CERTIFIED TRANSCRIPT

NATIONAL FEDERAL MILK MARKETING ORDER

PRICING FORMULA HEARING

DOCKET NO.: 23-J-0067; AMS-DA-23-0031

Before the Honorable Jill Clifton, Judge

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Carmel, Indiana

October 4, 2023

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(Please note: Appearances for all parties are subject to change daily, and may not be reported or listed on subsequent days' transcripts.)

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IN CHRONOLOGICAL ORDER:

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WEDNESDAY, OCTOBER 4, 2023 - - MORNING SESSION

THE COURT: Let's go back on record.

We're back on record. It's 8:03 in the morning on October 4, 2023. It's a Wednesday.

Dr. Bozic, would you identify yourself, please?

DR. BOZIC: Dr. Marin Bozic for Edge Dairy Farmer Cooperative.

THE COURT: And you remain sworn.

MARIN BOZIC,

Having been previously sworn, was examined and testified as follows:

THE COURT: And we have been anticipating that you would clear up some questions that we had left over. How would you like to proceed? I have got two new exhibit numbers to give you. I have got, for example, 297, which could be for your Edge-15 corrected, and 298 for your Edge-15B corrected, if that's what you want.

THE WITNESS: Yes. Thank you, Your Honor.

THE COURT: Very good.

You may proceed.

(Exhibit Numbers 297 and 298 were marked for identification.)

THE WITNESS: This should take only four minutes.

If we can have the slides on the screen.

Mr. Wilson asked me yesterday morning how come that my baseline PPD was much higher than was published in the Journal of Dairy Science. Upon the urging of Your Honor, I did some forensics, and turns out that because I

wanted to use the version of the file that hasn't been modified or further automated since the Journal of Dairy Science article was published, I had on this slide a mix of two different orders.

So the first four columns, the baseline PPD, trends, III/IV spreads and advanced price -- the first five columns -- advanced prices and Class I reform, all of that was for Southwest Order, and then the depooling and actual PPD were for the Mideast order.

THE COURT: No wonder you couldn't figure it out.

THE WITNESS: So to err on the side of transparency, I've now included -- I have obviously modified all of these slides to properly be titled Southwest, and the last two columns corrected. But I also included additional slides for Mideast, as while I was testifying on Monday I read off some pooling numbers that were for Mideast. So just to, you know, err on the side of transparency, I included everything.

No conclusions are changed, no numbers presented, relative size of these numbers or the absolute values of those numbers, none of that changes. That's all from the file that has been previously part of a package that was reviewed for the Journal of Dairy Science. It was just wrong. The order of the -- the title of the order was wrong, so I now have both Southwest and Mideast.

In the Exhibit 15 I only included Southwest. And in the Exhibit 29- --

THE COURT: 298?

THE WITNESS: This is 298?

THE COURT: Oh, okay. So, I'm sorry. In 297, we have Exhibit 15 corrected --

THE WITNESS: Yes.

THE COURT: -- and in 298, 15B corrected.

THE WITNESS: Thank you, Your Honor.

In the Exhibit 297 I have modified only slides -- only the titles and appropriate sentences to -- to clarify that it's the Southwest, not Mideast.

In the Exhibit 298, I have both Southwest and Mideast.

Those are the full extent of my corrections.

THE COURT: Now, for our viewing audience, who haven't seen anything up on the screen, that will come.

THE WITNESS: Yes, these exhibits will be posted on the Federal Order website sometime today, I assume.

THE COURT: Very good.

And in the meantime, I still would like to entertain moving them into evidence, even though, we know -- we know what to expect. We just haven't seen all of it yet.

What did you do in an attempt to alert the people who are in the room?

THE WITNESS: This morning, between 6:30 and 7 o'clock, I sent these files to the -- to the AMS team as well as the counsels for all other parties.

THE COURT: What questions would anybody like to ask Dr. Bozic about this topic?

There are none.

Is there any objection to the admission into evidence of Exhibit 297, which is the corrected Edge-15, and includes the corrections to the -- did you say titles?

