?

23 A Well, the number of trailers and the number of  
24 -- on each car were included in the Santa Fe data base.  
25 On the SP data base, in the SP data base and in the ICC

1 carload waybill sample there were no estimates of  
2 trailers associated with each waybill.

3 Q And what did the model use as a surrogate for  
4 the number of trailers for those data bases?

5 A The model originally went through and in both  
6 cases my recollection is multiplied the number -- we had  
7 car information. We multiplied the number of cars by  
8 1.78, which is the kind of a standard Rail Form A number  
9 for the number of trailers per car, to get the number of  
10 trailers that were associated with that movement in the  
11 sample.

12 After we had gone through the adjustments and  
13 through the diversion study, when we were doing the  
14 costing, we found out that we had way too many trailers,  
15 particularly in the SF or in the SP and the carload  
16 waybill sample data. We got numbers from the Santa Fe  
17 -- at this point the data had been combined, like  
18 records had been combined, and it was impossible to go  
19 back to the base data and correct this. So we got  
20 information from the Santa Fe based on their historical  
21 records which showed how many trailers there were per  
22 waybill, how many cars there were per waybill, and how  
23 many trailers there were per car, and we basically  
24 reconstructed the waybill count first, and then the  
25 trailer count, and then the car count. And the formula

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1 for doing that is in the work papers.

2 Q The number 1.78 is a familiar number to me  
3 because I think that in the SFSP diversion matrix you  
4 have a Code R that affects the diversion percentages by  
5 that same factor. Do you know what the Code R means in  
6 the SFSP diversion matrix? I think it's in the last  
7 column of that matrix?

8 A That is a route efficiency. If I'm not  
9 mistaken, I think that is the route efficiency. I would  
10 have to see a matrix to verify that.

11 (Pause.)

12 Q Do you see the R reference?

13 A I see the R reference, yes.

14 Q Do you know what it means?

15 A It looks like in this -- well --

16 Q If you prefer, we could add that to your list  
17 of things to report back on.

18 A Fine.

19 Q We are confused as well. Would you prefer to  
20 study that some more, or would you like to move on?

21 MR. WILSON: Why don't we move on, Mr. Levy,  
22 and we can supply that answer at the break.

23 THE WITNESS: Let's move on.

24 BY MR. LEVY: (Resuming)

25 Q Mr. Swain, I'd like to turn next to the reason

1 codes, the diversion codes that we used to determine the  
2 diversion percentages and the reasons for the diversions  
3 or nondiversions in the model. And I intend to touch on  
4 these really only very lightly.

5 Was there any distinction intended between the  
6 term "one merging road" that shows up for codes 25 and  
7 26 and "single merging carrier" as that term shows up on  
8 codes 107 and 108?

9 A To my recollection, no.

10 Q Do you have something with the codes listed in  
11 front of you?

12 A I have the Attachment B to SFSP-31.

13 Q Okay. Maybe you can look just to refresh your  
14 memory. Can you look at the numbers -- well, I see this  
15 doesn't --

16 A I remember 25, 26 and 27.

17 Q And as far as you can tell, the distinction  
18 between the language there has no substantive  
19 significance?

20 A No. Twenty-five, 26 and 27 were codes that  
21 existed to prevent diversions from occurring that were  
22 between points where one of the merging carriers either  
23 served the origin and the destination or the origin and  
24 the new offgoing junction, or the destination and the  
25 new oncoming junction.



1 Q On reason codes 107 and 108, the narrative  
2 description of those reasons refers to end points. I  
3 assume that end points in that context refers to the  
4 place at which the merging carrier receives or delivers  
5 the traffic and not to the origin and destination.

6 A That is correct. That is correct for the most  
7 part. Rule 107 has jillions of exceptions.

8 Q Well, that's where we're going next.

9 A Those exceptions are numerous, and my  
10 recollection is some of them apply to the end points in  
11 the sense of the origin and destination, and others  
12 apply to just the origin and -- the end points of the  
13 merging carriers.

14 Q Are you familiar with any narrative  
15 description of the various exceptions to rule 107 that  
16 you have referred to?

17 A I think there are some of the exceptions are  
18 discussed in SFSP-31 and in Mr. Reyff's statement.

19 Q Are all of the exceptions addressed in SFSP-31  
20 and Mr. Reyff's statement?

21 A I don't think all of them are, no.

22 Q What exceptions are not addressed in those  
23 statements?

24 A Well, I think the exceptions are generally  
25 addressed in Mr. Reyff's statement and in SFSP-31.

1 That's all I can say.

2 Q Well, correct me if I'm wrong, but did you  
3 just use the term a jillion exceptions?

4 A I perhaps overstated it.

5 Q I don't mean to be coy here, but I have read  
6 SFSP-31 and Mr. Reyff's statement. We have had hundreds  
7 of man hours devoted by people, including some of your  
8 former colleagues, to try to decipher the exceptions to  
9 rule 107. After having read this, after having had the  
10 work papers available to them, after having gone back  
11 and forth through various computer printouts of our own,  
12 we still can't figure it out. And if there are  
13 exceptions or nuances to the exceptions that were useful  
14 to the model, I frankly suggest it is in applicants'  
15 interest as well as our own for you to be able to  
16 explain them, because with the hundreds and hundreds of  
17 man hours and the computer time that the protestants  
18 have invested and still being unable to understand the  
19 model, I presume that the Commission staff is going to  
20 have even greater difficulty. So if there are  
21 additional exceptions, I would like to hear about them.

22

23

24

25



1 A I have here a list of all of the exceptions.

2 Q Would you tell me what you're reading from?

3 A I'm reading from a document that was prepared  
4 for me prior to going on the stand.

5 Q That document was just handed to you by your  
6 counsel.

7 A Which was just handed to me by my counsel.

8 Q And it was not in the work papers?

9 A It was not in the work papers. As I said, it  
10 was prepared for me, preparatory to cross-examination,  
11 because I wanted to understand what all of the  
12 exceptions were, to refresh my mind as to what all of  
13 the exceptions were to Rule 107.

14 Q If what you are going to do is read to me from  
15 that document, what I would like to do is to have  
16 copies, and to raise with counsel the question of why  
17 these exceptions weren't included in the supplemental  
18 verified statement that was intended to explain this  
19 model.

20 We've been working on this thing for weeks and  
21 still haven't been able to figure it out.

22 JUDGE HOPKINS: Mr. Wilson.

23 MR. WILSON: Nuances to an exception seem to  
24 be below the level of detail of the verified statement,  
25 so we just didn't include it. We're talking about

1 exceptions to exceptions. And in any event, it was in  
2 the work papers.

3           However, we could make it an exhibit for Mr.  
4 Levy.

5           JUDGE HOPKINS: It looks like it would be  
6 helpful. Is that all that that contains?

7           MR. WILSON: I haven't even seen the exhibit  
8 myself. I just passed it up as a messenger.

9           MR. LEVY: I want to make sure I understand.  
10 Mr. Wilson just said that this was in the work papers.

11           MR. WILSON: This document was not in the work  
12 papers, Mr. Levy, but the nuances to the exceptions to  
13 Rule 107 in Newt's handwritten comments were included in  
14 the work papers, because I recall seeing them.

15           MR. LEVY: Some of the exceptions?

16           MR. WILSON: I think all, but I don't know.

17           MR. LEVY: I'd appreciate being invited to  
18 those page references, and I would simply note for the  
19 record -- and I intend to move on -- that these two --  
20 that 107 and 108 -- we're not simply dealing here with a  
21 small quantity of movements from the study, and this  
22 dealt with more than half of the non-diverted movements  
23 that affected the Union Pacific and the Missouri Pacific  
24 system.

25           JUDGE HOPKINS: You know, one of the things I



1 have noticed here, I don't see why some of these things  
2 can't be worked out ahead of time by expert on expert.

3 I have noticed in these cases, in my opinion,  
4 a lot of this time is wasted by counsel asking questions  
5 on cross-examination that can be very well worked out  
6 with expert on expert discussing these, and a lot of  
7 these matters could be brought out before we ever get to  
8 cross-examination.

9 MR. LEVY: I could't agree more, Your Honor.

10 MR. WILSON: Your Honor, I have read this, or  
11 at least looked at this document, and it seems to me  
12 that we could make it an exhibit.

13 JUDGE HOPKINS: I would like to have it as an  
14 exhibit.

15 MR. WILSON: Okay. I would like to have the  
16 document then marked as SFSE-C-5, which I believe is the  
17 next-in-order number.

18 JUDGE HOPKINS: That will be marked for  
19 identification and you will provide copies.

20 MR. WILSON: I will provide copies.

21 (The document referred to  
22 was marked Exhibit SFSE-C-5  
23 for identification.)

24 MR. KHARASCH: I would like to have a copy  
25 today, Your Honor, because I'm really furious at this

1 sort of thing. We made every possible effort, from  
2 starting in the spring of this year, the day after the  
3 application was accepted, we demanded detailed statement  
4 of procedures.

5 We went through -- we had a prehearing  
6 conference and we said you are not telling us how you  
7 work this thing. Tell us what happened at each point,  
8 and tell us the specific numbers, so that we could work  
9 through and audit what you did. It's essential.

10 At the prehearing conference, Your Honor will  
11 recall, I had spent a day on the telephone with Mr.  
12 Wilson and Mr. Smith, and that day on the telephone had  
13 resulted in the commitment to give us a statement of  
14 procedures. At the prehearing conference, it was  
15 expected July 3rd.

16 On August 25th, a statement arrived here --  
17 and I'm going to ask you, when it's my turn, to have  
18 five minutes to specify in the record places where the  
19 statement of procedures is totally inexplicit, and at  
20 this time there is no mention of exceptions to this.  
21 There's a little rule there. This is brand new.

22 We're going to go through several of the  
23 things, all of which are caused by the fact that the  
24 Applicants have refused to make an orderly and complete  
25 statement here from which the reader would know what was



1 done. And precisely what was done in every other case,  
2 where much less, infinitely less complex procedures were  
3 employed, the experts that have appeared before the  
4 Commission have said "I did this; here is a sample page  
5 of that. Here are the pages," and so on.

6 We were given no index to the work papers. I  
7 don't know whether one scribble was Mr. --

8 MR. WILSON: Your Honor, I object to speeches  
9 at this time.

10 JUDGE HOPKINS: I want to hear the whole  
11 thing, Mr. Wilson. Go ahead.

12 MR. KHARASCH: Yes, it makes a very long  
13 examination. It also makes a somewhat unfocused  
14 examination because one doesn't know what was going on  
15 here. And I think it is entirely the Applicant's fault,  
16 and I hope Your Honor will have compassion on those who  
17 have spent, yes, hundreds of hours.

18 And I have sat, preparatory to this time, with  
19 experts from each of the Protestants, and nobody knows  
20 what went on. And that is the Applicant's fault that we  
21 don't know that.

22 JUDGE HOPKINS: I can see a lot of wasted time  
23 in some of these where it could have been worked out  
24 ahead of time with expert on expert discussing these and  
25 making it clear as to what was being done.

1                   Otherwise, we waste a lot of time that is  
2 being brought out on cross-examination that could have  
3 been handled differently.

4                   MR. LEVY: Your Honor, I am going to try to  
5 move this examination forward quickly. I sympathize  
6 with the problem.

7                   BY MR. LEVY: (Resuming)

8                   Q     Mr. Swain, looking again at Rules 107 and 108,  
9 the reference there to single merging carrier in each of  
10 those rules doesn't necessarily mean the carrier that  
11 participated in the movement, does it?

12                  A     No, not in all cases.

13                  Q     So the model, in applying Rules 107 and 108,  
14 really focuses on the so-called end points and which  
15 railroads serve those end points, rather than on the  
16 carrier that actually participated in the haul?

17                  Is that correct?

18                  A     For the most part, yes.

19                  Q     Tell me about that part which is not included  
20 in the "for the most part."

21                  A     Repeat what you said.

22                  Q     As I understand it, single merging carrier, as  
23 used in Rules 107 and 108, does not necessarily mean the  
24 carrier that participated in the movement. It may mean,  
25 if the Santa Fe handled the traffic, that the Southern



1 Pacific serves both end points, or vice versa.

2 A That's true.

3 Q And so I conclude from that, that when the  
4 model applies these rules, it looks at the end points  
5 rather than the participating merging carrier.

6 A Some of the exceptions, it looks at  
7 participating -- which carrier it is. Let me give you  
8 an example.

9 One of the exceptions is the Texas-Louisiana.  
10 If a shipment originates or terminates in Texas on the  
11 SP and is going north, and is interchanged, for example,  
12 at Kansas City, that could be done today.

13 If the SP is in the route pre-diversion, we  
14 will allow that diversion to occur. If the Santa Fe was  
15 in the route pre-diversion, we would not allow it to  
16 divert to an SFSP route if the SP also served the  
17 destination.

18 Q I understand the example you've just given  
19 me. Was that example typical of the way the model  
20 applied Rule 107 or Rule 108, or was that unique to the  
21 Texas-Louisiana movement?

22 A That was unique to the Texas-Louisiana  
23 movements.

24 Q How did you distinguish the Texas-Louisiana  
25 movement from all other movements where the same

1 diversion structure exists, if I can use that term?

2 A Because we know that the origin and the  
3 destination is in Texas or Louisiana, and we know that  
4 the SP is either in or not in the pre-diversion route.

5 Q I want to move off 107 and 108 in just a  
6 second, but before I do, I'd like just to hear a  
7 narrative explanation from you of each reason code.

8 A Code 5 is no merging carrier in the diverting  
9 route.

10 Q Excuse me. I don't want every reason code. I  
11 only want -- I'm afraid you're going to get that later.  
12 What I'm interested in are reason codes 107 and 108.

13 A Okay. To speed this up, why don't I just read  
14 the --

15 MR. WILSON: It has gone to get copied.

16 THE WITNESS: That is the most precise way to  
17 do it.

18 BY MR. LEVY: (Resuming)

19 Q Mr. Swain, as I understand it, what your model  
20 does in trying to determine whether or not a movement  
21 will be diverted, is it picks a most desirable route by  
22 some efficiency definition you developed, and then  
23 compares that route to the historical route and decides  
24 whether or not any diversion can occur.

25 Is that right?



1           A       Basically, it picks what we consider a good  
2 candidate route, and then puts that route through a  
3 number of screens to determine whether it is a suitable  
4 candidate for diversion, and if it is suitable for  
5 diversion, then determines how much of the traffic will  
6 be diverted to that route.

7           Q       If the model rejects diversion on what you  
8 have defined as the good candidate route, does it  
9 consider any other candidate routes for diversion?

10          A       No. The model considers one route.

11          Q       So the model rejects the ideal route or the  
12 route that it has selected, there's a zero percent  
13 change of diversion?

14          A       The movement remains undiverted.

15          Q       And that's true even though diversion may very  
16 well be possible over alternative routes that might not  
17 be disqualified on the same basis that the good  
18 candidate route that the model defined has been  
19 disqualified?

20          Q       This is one of the reasons why we spent a long  
21 and laborious time developing the diversion model and  
22 the network and the impedances, to make sure that that  
23 does not happen.

24                   We are relatively certain when we choose a  
25 candidate route, that it is a very good candidate route

1 for the merging carriers, and it is a -- it is the best  
2 candidate route for diversion.

3 If it doesn't pass the screens, it is for some  
4 reason. This is one of the things the final evaluators  
5 looked at very closely: Was the model choosing the best  
6 possible route for diversion and, if not, what can we do  
7 to modify the -- either the impedances -- well, the  
8 impedances primarily -- to make sure that the best route  
9 is determined?

10 This is one of the things that the evaluators  
11 spent the most time doing -- making sure that the routes  
12 that were selected were the most reasonable routes and  
13 that we weren't rejecting diversions because we chose a  
14 route that was just totally inappropriate.

15 Q Mr. Swain, I delivered to your counsel  
16 yesterday afternoon four pages that included excerpts  
17 from your work papers that I'd like to have marked for  
18 identification as Exhibits UP/MP-C-10 through 13.

19 JUDGE HOPKINS: They will be marked for  
20 identification.

21 (The documents referred to  
22 were marked Exhibits  
23 UP/MP-C-10 through 13 for  
24 identification.)

25 BY MR. LEVY: (Resuming)



1 Q Have you had an opportunity to look at these  
2 exhibits, Mr. Swain?

3 A I saw these very briefly at lunchtime. I have  
4 not had a chance, an opportunity to study them in great  
5 detail.

6 Q I want to tell you what they are. They are  
7 all examples of one general phenomenon, and those are  
8 situations where the model has apparently taken two  
9 movements that appear by objective standards to be quite  
10 similar, but treated in different ways.

11 I don't intend here to harken back to the days  
12 of yesteryear where we asked each traffic evaluator to  
13 justify every diversion --

14 JUDGE HOPKINS: Thank you.

15 BY MR. LEVY: (Resuming)

16 Q What I'm interested in is why the model  
17 treated these movements differently, and I hope that  
18 that information will help us better to understand how  
19 the model treated all movements.

20 Maybe we can start with Exhibit UP/MP-C-10  
21 which, as you will see, includes two movements, two TOFC  
22 movements that originate in Oakland on the Union Pacific  
23 consolidated system; both of them moved to Memphis, one  
24 of them moves after Memphis to Charlotte.

25 In the first movement, you'll see that there

1 is a 20 percent diversion, and that's the movement where  
2 the traffic terminates in Memphis.

3 In the second movement, the movement that goes  
4 on via Memphis to Charlotte, there's a zero percent  
5 diversion.

6 The diversion reasons which are set forth here are  
7 18 in the case of the 20 percent diversion, and 107 in  
8 the case of the non-diversion. Can you tell me why they  
9 were treated differently?

10 A It appears -- and I'm going to have to verify  
11 this over the weekend -- that the exception to Rule 107  
12 that applies between Oakland and Memphis only applies  
13 between Oakland and Memphis when Memphis is an  
14 originating or terminating point and not a gateway.

15 Q What is the exception to Rule 107 that applies  
16 between Oakland and Memphis?

17 A TCPC traffic that moves between Oakland and  
18 Memphis, and there are other points which were included  
19 in the list of exceptions to Rule 107, are deemed to be  
20 an exception to the rule that says that if one merging  
21 carrier serves the origin and the destination today,  
22 don't divert because they're capable of handling it  
23 today.

24 That is one of the exceptions to 107.

25 Q What is the reason for that exception and why



1 is it not applied to traffic that moves beyond Memphis?

2 A The exception was designed to reflect the fact  
3 that the merged SFSP system, in the opinion of the  
4 evaluators, will have improved service between the Bay  
5 area and Memphis, and that they will in fact be able to  
6 divert traffic away from other routes.

7 Q But that improvement will apply not only to  
8 traffic that terminates, but also traffic that flows  
9 beyond Memphis, will it not?

10 A That's correct.

11 Q Let's turn to Exhibit 11. You may have  
12 answered the question already for Exhibit 11. As you  
13 will see, there are four movements here. All of them  
14 have a diverted route via Norfolk Southern and your new  
15 merged system, SFSP.

16 The TOFC moves, however, show non-diversions,  
17 while the carload movements are diverted.

18 Can you explain to me the reason for those  
19 distinctions?

20 A It appears -- and again we will check this  
21 out, check these explicitly over the weekend -- it  
22 appears that the carload movement terminates at a  
23 standard point, a SPLC, a standard point location code  
24 that is only served by the Santa Fe.

25 If that is the case, then we would have the

1 situation where the single merging carrier does not  
2 serve both the origin and the off-going junction, which  
3 in this case is Memphis, and we would allow that  
4 diversion to occur.

5 That's what I think has happened here.

6 Q You're talking about the Santa Fe serves the --

7 A Santa Fe serves the SPIC at Los Angeles and  
8 the SPSP does not serve it.

9 Q And how are you going to make that  
10 determination?

11 A We will go back and we will try to find this  
12 record and see what the SPIC is.

13 Q Let me ask you to turn to Movement 12. This  
14 is another movement via Memphis to Los Angeles. It's a  
15 TOFC movement that was 39 percent diverted.

16 Is this the same phenomenon that we were  
17 seeing?

18 A This would be the same phenomenon. This  
19 could, for example, be a Plan 2 movement, even though it  
20 was a TOFC movement. It could be a Plan 2 movement that  
21 shows the origin SPIC of the shipper which is only  
22 served by the Santa Fe.

23 Q Now, nothing in this header information  
24 indicates that this is a Plan 2 movement, does it?

25 A No.



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1 Q And nothing in the diversion detail that was  
2 available in the work papers indicates that the two  
3 movements that were -- the two carload movements that  
4 appear on Exhibit 11 moved only exclusively-served Santa  
5 Fe points, does it?

6 A No, but you can look at the matrix line, and  
7 the matrix line will determine whether or not it's an  
8 exclusive point.

9 Q If that situation is --

10 A Let me take that back. It will show whether  
11 it's an exclusive point. It will not show whether it's  
12 not a point served by the SF.