THE WITNESS: To the titles and some text in the -- on the -- related to the waterfall charts, related to the depooling analysis.

THE COURT: Is there any objection to that document being admitted? That's Exhibit 297.

There is none. Exhibit 297 is admitted into evidence.

(Exhibit Number 297 was received into evidence.)

THE COURT: With regard to Exhibit 298, which is the Edge-15B corrected, including both Southwest and Mideast orders, is there any objection?

There is none. Exhibit 298 is admitted into evidence.

(Exhibit Number 298 was received into evidence.)

THE WITNESS: Your Honor, this is -- I anticipate this is my last time on the stand, so I just want to express my gratitude for the hard work of your colleague that was here the first few weeks, yourself, AMS team, as well as all of the parties, and all I can say is we should do this more often. Thank you.

THE COURT: That's great.

You know, every participant in this hearing is so

valued. The Secretary cannot possibly address these issues without hearing from different parts of the country, different aspects of the business, and everyone is valued. And I appreciate your collegiality, and I have enjoyed, Dr. Boze (sic), welcoming all different people's explanations, and trying to puzzle through it, and trying to help the Secretary find something that would work. And I appreciate very much his good humor.

THE WITNESS: Thank you very much.

THE COURT: You're welcome.

Now, Dr. Vitaliano.

And I'm going to take just a minute to talk about the FEMA Emergency System trial that will happen at 2:20 Eastern today throughout the entire country, an alert, to see if it works as an emergency alert. So help me remember that we should all go off record about 2:15, so wherever our devices are showing the alert, I think it will be on television as well as devices. So we'll see how that works. But help me be off record by 2:15, if you will.

Would you state and spell your name, please?

THE WITNESS: Peter Vitaliano, P-E-T-E-R, V as in Victor, I-T-A-L-I-A-N-O. It's the word "Italian" with a V on the front and an O on the back.

THE COURT: Have you previously testified in this proceeding?

THE WITNESS: I have, Your Honor.

THE COURT: You remain sworn.

THE WITNESS: Thank you.

PETER VITALIANO,

Having been previously sworn, was examined and testified as follows:

MS. HANCOCK: Good morning, Dr. Vitaliano.

Just for the record, Your Honor, not only has he been previously sworn in and testified, but he's also been previously designated as an expert in this matter.

THE COURT: Excellent.

DIRECT EXAMINATION

BY MS. HANCOCK:

Q. Dr. Vitaliano, did you prepare Exhibit NMPF-35 in support of National Milk's proposals related to Class I differentials?

A. I have.

MS. HANCOCK: And, Your Honor, I believe we're at Exhibit 299?

THE COURT: Yes.

MS. HANCOCK: If we could mark that exhibit. I missed the 300 by one exhibit.

(Exhibit Number 299 was marked for identification.)

THE COURT: Well, you want to step down for a minute?

THE WITNESS: In the interest of moving the hearing along, I will forego that privilege. Thank you.

BY MS. HANCOCK:

Q. Okay. Dr. Vitaliano, would you proceed with your

written testimony, please?

A. Yes.

This is a -- I have testified on all five of National Milk's proposals. My written testimony has followed the same form in all five. A -- start -- begins with an introductory section of a few pages describing our process of arriving at our package of proposals, and has a section later on on economic impact.

My original testimony on Proposal 1 on the very first day of this hearing -- seems like ages ago -- I read the full testimony into the record. Those repetitive parts I have not read subsequently, and I will follow basically that same procedure.

But since this testimony on Proposal 19 bookends that original one and the whole series, I will re-read a few selected paragraphs from those common sections to kind of refresh your memory and for the benefit of Your Honor.

I will note that the version -- the short version of my written testimony that we're handing out is just the textual part. The full version on the website is about 80-some pages and contains the full list of the 3100-some counties, city, and parish differentials that we are proposing.

Q. And, Dr. Vitaliano, I forgot to mention. We originally submitted this in September at some point, I can't remember what the deadline was, and you have since amended just the counties, which is that last part of your testimony that begins on page 12; is that correct?