13 Q Well, looking again at Exhibit 12, doesn't  
14 Exhibit 12 demonstrate in the routing information on the  
15 left-hand side of the page, by virtue of the fact that  
16 the traffic was terminated by Union Pacific, that this  
17 is not an exclusively served Santa Fe point?

18 A Yes.

19 Q Whether Plan 2 or not?

20 A Yes. That's why I amended my previous  
21 statement to say it is not served by the SF.

22 Q So what you're suggesting is that there are  
23 exceptions to reason code 2 as well as reason code 107  
24 about which we have not yet been informed.

25 A No. There are no exceptions to reason code



1 2. If it's an exception to reason code 107, it will  
2 show as a reason code 2, acceptable for diversion.

3 Q And you are going to look at the movement on  
4 Exhibit 12 and trace that back to the original record  
5 and tell me what's happened?

6 A That's right.

7 MR. WILSON: Excuse me, Mr. Levy. Perhaps it  
8 would be beneficial to go ahead and distribute the much  
9 sought-after SFSP-C-5. Is that okay?

10 MR. LEVY: Absolutely.

11 (Pause.)

12 MR. LEVY: I think what I'd like to do, if  
13 it's all right with the judge, is just to continue with  
14 my questions, and then perhaps at the break have an  
15 opportunity to take a quick look at this, rather than  
16 take the time to do that now.

17 JUDGE HOPKINS: Go right ahead.

18 BY MR. LEVY: (Resuming)

19 Q You have referred to the exceptions to Rule  
20 107. Are there exceptions to any other rules that we  
21 may not know about?

22 A No.

23 Q Let's look at Exhibit 13. This will be the  
24 last of these moves. I'm going to turn back to Exhibit  
25 13 after having had a chance to look at the reason

1 codes.

2 Let me ask a series of additional questions,  
3 Mr. Swain. Can you tell me what operating assumptions  
4 the model used in terms of the service that the  
5 Applicants would offer after the merger?

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1           A       Explicit in the model is -- first of all, the  
2 objective of the model is to select for evaluation a  
3 reasonable candidate diversion route for evaluation as a  
4 potential diversion. It does that by using our version  
5 of the FRA network which has main lines -- well, which  
6 has all lines classified as A or B mains and C or D  
7 branches. We give the highest or rather lowest  
8 weighting factor to those lines which are heavy density  
9 main lines, the so-called A main lines.

10           Implicit in that designation is high density,  
11 high volume, more frequent train service, so scheduling  
12 in that sense is implicit in the selection of the route,  
13 because the model tries to minimize -- not tries to --  
14 does minimize the weighted miles in the selection of a  
15 route, and it does so by generally moving traffic over  
16 the heavy density A main lines.

17           Q       Were there adjustments made to the model to  
18 reflect the operating improvements that applicants have  
19 promised in their operating plan?

20           A       There were the addition of internal junctions;  
21 there were changes in line designations. Yes, there  
22 were.

23           Q       Were there adjustments based on service  
24 improvements made possible by increased volumes of  
25 traffic?

1           A       There were adjustments made to the category,  
2 the designation of lines as A main or F main, and those  
3 designations, changes in designations were based on --  
4 were determined by the operating people and were based  
5 on their operating plan. This is the way they planned  
6 to route the traffic.

7           Q       Other than the adjustments from A main or F  
8 main were there any other adjustments made to reflect  
9 service improvements or increased numbers of trains that  
10 applicants' proposed operating plan will make available  
11 due to the increased volume of traffic that they will be  
12 handling after the merger?

13          A       I think there was one other adjustment that  
14 was made at Chicago to allow the diversion of automobile  
15 traffic to Chicago where the applicants, it's my  
16 understanding, do not now have an automobile unloading  
17 ramp. And we considered automobile unloading ramps as  
18 being open on the theory that they would make the  
19 capital investment to handle automotive traffic at  
20 Chicago. And I believe that that -- that such capital  
21 investment is in the plan.

22          Q       Did that result in the diversion of any  
23 automobile traffic to the applicants?

24          A       I'd have to check that. I think it did.

25          Q       As I understand it, Mr. Swain, shipper



1 identification information was not available on many  
2 movements that were included in the -- that were flowed  
3 by the model, is that correct?

4 A There was a much higher incidence of shipper  
5 information available for SP traffic than there was for  
6 Santa Fe traffic. Are you speaking in terms of the  
7 shipper identification number?

8 Q I'm speaking in terms of any information that  
9 will allow us to identify the specific shipper who route  
10 the traffic.

11 A My recollection is that the Santa Fe and the  
12 SP tapes all, for the most part, did have shipper  
13 information on them.

14 Q I note in your verified statement on page 10  
15 you say that "Many Southern Pacific records and some  
16 Santa Fe records were assigned shipper identification  
17 numbers." From that I infer that less than half of the  
18 Santa Fe records were assigned shipper identification  
19 numbers.

20 A I don't know precisely how many Santa Fe  
21 records were assigned shipper identification numbers,  
22 but it was less than the SP.

23 Q Is there anything in the work papers that  
24 would allow us to figure that out?

25 A No, there is not.

1           Q     There were no shipper identification numbers  
2 on the movements that were derived from the 1 percent  
3 waybill sample, is that correct?

4           A     Yes, that's correct, because there was no  
5 shipper information on the waybill.

6           Q     How did the model treat an origin point when  
7 the shipper of origin is unidentified? Does the model  
8 treat an origin point as closed?

9           A     It treats it as either closed or open  
10 depending on what the situation is with the SPIC.

11          Q     Well, let me give you an example. I don't  
12 know if you know enough of this detail to deal with  
13 these examples, but take the example of St. Joseph.

14          A     St. Joseph, Missouri?

15          Q     Missouri. Do you know how the model treated  
16 St. Joseph, Missouri in circumstances where there was no  
17 specific shipper identification provided in the data?

18          A     The cases where there was no specific  
19 identification provided by shipper identification  
20 number, we fell back to the designation of the SPIC.  
21 That is shown as the origin SPIC or the destination  
22 SPIC. And that SPIC was either open or closed to the  
23 other railroads at that point.

24          Q     You don't recall how St. Joseph, Missouri was  
25 treated?



1 A I don't, no.

2 Q Who determined the sequence of the iterations  
3 that were used by applicants in processing the study?

4 A I think the sequence was the result of joint  
5 discussions and was pretty much based on chronology.

6 Q Were those discussions in which you  
7 participated?

8 A Yes, I did.

9 Q Who else participated in those discussions?

10 A Messrs. Peyff and Guerin.

11 Q Did you consider the impact of the sequence of  
12 the iterations on the ultimate diversion results?

13 A Well, what we were trying to do is replicate  
14 the sequence in which they actually occur, figuring that  
15 that was the best way to represent their impact. And my  
16 recollection of the discussions were that eastern route  
17 closings had clearly taken place in 1982. The PPS  
18 merger took place in -- was consummated in late December  
19 1982, and I think took effect in early January.

20 The SP trackage rights were early January.  
21 The Rio Grande trackage rights, my recollection -- I'm  
22 not exactly sure when that happened, but in that  
23 iteration we were also replicating the SP-Rio Grande  
24 solicitation agreement, and that signed somewhat  
25 subsequently to the trackage rights. So what we were

1 trying to do is represent the chronological order in  
2 which these events occurred.

3 Q Why is the chronological order important?

4 A It just seems to make more sense. Given a  
5 choice, if something takes place, if this happens first,  
6 it's going to have the first impact on the traffic, and  
7 then if something takes place after that, it's going to  
8 have an impact that takes place later on after this has  
9 already had time to take effect. It just seems to make  
10 sense to do it in chronological order rather than to put  
11 the horse before the cart.

12 Q What impact do you think it would have had if  
13 you had studied -- put aside the eastern gate closings.  
14 What impact do you think it would have had if you had  
15 studied the SP trackage rights before the Union Pacific  
16 consolidation and done the iterations in a different  
17 sequence?

18 A I really can't speculate. I'm not sure what  
19 impact it would have.

20 Q Is it possible now to go back through the  
21 model and perform such a calculation?

22 A It would be possible to run all of the  
23 iterations in a different order, yes, it would.

24 Q That would make you a rich man, I assume.

25 A It wouldn't make me a rich man.



1 Q Mr. Swain, how would I trace a single movement  
2 of a single record through every iteration in the model,  
3 either forwards or backwards?

4 A With great difficulty.

5 Q You'd agree with me that it can't be done,  
6 would you not?

7 A I have not tried to do it, but it would be  
8 very difficult to do. I'm not saying it can't be done,  
9 but it would be very difficult.

10 Q Would you agree with me that it cannot be done  
11 on the basis of the information that's been provided to  
12 the protestants and on the basis of the information that  
13 you have generated thus far in connection with this  
14 engagement?

15 A Well, no. I think that the protestants  
16 probably have all the information that's necessary.

17 Q Tell me how I do it.

18 A That's what I haven't thought through. I have  
19 not tried to think through how you would do it. I think  
20 it would be very difficult.

21 Q If you can come up with such a process, I  
22 would be grateful if you'd let us know.

23 A Well, I can think of one way to do it.

24 Q Okay.

25 A I can think of one way, and that is to start

1 at the beginning and assign some kind of a sequence code  
2 number which is then maintained throughout every  
3 iteration, and go through and replicate the entire  
4 process and find out what happens to the start of that  
5 record and how many permutations are created at the end  
6 and what has happened to it.

7 Q And could that be done on the basis of the  
8 information that we have, given the extent to which the  
9 records have been collapsed in the printouts that we  
10 have been provided?

11 A No. You would have to, as I say, start from  
12 scratch.

13 Q That raises another question. You mentioned  
14 earlier the SP-DRGW joint solicitation agreement and  
15 said that that was handled in the same iteration as the  
16 trackage rights, is that right?

17 A Yes.

18 Q Under that iteration, how did the model treat  
19 Southern Pacific stations in Oregon? Did they become  
20 open to the Rio Grande, or did they become open but not  
21 served to the Rio Grande?

22 A Well, now you've got me, because my  
23 recollection of the territory in the solicitation  
24 agreement right now is hazy. I know it went as far  
25 south in California as a line from I think King City to



1 Cochilla. I don't recall whether it included Oregon or  
2 not. I can find out.

3 Q What about SF stations that were covered by  
4 the joint solicitation agreement? How did the model  
5 treat them? Were they treated as open or were they  
6 treated as open but not served?

7 A Can I look through my notes here? There's a  
8 statement in either --

9 Q Mr. Reyff's statement at page 23 says that  
10 they are open, but that term, as I understand it, is  
11 ambiguous. At least we are not able to confirm that by  
12 looking at the records. So the question I have is --  
13 now, if you'd like to check your office or your work  
14 papers, that's fine with me, but the question is does  
15 open mean open or does open mean open but not served?

16 A They were treated as open and served. If it's  
17 open, we treated them as if they were served.

18 MR. WILSON: Excuse me, Mr. Levy. Do you mean  
19 by open and served the distinction that we have in the  
20 model of served when you switch the industry versus open  
21 when you don't know whether the industry is switched or  
22 not?

23 MR. LEVY: That distinction, or any other. I  
24 am confused about this.

25 BY MR. LEVY: (Resuming)

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1 Q If you tell me they are open and served,  
2 that's good enough for me, if you are confident that's  
3 right.

4 A I'm sure it was at least treated as open.

5 Q Could you add that to your list?

6 A Yes.

7 MR. WILSON: I believe that was already on his  
8 list.

9 JUDGE HOPKINS: Or we can find out twice.

10 BY MR. LEVY: (Resuming)

11 Q I will ask the same general issue as it  
12 applies to Southern Pacific equipment that was affected  
13 by the joint solicitation agreement in the DFGW  
14 iteration. How did the model treat -- excuse me -- not  
15 Southern Pacific equipment but Rio Grande equipment.  
16 Did the model treat Rio Grande equipment as Southern  
17 Pacific equipment for the purpose of processing moves  
18 affected by the joint solicitation agreement?

19 A I'm going to have to check that, too, but my  
20 recollection is that it did not.

21 Q I'd like to turn next, Mr. Swain, to the  
22 so-called Oregon rule. Can you tell me who made the  
23 decision to implement the Oregon rule?

24 A Again, the decision was concurred in by all of  
25 the final evaluators. It was the result of, as I



1 recall, an impassioned discussion by Mr. Guerin  
2 recalling his experiences as a regional sales manager in  
3 Oregon where he had been competing with the UP and the  
4 DRWG and felt that those diversions would not -- that we  
5 should adjust the diversions from Oregon for a variety  
6 of reasons.

7 Q So the assumption initiated with Mr. Guerin?

8 A That's correct.

9 Q And you participated in the discussions?

10 A Yes.

11 Q When did the decision -- when was a decision  
12 made to implement the Oregon rule, do you recall? You  
13 can give me either a date or a point in the sequence of  
14 iterations.

15 A My recollection is that it occurred early on  
16 in the SFSP iteration, very early in the process.

17 Q The rule was only used for the SFSP iteration?

18 A That's right.

19 Q Was consideration given to adjusting the other  
20 iterations to reflect this real world phenomenon that  
21 Mr. Guerin felt so passionately about?

22 A As I recall, yes, there was some discussion  
23 about that, but the general feeling of the evaluators  
24 was that that was not necessary.

25 Q Did you concur in that judgment?

1 A I did.

2 Q Why?

3 A Well, let me try to recall exactly what  
4 happened.

5 (Pause.)

6 As I recall the discussions we had, the thrust  
7 of the argument was that the UP and the Rio Grande had  
8 been soliciting traffic in Oregon for many years. The  
9 SP had been competing with them for their long haul  
10 routes, had been unsuccessful or relatively unsuccessful  
11 in doing so. The UP and the Rio Grande had been  
12 particularly good at supplying equipment to an area  
13 which is basically a deficit equipment area. They load  
14 more cars than they make empty. The shippers had a very  
15 strong, longstanding relationship with both the UP and  
16 the Rio Grande, and that the merged SFSP system would  
17 not be able to overcome that.

18 Conversely, the UP-MP system, if anything,  
19 strengthened the UP's ability to compete in this  
20 market. And for that reason, we did not feel that it  
21 was necessary to make any adjustments to any of the  
22 other iterations.

23 Q Was there any counterpart to the Oregon rule  
24 for the other movements or corridors? As I understood  
25 it, you folks thought the model worked just fine until



1 it came to the possibility that traffic might be  
2 diverted from UP or DRGW up in Oregon.

3 A Well, what we are representing here is what  
4 our view is of how shippers will react and what we  
5 expect -- how we expect the shippers to react is that we  
6 don't expect those shippers to divert very much traffic  
7 to the SFSP route. We do expect them to divert traffic  
8 in other areas. But here, we don't think that they will  
9 divert it in the same numbers that we do in other  
10 places. It's the same kind of evaluation we would have  
11 made if we would have used individual study movement  
12 sheets.

13 Q Let me ask the question again without the  
14 editorial tag. Was there a counterpart to this rule for  
15 any other movements anywhere in the country affecting  
16 any other railroad?

17 A Yes, there was. In the PRS merger we had a  
18 special TOFC circuitry rule over Fremont where we did not  
19 feel that based on the testimony of the Union Pacific  
20 and Missouri Pacific witnesses that they would not  
21 divert time-sensitive TOFC shipments that were going  
22 over the Chicago gateway and the Fremont gateway with  
23 the CNW, and so we had to put in a special TOFC rule to  
24 prevent those diversions from occurring. But we agreed  
25 that the UP-CNW route was an efficient route.

1 Q An element of consistency to those two rules.

2 Let me ask a couple of more questions about  
3 the Oregon rule. Did you at any time run the model to  
4 determine, in whole or in any part, what the impact of  
5 the SFSP transaction would have been in the absence of  
6 the Oregon rule?

7 A I think we had at least -- I'm speculating.  
8 My memory is hazy.

9 Q And your answer is yes?

10 A No. I'm saying my memory is hazy. I suppose  
11 my answer should be I don't remember, because I don't.

12 Q In any event, no such report was ever  
13 retained, and you didn't keep a log that would allow us  
14 to identify whether there was such a report produced?

15 A I don't know whether it's in the work papers  
16 or not.

17 Q If you had done such a run of the model to  
18 determine the impact of the applicants' proposed  
19 transaction, in the absence of the Oregon rule how much  
20 less traffic would have been diverted, do you have any  
21 idea?

22 A I have no idea.

23 Q Do you have any suggestions as to how we can  
24 calculate such an impact without going back and running  
25 the model again?



1           A     Well, yes. The simplest way to do it would be  
2 to take the results from the SFSP merger, SFSP 6, as it  
3 stands, and run it through what is called DVPC, which is  
4 the percentage matrix code which applies the diversion  
5 percentages, and change the -- take out the Oregon  
6 rule.

7           Q     Is that something that could be done without  
8 your help, or your work product tapes?

9           A     No I suppose it could be done, but it would  
10 be difficult to do. It would be a lot easier for us to  
11 do it.

12           MR. LEVY: May I go off the record?

13           JUDGE HOPKINS: Off the record.

14           (Discussion off the record.)

15           JUDGE HOPKINS: Back on the record.

16           BY MR. LEVY: (Resuming)

17           Q     I would next like to ask you, Mr. Swain, about  
18 the treatment of Kansas City and the UP, MP and SFSP  
19 iterations

20                     Was Kansas City treated differently in the two  
21 iterations? Was it treated as a river junction in one  
22 iteration and not as a river junction in another  
23 iteration?

24           A     It was treated as a river junction in Pic  
25 Grande trackage rights.

1 Q And not as a river junction in --

2 A And not as a river junction in SFSP.

3 Q How was it treated in the UP-MP transaction?

4 A It was not treated as a river junction.

5 Q Why was it treated differently in the Rio  
6 Grande trackage rights iteration?

7 A We wanted to apply the same type of logic that  
8 we had applied throughout the other iterations, the  
9 difference here being that all of the major participants  
10 from the prior iterations had gone to the river  
11 junctions, and so the matrix arguments that were  
12 calculated were based on that position of the pre- and  
13 postdiversion routes.

14 Now, if you did not treat the Rio Grande that  
15 way, if you continued to leave the river junctions as  
16 they stood and not make Kansas City a river junction,  
17 you would in effect cause another carrier to be inserted  
18 into the route between Kansas City and the river  
19 junctions on movements going beyond, and we would have  
20 had in effect a lower classification. We would have had  
21 more carriers in the route, and we wanted everything to  
22 be replicated on essentially the same basis. So we  
23 treated Kansas City as a river junction for that purpose  
24 because we really didn't want to measure what happened  
25 beyond. We are trying to measure what happens in this



1 area in the west.

2 Q Correct me if I am wrong, but doesn't some of  
3 that traffic flow over the Southern Pacific from Kansas  
4 City to St. Louis?

5 A Yes, it does.

6 Q And how does the model -- does the model treat  
7 that traffic differently?

8 A No. It doesn't treat the traffic  
9 differently. It is simply a different way of entering  
10 the diversion matrix, the percentage diversions.

11 Q Were there other cities or gateways that were  
12 treated differently among the different iterations?

13 A For purposes of percentage determination?

14 Q Yes.

15 A No.

16 Q Mr. Swain, in selecting the good alternative  
17 route as you have described it, does the model recognize  
18 that it can use both Santa Fe and Southern Pacific track  
19 if that joint route is more efficient than the  
20 alternative single line route of either carrier?

21 A Yes.

22 Q When the model gets to the next stage, when it  
23 evaluates diversion potential, does the model recognize  
24 that there has been an improvement in the service  
25 available via the combined system compared to the

1 service that was available premerger, single line, via  
2 one or the other of the carriers?

3 A Again, implicit in the selection of the route  
4 are the weighting factors, and implicit in that is the  
5 idea of improved service, yes.

6 Q But aren't there situations where one of the  
7 merger carriers may have served the origin and  
8 destination prior to the merger, and for that reason,  
9 diversion would be rejected? The movement would never  
10 pass the screen, even though the traffic could have  
11 moved via a combined Santa Fe-SF more efficiently than  
12 via say a single line SF move.

13 Take East St. Louis to Los Angeles, for  
14 example.

15 A That is precisely why we have the exceptions  
16 to Rule 107, is to reflect those cases where there is a  
17 sufficient increase in efficiency to warrant the  
18 acceptance of a diversion when one of the merging  
19 carriers could have handled the route premerger.

20 Q Could you tell me who Bengt Muten is?

21 A He's one of our programmers, a consultant with  
22 our firm.

23 Q My last couple of questions, Mr. Swain, did  
24 you have any role in preparing the data base that was  
25 made available to Protestants in response to their



1 discovery request?

2 A My role was I communicated with our attorneys  
3 and our staff.

4 Q But those tapes originated in your office.

5 A The tapes, the original tapes were in our  
6 firm, yes. In many cases we had to send them out to get  
7 them copied, but yes.