A. That's correct.

Q. And what did you change in the counties that was resubmitted? Do you recall?

A. From our technical group that put these together, I received only two, believe it or not, two corrections, to two counties in Texas. And the version that's posted on the website as Exhibit NMPF-35 has the corrected versions. I'm not sure whether the Appendix A version has them yet.

The two corrections are, for those of you who have those, Comanche County in Texas should be $3.85.

THE COURT: Do you know what page?

THE WITNESS: I don't have that. If you give me the page number for the -- I don't have the full version in front of me.

MS. HANCOCK: Your Honor, your version should be corrected. I think he's just noting the difference that happened. But it should be on page 69.

THE COURT: Very good. Thank you.

And say it again, please, Dr. Vitaliano?

THE WITNESS: Comanche County, Texas should be $3.85.

And then a few pages later, Travis County, Texas -- there are a lot of counties in Texas, it takes up several pages -- it should be $4.35 --

MS. HANCOCK: And that's on page 73.

THE WITNESS: -- instead of 4.70 -- $4.70.

With that, let me begin my statement.

I'm Peter Vitaliano, Vice President of Economic Policy and Market Research for the National Milk Producers Federation.

Skipping to the last paragraph on page 2, those of you following.

NMPF has engaged in an almost two-year comprehensive study of needed updates to the Federal Order pricing formula provisions. NMPF has undertaken this important activity with the essential and dedicated assistance of dozen of marketing experts from the staffs of its member cooperative marketing associations.

In a series of well over 200-monthly virtual meetings by this mostly virtual meetings, this team examined every detail of the current federal pricing formulas of the Federal Order uniform pricing regulations in 7 CFR, paragraph 1000.50 through 52.

The goal was developed -- to develop a comprehensive, integrated, and balanced program of updates to these formulas, to realign them more fully with the structural realities of the current dairy industry, and to address the disorderly marketing conditions which the growing misalignment has allowed to develop. This effort included considerations of mechanisms for making further updates in the future as the industry continues to evolve.

The comprehensive package which resulted includes seeking additional legislative authority for USDA to conduct mandatory studies of manufacturing costs and product yield factors, seeking a change via ordinary rule

making for the regulation implementing the dairy product mandatory reporting program, and five recommendations for amendments to the uniform pricing provisions for all Federal Orders.

The NMPF Board of Directors unanimously approved this package of recommendations, including the five recommendations for proposed amendments to all Federal Orders which NMPF has submitted as Proposals 1, 3, 7, 13, and 19.

This testimony today is in support of Proposal 19 concerning the Class I and Class II differentials. NMPF requests that the Secretary amend 7 CFR 1000.50(b) and (c) and 1052 applicable --

THE COURT: Sorry, that's .52.

THE WITNESS: .52.

THE COURT: And please go very slowly through this. This is very hard to capture just by hearing it.

THE WITNESS: Okay.

-- applicable to all Federal Milk Marketing Orders, as well as 7 CFR, paragraph 1005.51(b), paragraph 1006.51(b), and paragraph 1007.51(b), as specified at the conclusion of this testimony, which would increase the Class I differentials for all counties, parishes, and cities of the 48 contiguous United States to reflect the current cost of providing adequate supplies of fresh milk to fluid processing plants.

The majority of Federal Order Class I differentials have remained unchanged since Federal Order

Reform, as reviewed and revised by Congress. The differentials in the Appalachian, Florida, and Southeast orders were modestly updated in 2008.

Just as the Make Allowances embedded in the milk component pricing formulas are out of date, so, too, are the underlying cost assumptions embedded in the Class I differentials. Since the current Federal Order Class I differentials were established, one of their key determinants, fuel costs and the basic per mile cost of hauling milk, have increased significantly. Truck driver per-day hours have been reduced, which has required more truck drivers and investment in more rolling stock. Additionally, federal requirements for in-truck electronic driver and truck logs were implemented during this period. Higher capital investments have also driven up overall milk hauling costs.