8 Q Do you know whether the data bases provided to  
9 the Protestants in discovery are the same data bases  
10 that were used by the Applicants in reporting the  
11 results of their diversion study?

12 A To the best of my knowledge they are one and  
13 the same.

14 Q And if that's correct, we should be able to  
15 trace individual records from the diversion detail back  
16 to the data base, or from the data base through the  
17 model to the diversion detail, right?

18 A For each of the iterations?

19 Q Yes.

20 A You should be able to do that.

21 Q Is there any reason that you can think of,  
22 aside from mechanical or human error, that we would not  
23 be able to reconcile the printouts reflecting the  
24 Applicant's data base with the -- excuse me, the  
25 printouts reflecting the Applicant's diversions with the

1 data bases that your office provided to us?

2 A I can think of no reason.

3 Let me make sure I understand what you are  
4 talking about.

5 You are talking about taking the output from  
6 SFSP, SFSP-6, and producing the same detailed report  
7 that we have in our work papers.

8 Q Yes.

9 A To my knowledge, there should be no reason why  
10 you can't do that other than human or computer  
11 problems.

12 MR. LEVY: Your Honor, pending a look at  
13 SFSP-C-5, I have no other questions.

14 I might request that Applicants make available  
15 to us a copy of the diversion matrix which Mr. Wilser  
16 handed to us, which bears the handwritten initials FDS  
17 000420, which I'm told we were unable to find in the  
18 document depository.

19 And I might reserve the right, but I hope I  
20 don't have to do it, to ask some additional questions if  
21 Mr. Swain comes up with surprising answers to the  
22 questions he has agreed to ponder over the weekend.

23 JUDGE HOPKINS: Are you talking about  
24 additional time after the break or next week?

25 MR. LEVY: Maybe it would be a good idea, if



1 we are going to take a break this afternoon --

2 MR. WILSON: Could we go off the record for a  
3 minute?

4 JUDGE HOPKINS: Yes.

5 (Discussion off the record.)

6 JUDGE HOPKINS: We will take a fifteen minute  
7 recess.

8 (A brief recess was taken.)

9 JUDGE HOPKINS: Let's get back on the record.  
10 Ready, Mr. Kharasch?

11 MR. KHARASCH: Are we through?

12 MR. LEVY: I have had enough for one day, Your  
13 Honor?

14 JUDGE HOPKINS: I figured you had.

15 BY MR. KHARASCH:

16 Q Mr. Swain, have you had any academic education  
17 in the field of statistics?

18 A I have had a course in statistics.

19 Q Do you hold any degrees in statistics or  
20 similar disciplines dealing with the validity of  
21 sampling procedures and confidences?

22 A No, sir.

23 Q Have you ever seen, sir, the interrogatories  
24 that were submitted by the MKT in this case?

25 A I recall some months ago seeing a series of

1       interrogatories from the MKT.

2               MR. KHARASCH: Your Honor, may we have marked  
3       as the Counsel's Exhibit MKT next in order a 30-page  
4       exhibit, MKT-C-23, which consists of interrogatories and  
5       answered as produced by the Applicants.

6               JUDGE HOPKINS: It will be marked for  
7       identification.

8                               (The document referred to  
9                               was marked Exhibit No.  
10                              MKT-C-23 for  
11                              identification.)

12              BY MR. KHARASCH: (Resuming)

13              Q       Would you take a glance, Mr. Swain, at page 2  
14       of MKT-C-30 and state whether the request submitted  
15       April 23, 1984 of the MKT to -- let's look down at  
16       4(b) -- to submit a detailed, complete and specific  
17       statement of all data and assumptions used at each stage  
18       of the calculation and so on.

19                      Is that interrogatory an interrogatory that  
20       was brought to your attention?

21              A       I assume it was, yes. My recollection is that  
22       the MKT filed more than one set of interrogatories. I  
23       have forgotten how many. I assume this is one of the  
24       ones that I saw.

25                      I do not remember this specifically.



1 Q Let's look over at page 6, sir, which is some  
2 material that was supplied on June 4, 1984 by the  
3 Applicants in response to the question in the  
4 interrogatory.

5 Did your office prepare Appendix A which shows  
6 on page 6 and following pages?

7 A No, sir, we did not I certainly didn't  
8 prepare it. I don't recall it.

9 Q Your office is the question.

10 A I don't recall anybody in my office preparing  
11 it.

12 MR. WILSON: For the record, Mr. Kharasch,  
13 Witness Beyff prepared Appendix A.

14 BY MR. KHARASCH: (Resuming)

15 Q Let's turn over to page 11 of Exhibit  
16 MKT-C-23.

17 Do you see the paragraph No. 5 asking for  
18 production of documents describing all or part of the  
19 SFSI diversion study or its creation, procedures,  
20 methods, etc.?

21 Did you see that interrogatory?

22 A Again, my answer is the same as the previous  
23 one. I assume that I did.

24 Q Does there exist, sir, other than the  
25 documents produced in this case, your statement, Mr.

1       Reyff's statement and SFSP-31 any place where there is a  
2       statement describing the diversion study and its  
3       procedures, methods, assumptions, adjustments,  
4       subjective judgments, incorporated?

5           A       A single document that includes all that?

6           Q       Yes.

7           A       No, sir.

8           Q       Do there exist documents other than the  
9       documents submitted by the applicants in this case that  
10       in part respond to a request for descriptions of the  
11       study or its procedures, methods, assumptions,  
12       adjustments and subjective judgments incorporated?

13          A       The documents that are available in my work  
14       papers and the other evaluators' work papers are all the  
15       documents available to my knowledge.

16          Q       Please turn over to page 24 of MKT-C-23.

17                    Do you see the table on that page labeled DNS  
18       Model Treatment of Selected Rail Routes?

19          A       I see it.

20          Q       Was that document prepared by your office?

21          A       No, it was not.

22          Q       And page 28, was that document prepared by  
23       your office?

24          A       Page 28?

25          Q       Yes.



1           A     No. Neither page was prepared by our office.  
2 Obviously the information on the page came from our  
3 model. At least that's what it says at the top.

4           We at one point supplied the information, but  
5 we didn't prepare this document.

6           Q     When did you have your first discussion with  
7 anybody representing the applicants with reference to  
8 the preparation of a diversion study for use in this  
9 case?

10          A     Shortly after the case was announced, I mean  
11 the -- shortly after the decision was announced to the  
12 public, we discussed with the Applicants the possibility  
13 of using the model in this case.

14          Q     And that would be October 1983?

15          A     That would be in early October 1983.

16          Q     When were you formally engaged to begin work  
17 on the diversion study?

18          A     That's a difficult question to answer. I  
19 would say it was within three or four weeks of that. We  
20 had had, previously, we had talked to the Santa Fe and  
21 had been engaged to do another study, and there was some  
22 question as to whether we would do that study or  
23 participate in this case, and as the time progressed, we  
24 discussed both studies, and at some point -- and I've  
25 forgotten precisely when -- it was decided that we would

1 participate in this case.

2 Q Around the first of November?

3 A That would be approximately correct, yes,  
4 sir.

5 Q At what point in time, to use a Watergate  
6 term, was the data base that you used of actual 1982  
7 movements prepared?

8 A That was in process of preparation through  
9 November and into December, as I recall.

10 Q It arrived in December sometime?

11 A The SP and the Santa Fe tapes arrived  
12 separately. I don't remember in which order they  
13 arrived particularly. There were problems with both.  
14 It was around the end of November or early December, as  
15 I recall.

16 Q And then you prepared according to various of  
17 your documents, including SFSP-31, you prepared with the  
18 waybill sample, the SP data and the SF data, something  
19 we might call the 1982 actual base case.

20 A The combined data base. We call it the  
21 combined data base.

22 Q The combined data base required you to do  
23 certain operations such as pulling things out and  
24 putting things -- eliminating --

25 A Eliminating double counts from the 1 percent



1 waybill, the ICC waybill sample, things like that.

2 Q Perhaps identifying bad data?

3 A That is correct.

4 Q When was that process completed so that you  
5 had the base case?

6 A Well, again, it is hard to be -- it's hard to  
7 give a precise data. I remember I worked on it  
8 Christmas day. It was sometime in late December or  
9 early January.

10 Q Now, that combined data base required the  
11 application of the formula that was testified to this  
12 morning, did it not, for allocating the revenue to the  
13 particular participating carriers in joint moves?

14 A That is correct.

15 Q At what point was that application of formula  
16 done?

17 A It was done right at the, as I recall, right  
18 at the end of the completion of the consolidation of the  
19 data base and the clean-up of the data base.

20 Q It appears from Exhibit DRGW-C-17 that some  
21 sort of statistical examination of the formula was run,  
22 or at least spotted, on the 10th of January 1984.

23 Would that be about right?

24 A That would be about right.

25 Q And sometime after the 10th of January 1984 it

1 was determined to use the revenue allocation formula  
2 that has been testified to.

3 A I think that's about correct, yes.

4 Q And then that revenue allocation formula was  
5 supplied to the combined data base?

6 Is that the sequence of operations?

7 A Well, revenues are -- you can say that, yes.  
8 It is applied to the combined data base. Revenue for  
9 individual carriers is never carried through from  
10 iteration to iteration. It is always calculated for  
11 each individual case for purposes of saving space and  
12 minimizing disk storage. So the gross revenue is always  
13 on the record, but the formula that was developed for  
14 allocating the revenues, yes, was developed at that  
15 time, and that was a formula that was subsequently  
16 applied on each of the data base adjustments and the  
17 merger itself.

18 Q Now, the data base adjustments were four  
19 before you got to the adjusted data base, iterations.

20 A That is correct.

21 Q And in the first iteration you applied this  
22 revenue allocation formula?

23 A That is correct.

24 Q And at the same time you applied the diversion  
25 matrix to consider what the effect of eastern route



1 closings was?

2 A We applied a program that we had developed to  
3 estimate the impact of eastern route closings with  
4 intraterritorially and interterritorially with two  
5 adjustments that we made for this application, yes.

6 Q So that eastern route closings formula was  
7 prepared, except for two adjustments, before --

8 A The eastern route closings do not use the  
9 diversion matrix. I thought that's what you were  
10 getting at. The eastern route closings do not use the  
11 diversion matrix. The routes are either -- the changes,  
12 the new routes are 100 percent.

13 Q I see.

14 The eastern route closings program existed  
15 prior to your work on this case?

16 A It had been developed previously, yes, sir.

17 Q I see.

18 And you said there were two changes made to  
19 that.

20 A That is correct.

21 Q Specify those, sir.

22 A Those changes involved coal movements and  
23 automobile movements, set-up automobile movements. We  
24 did not subject either coal movements or automobile  
25 movements to the eastern route closing program.