Other structural changes have increased both the costs and general availability of milk hauling, including increased road tolls, restrictive and variable road weight limits, labor shortages, and truck, trailer, tire, and replacement parts and shortages, as well as significant diesel fuel cost increases.

THE COURT: I'm sorry, go back again to the "and replacement parts," and finish from there, please.

THE WITNESS: And replacement parts and shortages --

THE COURT: So --

THE WITNESS: -- of replacement parts.

THE COURT: So replacement parts costs?

THE WITNESS: Costs and shortages thereof.

THE COURT: Thank you. You may continue.

THE WITNESS: Thank you.

Driven by the increase --

THE COURT: I'm sorry, I didn't mean for you to abandon the rest of your sentence.

THE WITNESS: Oh, okay.

-- as well as significant diesel fuel cost increases.

Driven by the increased cost of hauling milk per loaded mile, the cost per hundredweight for 100 miles has almost tripled since the current Class I differentials were established. Compounding this greater expense, opportunities for reducing costs through backhauls have become more limited.

For example, in the Florida Order, the marketing area most distant from a reserve milk supply, backhauls of orange juice and orange juice concentrate used to be common. However, today, reduction in the Florida citrus industry and the availability of juice concentrate from other countries have nearly eliminated juice backhauls out of Florida. Where backhauls may still be an option, processors often forbid the possibility by requiring tanker trailers to remain dedicated to delivering milk and dairy products only.

Changes in the relative locations of farms and fluid milk processing plants have also increased the cost

of delivering Class I milk to markets. Development in exurban fringes has displaced dairy farms. The location of milk production is increasingly distant from human population centers, while Class I processing plants remain in cities due to the higher per unit cost of transporting packaged fluid milk relative to bulk unprocessed milk. The miles that bulk raw milk must travel to get from dairy farms to processing plants have increased.

The combination of increased miles milk must move to serve Class I markets and the significant increases in the per mile cost of moving milk is threatening the reliability of milk supplies for Class I use in many Federal Orders. The Class I differentials which continue to be the fundamental regulatory mechanism of the Federal Order program for attracting an adequate supply of farm milk for fluid milk processing remain largely unchanged since Federal Order reform 23 years ago.

In addition to increases in milk hauling costs since 2000, all contributors to the costs of producing Grade A milk at the farm have also increased. Class I prices are the only Federal Order prices for which the cost to producers is taken into account, albeit in an indirect fashion.

The Federal Order base Class I differential has historically recognized that there has been a difference in the cost of producing milk solely for manufacturing use and the cost of producing for daily delivery to the Class I market. Over time, and with the Federal Order

reform changes in manufacturing class use prices eliminating any competitive milk procurement factor in a base milk price, the Class I differential base price now represents a modest nod to production costs at the producer level.

Since 2000, those costs have risen far more than the limited increase in the base Class I differential from $1.60 per hundredweight to $2.20 per hundredweight as embedded in the NMPF proposal, Proposal 19 that is. The base Class I differential also plays an important role in reducing instances of class price inversions, the importance of which the Department stressed in Federal Order reform, as previously reviewed in my testimony on Proposal 13 earlier in this hearing.

NMPF recognizes and supports USDA's longstanding policy of maintaining federally-regulated prices as minimum prices and allowing market forces to fine-tune market prices. However, structural changes in the industry are limiting the reach and effectiveness of over-order pricing for milk used in fluid milk products.

Larger fluid milk plants, higher costs of hauling, increased distances raw unprocessed milk must travel to supply Class I processing needs, and growing resistance by handlers to accept over-order prices are leaving many costs of serving Class I processors increasingly uncovered. The result is disorderly marketing conditions. As costs increase and the capacity for over-order prices to keep up with these costs wane, pricing equity between

competing processing plants is threatened. Worse, dairy farmers are subsidizing shortfalls of Class I prices to cover the full cost of supplying Class I milk to processors.