1 Q And at what point were you ready to run let's  
2 call it iteration 1? You have called that iteration 1  
3 the deregulation iteration, have you not?

4 A Yes. It was early in January.

5 Q At this early in January time, sometime after  
6 January 10?

7 A I'm not sure. They did not have to be after  
8 January 10 because, as I say, the revenues are  
9 calculated on the fly, and we may well have been running  
10 this and testing this prior to that.

11 Q And what date did you complete the running of  
12 iteration 1, the deregulation iteration?

13 A I don't know. I would have to look at the  
14 work papers to tell you that.

15 Q Would you make a note, sir?

16 A I am trusting my trusty lawyer to do that,  
17 sir.

18 Q We would like to know the date that you  
19 completed iteration 1.

20 Then, after you completed iteration 1, you had  
21 to prepare iteration 2?

22 A That is correct.

23 Q And what date did you complete iteration 2?

24 A Again, I don't remember specifically what date  
25 it was. It was probably from four to seven days after



1 the eastern route closings, but I'm not sure.

2 Q And iteration 2, what shall we call that, or  
3 what did you call that?

4 A We called that the FBS merger.

5 Q Also known around here as the UP-MP merger?

6 A Yes, sir.  
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1 Q All right. And then you wanted to run  
2 iteration 3, did you not?

3 A That's correct.

4 Q And how much time elapsed between the  
5 completion of iteration 2 --

6 A I think it was the same, 3, 2, 7 days. Some  
7 took longer than others. By recollection of how long  
8 each one took is imprecise.

9 Q And the name you give to iteration 3?

10 A SF trackage rights.

11 Q And then after you add that, you are ready for  
12 iteration 4?

13 A Yes, sir.

14 Q And how long before you ran iteration 4?

15 A The same, same answer as I've given previously  
16 -- 3 to 5 or 6 days.

17 Q And iteration 4 was the D&RGW iteration?

18 A Yes, sir. Rio Grande trackage rights.

19 Q And can you give us an approximate idea, sir,  
20 of the date you finished iteration 4 and you had you  
21 adjusted data base?

22 A That was at the end of January, as I recall.

23 Q At the end of January after you had run  
24 iteration 4 did you make any other adjustments before  
25 you were ready for iteration 5?



1 A What kind of adjustments?

2 Q To the results of iteration 4, before you  
3 started to apply iteration 5.

4 A I recall no adjustments that we made.

5 Q Then iteration 5 now is the SFSP merger effect  
6 iteration.

7 A That's correct.

8 Q And that was run when?

9 A That was run in late January, early February  
10 -- definitely in February. I'm not sure that it started  
11 in January.

12 Q And you had some test runs on that iteration,  
13 this last one?

14 A Yes, we did.

15 Q And as a result of the test runs was anything  
16 changed?

17 A We changed the Oregon rule. We changed the --  
18 some impedances. We changed some of the reasons for not  
19 rejecting a diversion route. I think those summarized  
20 the basic changes that we made.

21 Q Now, these changes were made after you had  
22 looked at a test run of the sample against a diversion  
23 procedure which you already had.

24 A That is correct.

25 Q So there is a difference in the diversion

1 procedure ultimately used in running iteration 5 from  
2 the diversion procedure used in running iteration 4.

3 A There were changes. The purpose of each  
4 iteration is to replicate our view as traffic evaluators  
5 as to what shippers are going to do in each one of these  
6 iterations, and there were changes between each  
7 iteration. Each iteration had different impedances;  
8 each iteration had different diversion rules, rules for  
9 rejection or acceptance of diversions, and in some cases  
10 there were slight differences in the application of the  
11 matrix. All reflect our judgments as final evaluators.

12 Q Now, Mr. Swain, at page 18 of your statement  
13 in SFSP-14 an erratum was submitted. You originally  
14 said, underlining it, "I believe this point is important  
15 because it is those same rules" -- and you underlined  
16 "it is those same rules," talking about rules that  
17 estimate rail diversion impacts -- you said, "it is  
18 those same rules which govern the diversion evaluations  
19 made for the Santa Fe-Southern Pacific merger study."  
20 Your erratum, the word "essentially" after the words "it  
21 is."

22 A That is correct.

23 Q All right.

24 Would you say in the light of your last  
25 statement before we looked at page 18 that you made



1 changes at each step of the iteration that they are  
2 essentially the same rules except as you change them  
3 each time?

4 A Well, what I would say is that the matrix,  
5 with the exception of the Oregon rule, stayed the same.  
6 Many of the diversion rules stayed the same. Almost all  
7 of the impedances stayed the same, with the exception of  
8 the few impedances that we adjusted for each case, which  
9 relative to the vast number of impedances that are in  
10 the network were very few. That's what I would say.

11 Q Can you give me a number of changes, the  
12 number of actual changes that you made in going from  
13 iteration 1 to 2 to 3 to 4 to 5 at each step?

14 A The specific changes in each area? I cannot --

15 Q A number.

16 A I could probably recreate that with a fair  
17 degree of accuracy, but I cannot -- I mean I can try to  
18 do it here on the stand, but it would be difficult for  
19 me to do that. In the work papers we have enumerated  
20 the changes in impedances for each of the iterations.  
21 The changes in the matrix are in the work papers, and  
22 basically there the only changes are vis-a-vis the  
23 Oregon rule.

24 In the area of the diversion logic itself,  
25 most of those changes occurred in the SFSP, and those

1 are fairly well spelled out in the exhibit that we just  
2 submitted.

3 Q The exhibit you just submitted?

4 A Prior, when Mr. Levy was cross examining me.

5 Q Now, when you went and changed the diversion  
6 program, when you went from iteration to iteration, the  
7 reasons, if I understand you, were that you had locked  
8 at a test run, and you found something wasn't happening  
9 the way you thought it should happen.

10 A That is correct.

11 Q And those changes were impelled because  
12 something you thought wasn't happening by application of  
13 the program that you thought should have happened in a  
14 noticeable degree, is that correct?

15 It must have been, to restate my question, it  
16 must have been a pretty important nonfunctioning of the  
17 program as it sat if you could notice something wrong in  
18 your test run and decide to change it. Is that a fair  
19 deduction?

20 A Well, if you ask the final evaluators, and  
21 myself included, I think we caught some pretty small  
22 ones, too. The process, to explain the process, we  
23 would get a printout of four to six or seven hundred  
24 pages, and we would all laboriously go through this.

25 Now, that seems like trying to find a needle



1 in a haystack. It was not quite that difficult, because  
2 we sorted the printout by route code. We had a special  
3 route code. We showed the carriers and the routes so  
4 that we could look at all of the UP traffic, all of the  
5 Katy traffic or all of the SP traffic. Then I believe  
6 that was further sorted by origin and destination. And  
7 so there was continuity to what we were looking at. We  
8 were not just looking at random records. So when you're  
9 looking at something that's relatively well sorted and  
10 you know what you're looking for -- in the early stages  
11 it was quite difficult and it was quite time consuming,  
12 but as the process went on -- and as I've explained, it  
13 went on for quite some period of time -- all of the  
14 evaluators became quite adept at going through this data.

15 Q Let's take the example of the Oregon rule that  
16 you just mentioned. That is a rule that has quite a  
17 massive effect on the amount of diversion, does it not?

18 A I don't know how much effect it has. It has  
19 the effect of reducing a diversion on carload traffic  
20 from whatever it was. It reduces it to 30 percent of  
21 what it would have been.

22 Q A 70 percent deduction of diversion.

23 A Right. I have no knowledge of how much volume  
24 of traffic is involved.

25 Q Now, you just indicated that your test runs

1 were sorted by carrier.

2 A They were sorted by route code.

3 Q When you say sorted -- and I want to finish  
4 the question so that you'll understand what I'm asking  
5 -- when you say it was sorted by carrier or sorted by  
6 route code, was -- do you mean that there was a printout  
7 by computer with this sort of sorting in it?

8 A The test samples that we had were sorted by  
9 route code. The route code was a four-digit number with  
10 1 through 9 representing the major carriers in the west,  
11 and then the four digits represented their position in  
12 the route. For instance, a 1 -- and I don't remember  
13 what those numbers were, but let's assume that the SP  
14 was 1, and let's assume that the UP was carrier 6, and  
15 then we had a movement that originated on the Santa Fe  
16 or SP and terminated on the UP. That would be a 1006.  
17 If we had a movement that originated on the SP, and say  
18 the Katy was railroad number 5 and was an intermediate  
19 carrier, and the UP was the terminating carrier, that  
20 would be a 156.

21 Q And those were the test runs that you  
22 conducted at each stage before you settled on the final  
23 form of the matrix, and the final form of the rules, and  
24 the final form of the impedances?

25 A That's correct.



1 Q Was that a difficult job for the computer to  
2 sort in those route codings?

3 A Not particularly, no.

4 Q Do you know what Appendix C to SFSP-31 is? I  
5 believe it to be -- I won't call it a sample -- a  
6 selected printout of the result of the final SFSP  
7 iteration. It's about 940 pages of --

8 A I don't have a copy.

9 Q It's 946 pages long.

10 A I know it's substantial.

11 Q That -- and let's call it a selection at the  
12 moment -- that is a selection of movements diverted by  
13 the final diversion, correct?

14 A Yes, sir, it is.

15 Q And that is a selection that is not sorted by  
16 route code.

17 A No. It is sorted. It appears to be sorted by  
18 route code to me.

19 Q Oh, it is?

20 A I think it's sorted first by commodity and  
21 then by route code -- no, it looks like it's sorted by  
22 route code to me. Well, wait a minute.

23 (Pause.)

24 Wait a minute. I'm looking at this  
25 backwards. It looks like it was sorted by route code to

1 me.

2 Q Just by numerical route codes in that coding?

3 A Actually, it looks like it's sorted by  
4 commodity. No, it's sorted by route code.

5 Q One or the other answer. I just want the  
6 facts.

7 A It looks like it's sorted by route code.

8 Q It's sorted by route code.

9 A Yes.

10 Q And that route code sorting permits you to  
11 look at traffic originated by one of the nine named  
12 railroads.

13 A That's correct. And other railroads, too.

14 Q Yes. Let's say your railroad is number 5.  
15 You could look up number 5.

16 A That's correct.

17 Q Was there any key to that route code provided  
18 to us at any time?

19 A I think at the beginning of the printout  
20 there's a list of the carriers and what their  
21 designation is.

22 MR. WILSON: Yes, Mr. Kharasch. It's at the  
23 beginning of the printout, so that was provided to you.

24 BY MR. KHARASCH: (Resuming)

25 Q You were able in your shop to prepare a



1 program of instructions to the computer that enabled it  
2 to sort this selection printout which is Appendix C to  
3 SFSP-31 by route code, including which carrier came  
4 first and so on.