Taken together, milk transportation costs, producer production costs, and other factors have created a market environment in which the Federal Orders operate which is antithetical to the goals of the Federal Order system. That is, ensuring adequate supplies of milk for fluid processing, equitable treatment of producers and processors, and providing for the orderly marketing of milk. It is important for USDA to ameliorate this, as well as other changes that are eroding the effectiveness of the Federal Order system.

Our proposed solution to update the current Class I differentials for all counties, parishes, and cities in the contiguous United States.

NMPF's proposal to address these multiple challenges and to help alleviate the economic stresses on milk marketers who have accepted the responsibility of supplying the marketplace with milk for Class I use is to update the adjusted Class I differentials for every U.S. county, parish, and city currently listed 7 CFR, paragraph 1000.52.

The method NMPF has followed to develop its proposed update to the Class I differentials follows the general process previously used during Federal Order reform. This method also follows certain precepts of

price alignment accepted by the Secretary in the Southeastern Order pricing hearing held in 2007.

In brief, NMPF commissioned an update to the University of Wisconsin, previously Cornell University, national price surface model using 2021 model input data, including milk supplies, dairy product demand, cost of processing milk, and the cost of transporting milk and dairy products. The model has been greatly expanded to include many more supply and demand points, as well as considerably more point-to-point road mileages.

NMPF used the model outputs from the University of Wisconsin model as a starting point. NMPF then applied local knowledge of milk movement, plant locations, and historic price relationships to refine the model results and prepare a rational regulated Class I value surface, using time-honored Class I price alignment techniques and processes. NMPF's final Class I recommendations deviated somewhat from the model results due to a variety of real-world milk movement considerations, as will be addressed in further hearing testimony.

In all locations, as would be expected given the substantial increases in the cost of milk hauling, the recommended regulated Class I differential surface increased versus the current regulated Class I differentials. The tilt, or slope, of the price surface from reserve supply points to Class I demand points has become steeper, and the geographic locations representing the reserve supply of milk have generally shifted toward

western states. Similar to the general nature of the existing Class I differential price surface, the updated price surface slopes from lower values in the Northwest and West areas of reserve supply, with increasing values when moving toward the milk deficit areas of the Southeast.

The updated Class I differentials, as proposed, which resulted from this NMPF analysis, reflect less than the full cost of moving milk, and thereby maintain the Department's longstanding principle of minimum prices. In developing this proposal, NMPF used the expertise of numerous individuals responsible for marketing milk in NMPF member cooperatives, as well as others that have longstanding expertise in the national Class I price surface. Their expertise was used to further refine the model results to develop the proposed pricing surface that best fits the reality of today's marketplace. As such, the proposal does not follow the model's results in every instance, as there are both positive and negative deviations from the model results to better support a more orderly marketing system.

The results of the NMPF study, analysis, and price alignment processes are included in Figure 1 below. It is a color-coded representation map, as shown, that visibly presents the 3,108 counties, parishes, and independent cities and each civil district's Class I differentials.

Exhibit USDA-46, which is Hearing Exhibit Number 46, provides a summary of the Proposal 19 national

average Class I differentials by Federal Order.

This testimony provides an overview of NMPF's justification for adoption of Proposal 19. More detailed testimony will follow that supports all or key portions of Proposal 19, including testimony provided by Jeff Sims, representing NMPF member cooperative Lone Star Milk Producers, as well as an expert witness from the University of Wisconsin who will testify about the national price surface model used to develop Proposal 19, also, other members of the NMPF task force that developed NMPF's Federal Order modernization proposals, and producers who are members of NMPF member dairy cooperatives.

I will read a few more paragraphs from the following section on the economic market impacts of NMPF's proposed changes, starting in the top of page 8:

Figure 2 provides a perspective on the key issue of the impact of NMPF's proposals on consumers of the Federal Order program and potential changes to the regulatory provisions of that program. This figure charts the monthly consumer price indices (CPIs) reported by the U.S. Bureau of Labor Statistics (BLS) over the past decade and a half for all items -- which is the line in red -- which is the general measure of overall consumer price inflation, also referred to as the overall cost of living, together with the aggregate CPIs for all food and beverages shown in green, for all dairy products shown in the bright blue, and for all fluid milk products shown in

a sort of darker shade of blue, the principal -- which is the principal regulatory focus of the Federal Order program, that is, fluid milk.