5 A Yes.

6 Q Does there exist anywhere in the world any  
7 printout of the full final calculation of diversions  
8 after the SFSP iteration?

9 A Of all the detailed records?

10 Q Yes.

11 A No, sir. No such printout -- I take that  
12 back. All of the -- many of the protestants have asked  
13 for the tapes of the output of the merger. They may  
14 have produced such a report. We at DNS have never  
15 produced such a report.

16 Q Is there any place that there exists a  
17 printout sorted by route code or otherwise that I could  
18 look at if I wanted to know what in the final diversion  
19 study was diverted from the MKT?

20 A All of the traffic that was diverted from the  
21 MKT?

22 Q Yes.

23 A We have not produced -- we have given the  
24 MKT's consultants tapes of all of that data. We have  
25 not produced a detailed report of it ourselves.

1 Q Now, the data that was on the tape would  
2 produce a report in the form such as you would see in --

3 A No. It was the raw data.

4 Q The raw data.

5 A It was the raw data.

6 Q How many man hours -- person hours, excuse me  
7 -- how many person hours of time have been spent in  
8 preparing the applicants' diversion study in this case?

9 A I'd have to sit down and figure it out. I  
10 don't know.

11 Q You might start with the hourly charges and  
12 figure the bills and go backwards from that.

13 MR. WILSON: Applicants will stipulate that  
14 there were lots and lots.

15 THE WITNESS: I will stipulate that there were  
16 lots of hours spent. There's no doubt about that.

17 BY MR. KPARASCH: (Resuming)

18 Q How many people were working on the study?

19 A DNS Associates?

20 Q Yes.

21 A We had basically four people.

22 Q Did you have clerical help, people doing  
23 keypunching and that sort of thing?

24 A Very little, very little.

25 Q Did other people other than people in DNS



1 Associates work on the study?

2 A Certainly the applicants did, yes, the final  
3 evaluators.

4 Q Name those people.

5 A Mr. Beyff and Mr. Guerin.

6 Q Anybody else?

7 A Mr. Bosanko was there for part of the time.

8 Q Anybody else? Just name them all, please.

9 A We had attorneys available from time to time.  
10 Mr. Wilson was there.

11 Q Did you have a great number of meetings with  
12 the applicants' people that you have named so far?

13 A The applicants literally lived in Lexington,  
14 which is where our firm is located, for the better part  
15 of two months.

16 Q All right. So there's your four people, and  
17 you named about five from the applicants. That's about  
18 nine people.

19 Lexington, Kentucky?

20 A Lexington, Massachusetts.

21 Q Lexington, Massachusetts. And you had nine  
22 people working there. Now, how about the work of  
23 putting in little details? Don't you need a  
24 programmer? You don't wave a hand and say change that  
25 impedance. Someone has to do that.

1 A That's included in the DNS personnel.

2 Q I see. Those are the programmers, the four  
3 DNS personnel.

4 A That's right.

5 Q And the other people are evaluators and  
6 judgment makers?

7 A That is correct.

8 Q And Mr. Wilson was there quite a lot?

9 A Mr. Wilson was there, yes.

10 Q Quite a lot?

11 MR. WILSON: We're willing to stipulate.

12 BY MR. KHAFASCH: (Resuming)

13 Q I'm asking a fair question.

14 A Yes, he was there.

15 Q Did you ever meet with any other officers than  
16 those you have named of the SF or the SP?

17 Mr. Wilson, I don't really think it's proper  
18 for counsel to indicate to the witness what he should  
19 answer.

20 JUDGE HOPKINS: I don't think he was  
21 indicating. He was going like this.

22 THE WITNESS: During the study or prior to the  
23 study?

24 BY MR. KHAFASCH: (Resuming)

25 Q During the study.



1           A     During the study? We had discussions with  
2 other, both SP and SF personnel.

3           Q     Name them, please.

4           A     Cheri Rang of the SP, Nolan Zissman of the SP,  
5 Gary Borelli of the SP, Dale Valentine of the Santa Fe,  
6 Frosty Raney of the Santa Fe, Doug Stevens of the SP. I  
7 can't think of anybody else.

8           Q     Were those people that you have just named in  
9 your last answer people that were computer types or  
10 traffic department types?

11          A     Some of them were computer types and some were  
12 traffic department types.

13          Q     Did you have available to you as you worked on  
14 this study personnel who knew the current routing  
15 policies of the SP and of the Santa Fe?

16          A     Yes, sir, we did.

17          Q     Have you conducted any further reviews of the  
18 study since it was submitted in March 1984?

19          A     I have not conducted any. I'm not sure --  
20 before I answer the question, let me make sure I  
21 understand what you mean.

22          Q     Have you reviewed the study to see if there  
23 were any mistakes, if you could pick up mistakes, if  
24 something was done wrong, that sort of thing, since you  
25 submitted it in March 1984?

1           A     We've had some -- we have not changed the  
2 study, no.

3           Q     I understand you haven't changed it. Have you  
4 reviewed it was the question.

5           A     We have had some data problems that have come  
6 to light which we have reviewed.

7           Q     You have reviewed data problems, but no change  
8 has been made?

9           A     No change has been made.

10          Q     No errata has been submitted?

11          A     No.

12               MR. KHARASCH: I want to get to those data  
13 problems, but I have, Your Honor, a zippy idea for  
14 speeding up the hearing, sir.

15               JUDGE HOPKINS: All right.

16               MR. KHARASCH: It's Friday, luckily, and I  
17 wish to speed up the hearing and give the witness the  
18 chance over the weekend to answer a number of questions  
19 which are all of exactly the same type, and with your  
20 permission, Your Honor, I will ask a very long  
21 question. I'm going to at this time pass the witness a  
22 pad of paper, if you would permit, and ask him to make a  
23 note of that. I will state the form of the question,  
24 and then the witness can answer on Monday, I hope, and  
25 that will save endless questioning on the record back



1 and forth.

2 BY MR. KHARASCH: (Resuming)

3 Q A preliminary statement, Mr. Swain. Despite  
4 -- and this is a personal statement, not evidence, you  
5 understand. We have tried over and over and over again  
6 to get the applicants to make a complete statement of  
7 the procedures and give us a complete set of the  
8 assumptions used at each stage and the numbers and the  
9 formulas. I do not find those in the papers you have  
10 submitted in the case. I shall now ask you a question  
11 of the following form.

12 I will give you a letter designator and place  
13 in your testimony where there is statement which in my  
14 view is imprecise because you did not state exactly what  
15 the procedure was or what the numbers were. And I will  
16 ask you to make a note of these and tell me where else  
17 in your statement, or in Mr. Wyff's statement to which  
18 you refer, or in Mr. Guerin's statement, or anywhere  
19 else in the papers that applicants submitted as  
20 evidence, the specifics were given.

21 Let me start with an example on page 2 of  
22 SFSP-31.

23  
24  
25

1           You see on page 2, for example, you have --  
2 after the line in the first paragraph that gives B  
3 Branch line 4 --

4           A     Yes, sir.

5           Q     You say that line classifications have been  
6 modified in some cases, but you do not say in what cases  
7 and you do not point us to what has been modified.

8           Now, I would say, in my definition for this  
9 question that is coming, that is not a precision just to  
10 say that things have been "modified."

11           All right, let's start. We will start with  
12 that statement I just gave you, and I would label that  
13 A. I label as statement B, also on page 2, and still in  
14 the first paragraph, the statement: "Changes were  
15 specified in the network."

16           I would label as --

17           A     Wait a minute. Would you repeat that one?

18           Q     "Changes were specified" --

19           A     Which paragraph?

20           Q     Three lines up.

21           A     Oh, three lines up.

22           Q     Three lines up from the beginning of the  
23 paragraph labeled B.

24           A     Oh. Okay.

25           Q     And your statement is: "Changes were



1 specified in the network to reflect generally."

2 A Okay.

3 Q On page 2, at the line where the paragraph B  
4 begins, you say: "The network also contained junction  
5 impedences." I will label that as C.

6 Let's go to page 3.

7 MR. WILSON: I don't understand the question.  
8 To what extent were junction impedences contained?

9 MR. KHARASCH: Where is a list of the junction  
10 impedences? That's what I call a precise statement.

11 I now go to page 3.

12 MR. WILSON: I still don't understand that  
13 particular question, Mr. Kharasch. You want us to bring  
14 in a computer printout with all of the junction  
15 impedences like we provided you three different times?

16 My patience is starting to get thin here.

17 JUDGE HOPKINS: Off the record a minute.

18 (Discussion off the record.)

19 JUDGE HOPKINS: Back on th record.

20 BY MR. KHARASCH: (Resuming)

21 Q Please understand, Mr. Swain, that my question  
22 is, after you look at this, you point to anything in the  
23 papers that have been submitted where the precise answer  
24 is given.

25 A I understand.

1 Q My next example is on page 3. I call it D.  
2 You have a statement that the impedences properly  
3 reflected relative 1982 interchange volumes.

4 A Which line?

5 Q Fourth and fifth line.

6 A Okay.

7 Q All right. In the last paragraph of page 3,  
8 it's going to be difficult, you have what I would call E  
9 where you say, with only "minor modifications for each  
10 study iteration, as described in Mr. Beyff's statement,"  
11 giving some numbers.

12 All right. You then refer us to pages 19, 20,  
13 21, 22, 24, and 25 of Beyff. Do you see that?

14 A Yes, sir; I do.

15 Q Now, I have these subdivided as E-1 and so  
16 on. Beyff at page 19 refers to a few minor adjustments,  
17 not specified. Beyff at page 20 says something was  
18 increased somewhat. Beyff at page 20 says something  
19 else was raised.

20 Beyff at page 20 says something else was  
21 increased. Beyff at page 20 says there was a special  
22 circuitry rule. Beyff at page 20 says there was a  
23 refinement.

24 Beyff at page 21 says something was  
25 increased. Beyff at page 21 says it refers to traffic



1 that was not diverted. He specified what the type of  
2 traffic was, but nothing about the volume.

3 Reyff at page 22 refers to lowering impedences  
4 at Ogden, without specifying what the lowering was.  
5 Reyff refers at page 22 to an adjustment. He calls it  
6 fine-tuning of this adjustment.

7 Reyff at page 22 refers to creation to new,  
8 relatively low impedences. Reyff at page 22 refers to  
9 "other new impedences." Reyff says impedences with KCS  
10 were set relatively low.

11 Reyff at page 22 says that impedences were set  
12 at a relatively higher level. Reyff at page 22 says  
13 impedences were "adjusted upwards," and then he tells us  
14 exactly what happened at the CNW/UP impedence.

15 Reyff at page 24 speaks of increased westbound  
16 impedences. Reyff at page 24 tells about setting an  
17 impedence.

18 Again, all of these are no specificity. And  
19 then he sets another impedence, no specificity.

20 Reyff at page 25 speaks of retaining an  
21 adjustment between Rio Grande and Santa Fe and Union  
22 Pacific. Reyff at page 25 says we also made several  
23 adjustments to the line segment network. Reyff at page  
24 25 says we added seven connections.

25 Then he gives a specific about the Hutchinson

1 to Topeka line, and at the bottom of the page he says,  
2 the trackage rights was changed, in part, to a B line.

3 Now, I go back to SFSP, page 4. In each of  
4 these cases, remember, I am asking you to point at the  
5 next section to anyplace where the specifics of these  
6 are provided in the testimony you have provided for the  
7 record.

8 I want to continue with the list. What I have  
9 as item 1 -- now, I am on page 4 of SFSP 31.

10 A I missed F and G.

11 Q I'm sorry, so did I. It's a blessing. Forget  
12 them. We will start with H on page 4. We have worked  
13 ourselves to page 4.

14 I'm sorry, that's incorrect. Turn to page 5.  
15 You say multipliers were then developed; changing the  
16 open-to-open multiplier of 1.0, multipliers were then  
17 developed.

18 I call your special attention to that, Mr.  
19 Swain. Where have you ever told us what multipliers you  
20 developed?

21 A Is this J?

22 Q Page 5. Also on page 5, you refer to -- of  
23 SFSP 31 -- you refer to routes that were significantly  
24 shorter.

25 A Can we go back to the previous one? Is that



1 J?

2 Q I think I dropped H. Let's call this one I.

3 All right, J is the significantly shorter.

4 A Where is J on page 5? I don't see it right  
5 off.

6 Q I'll point to it on the page. It's next to  
7 the last paragraph, two lines up: The post-diversion  
8 route was "significantly shorter." Do you see that?

9 A I see it.

10 MR. WILSON: Excuse me, Mr. Kharasch. For the  
11 record, this could be helpful to you. We supply the  
12 information you are requesting in I and J in answer to  
13 discovery by the U.S. Department of Transportation, and  
14 I'd be glad to give you a copy of that over the weekend  
15 so you could look at it.

16 MR. KHARASCH: Wonderful. I appreciate that,  
17 but let's continue.

18 BY MR. KHARASCH: (Resuming)

19 Q "Significantly shorter." We are now on page  
20 5. You refer to more compelling circumstances are  
21 required for automotive traffic. The question always  
22 is: Where does there appear a specification of that?  
23 And there is a reference there to Mr. Reyff.

24 And on page 16 of Mr. Reyff, there is K-1, Mr.  
25 Reyff refers to compelling circumstances. And then

1 next, he refers to "among other factors." He refers to  
2 some facilities, and he refers to facilities that often  
3 were treated.

4 L, on page 7 now of SFSP 31, you refer to  
5 incorporating files. And then you refer to your own  
6 statement, Mr. Swain, on page 12, where in your own  
7 statement you have statements such as "several rail  
8 stations," a statement such as "approximately 80 percent  
9 of the tape showed," a statement that particular closed  
10 stations "were identified," and you refer on page 12 to  
11 "many movements."

12 Now, on SFSP 8 and 9, you refer to adjustments  
13 to reflect management judgment concerning diversion,  
14 non-diversion criteria. That was page 8.

15 And on page 9, you say a complete list of all  
16 diversion criteria is set forth in Attachment B, but we  
17 have already learned today that that wasn't set out.  
18 The list was not complete because we got a new exhibit  
19 on that.

20 A Are those M and N?

21 Q Those were M, M-1.

22 A M-1. Okay.

23 Q And page 9, you refer to test run outputs. I  
24 believe we have been told those don't exist.

25 On page 9 you refer to further adjustments in



1 programming, and then on page 9 you refer to reviewing a  
2 sample. I believe that Appendix C to SFSP 31 must be at  
3 least the sample for the last iteration, sir.

4 A Is this all N, those three?

5 Q Those were N, O, and P, and now we are up to  
6 Q. On page 10 of SFSP 31, you refer to previously  
7 developed DNS diversion criteria. That's line 2, and  
8 then R, you say "as modified somewhat."

9 And then as query S on page 10, you refer to a  
10 sample output. I believe again that is identified as  
11 non-existing, I think.

12 And I also ask on page 10 whether the  
13 judgments of SF and SP traffic experts had been reduced  
14 to writing anywhere and, if so, if those exist.

15 A Now I'm confused. There are two mentions of  
16 sample output on page 10 that I see. One is in the  
17 middle of the first paragraph, sample output of the  
18 final runs (RDS 0000003). Is that what you are  
19 referring to?

20 Q Yes. I think you have told us those don't  
21 exist anymore. But I'm just commenting as we go along.

22 A Okay. So that is S. And then the second  
23 reference --

24 Q T is --

25 MR. WILSON: For the record, the reference

1 right in the verified statement is to the computer  
2 program which is the sample output of the final run.

3 So, of course, it exists. I mean 0000003 is  
4 the work paper. It's the program with output from the  
5 final run.

6 THE WITNESS: That's been the case with a lot  
7 of these.

8 BY MR. KHARASCH: (Resuming)

9 Q There is a reference on page 10 to judgments  
10 of SF and SP traffic experts, if those are reduced to  
11 writing.

12 A Is that T?

13 Q That's T.

14 U on page 10 is where you say circuitry rules  
15 were specified, referring to Reyff at pages 12 and 20.  
16 And you will find at page 20 of Reyff, he says things  
17 were increased somewhat and raised and increased.

18 Maybe you'll find something at 12.

19 All right. V on page 10, you talk about  
20 certain redesignation of certain line segments. On page  
21 11, you refer to impedances adjusted. On page 11 you  
22 refer to samples, which mean test runs. On page 12 --

23 A Wait a minute. Excuse me. I can't go that  
24 fast. Impedances were adjusted. Are you referring to  
25 post-UF impedances were reviewed, impedance Report FDS



1 000624?

2 Q Yes.

3 A And I guess that would be W. And then I  
4 missed the next reference.

5 Q On that same page, there is a reference to  
6 samples were reviewed until -- that is five lines up  
7 from the bottom.

8 A Okay.

9 Q -- until the evaluators were convinced. That  
10 may be one of these tests that's lost.

11 On page 11, five lines up from the bottom, you  
12 talk about samples were reviewed.

13 A Right. That's X.

14 Q On page 12, we are told that adjustments were  
15 made, and there is a reference to Reyff at 22 in which  
16 he informs us they were lowered, fine-tuned, or  
17 relatively lowered.

18 On page 12, there is initial sample review and  
19 a final review discussed. And then on page 12 there is  
20 reference to sample outputs against the full data base

21 That may be in the appendices; I don't know.

22 A Okay, that is AA?

23 Q Sure.

24 Now, in Romar III on page 12, you refer to  
25 minor changes were designated and refers to Reyff at

F.D. 30400

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PAGES

3063-

3066



1 24. Reyff at 24 says he increased, he set.

2 On page 12 you again talk about initial sample  
3 review. On page 13 you talk about program logic  
4 modified. You say it was modified and you refer to  
5 Reyff at 26, which leaves me baffled.

6 A Is that DD?

7 Q If you like.

8 A I'm just trying to make sure that I have the  
9 same thing that you have, so that we communicate.

10 Q All right, let's call that DD. I will skip  
11 some of these.

12 On pages 13 and 14 there is a reference to  
13 much specific information, and then there's a reference  
14 to "and other factors." Do you see those words, "much  
15 specific information," and then you say "and other  
16 factors"?

17 A Okay. Much specific information on diverted  
18 movements such as origin and destination?

19 Q That's right. And the very last line of the  
20 page, "and other factors."

21 A And other factors. And you are concerned  
22 about the other factors?

23 Q Yes. In each of these cases for our Monday  
24 meeting, I would appreciate your pointing to where there  
25 is any specific information in the materials submitted

1 by the Applicants.

2 MR. KHARASCH: Thank you, Your Honor. I  
3 didn't realize it would take this long to read the  
4 list.

5 JUDGE HOPKINS: All right. As long as this  
6 will speed it up eventually on Monday.

7 MR. WILSON: I think it might.

8 Your Honor, I would like to make two brief  
9 points for the record. First, a couple of -- some of  
10 the items that Mr. Kharasch identified, Mr. Reyff  
11 appears to be the proper witness to explain the more  
12 specific information because they dealt with items  
13 discussed by Mr. Reyff.

14 And the other point I would like to make,  
15 although I guess it's clear from anyone reading SFSP 31,  
16 that in most cases, immediately following the phrase  
17 involved, there was a reference to a verified statement,  
18 and also a reference to specific work paper pages. So  
19 that one who wanted to find out the specifics that were  
20 represented by words like "minor," could look it up.

21 JUDGE HOPKINS: Mr. Kharasch wants to say  
22 something. Go ahead.

23 MR. KHARASCH: Your Honor, I begged and pleaded  
24 for a full and complete statement of procedure, and I  
25 also begged and pleaded -- and you will recall in the



1 papers submitted at the prehearing conference, I begged  
2 and pleaded to please classify the work papers so we  
3 know what all this computer printout is.

4 And to get this thing on August 25, when we  
5 had a submission due September 10 --

6 JUDGE HOPKINS: All right, gentlemen. Anyway,  
7 it looks like it would speed the process along -- and  
8 let's try and let's see what we can do, and we'll be in  
9 recess until 9:00 o'clock.

10 MR. LEVY: Before we go off the record --  
11 because I won't be here Monday -- can I move the  
12 admission of UP/MP-C-10 through 13?

13 JUDGE HOPKINS: Any objection?

14 MR. HILSON: No objection.

15 JUDGE HOPKINS: They will be received in  
16 evidence.

17 (The documents referred to,  
18 previously marked Exhibits  
19 UP/MP-C-10 through 13 for  
20 identification, were  
21 received in evidence.)

22 JUDGE HOPKINS: We'll be in recess until 9:00  
23 o'clock Monday morning.

24 (Whereupon, at 5:10 o'clock p.m., the hearing  
25 in the above-entitled matter recessed, to reconvene at

9:00 o'clock a.m., Monday, October 22, 1984.)

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