These CPIs reflect actual retail prices paid in all U.S. cities, but they are expressed in the form of indices with their respective U.S. average retail prices during the 36-month period of 1982 through '84, each set to the value zero to facilitate comparisons.

THE COURT: Now, mine doesn't say "zero," so you will need to explain to me.

THE WITNESS: Oh, set to the value 100, to facilitate --

THE COURT: So, it's not me.

THE WITNESS: Excuse me?

THE COURT: I'm just making a joke.

THE WITNESS: Oh.

THE COURT: So I don't quite understand that, but I'm sure I will before we finish.

THE WITNESS: Yeah. The use of indexing is a standard method when you want to compare something like, you know, the cost -- the cost of a product A might have been $2 each in a base period, and the cost of another product B that you want to make a comparison to may have been $3, and so if -- if both of them have increased at, let's say the same rate, in ten years from that base period, they will still be different.

If you want to show how the price of both products changed relative to each other, you would take that base

period, you would divide the $2 product price by $2 and get it down to say, you know, basically 100. If you divide $2 by $2, you don't get a dollar figure, you just get an index number. That would be 100, or basically, you know, 100% starting out. You would divide the $3 product price, product B, by $3, and put its higher price down to an index value of 100. So the two of them would start out at the same relative price.

So over time, let's say ten years out, if product A price stayed fixed, and product B's went up by 10%, at the end of that ten years, the index of product A would still be 100, the index of product B would be 110, so you could see instantly that product B inflated more than product A. Whereas, if you looked at a chart of $2 and $3 starting out, and $2 and, you know, 3 -- you know, 3.30, in ten years, it wouldn't be quite as obvious how they changed relative to each other. So it's just a way of putting them on a common denominator so you can compare.

And so index -- or Figure 2 then shows the relative rate in which general inflation in red, all food and beverage inflation, which is an aggregate number, everything put together, that's the way CPIs are done, where some of them are very broad and some of them get more and more specific. You can get down to -- you know, the price of butter has its own CPI. And then you can compare how a somewhat more disaggregated category, like dairy, which is embedded in that all food and beverages,

you can see how dairy in the brighter blue line has inflated relative to all food and beverages, and you can see how dairy, over time, has gotten less and less expensive relative to all food and beverages.

They started out the same at 100 during that base period in the early 1980s, but as I'll show in my continued text here, going back to 2008, although that's, what, 25 years after the base period, they still -- all four of these indices were pretty close to each other. That means in 2008, the overall cost of living was -- had gone up about the same as all food and beverages, which was about the same as all dairy, which was about the same as fluid. They were all about the same. You could have -- you could have updated them to an index of 2008, and this chart would look very similar. That's just indexing chart mathematics -- arithmetic is what it is really.

THE COURT: Whoa, thank you. I would never have been able to figure it out without your explanation, and I appreciate that.

THE WITNESS: I'm happy to give it an explanation, because it's a pretty simple concept once you look at it.

So what this chart shows us is over these 15 years, how much have consumers needed to pay -- how much more have consumers needed to pay for the overall cost of living, everything they spend money on? How much more they have had to pay for food and beverages, how much they have had to pay for all dairy as an aggregate

category, how much more they have had to pay for fluid milk.

So continuing to -- Figure 2 shows that the retail prices represented by all four of the measures pictured had increased as of 2008 by about the same amount, slightly more than doubling during the quarter century since the index base period.

And that is because the index period they were all at 100 in the early '80s, in 2008 they were about 210, meaning they had, both slightly -- all of them had slightly more than doubled. That's what going from 100 index value to 210 means. They had all kind of gone up the same.

From 2008, the overall cost of living and the cost of all food and beverages have both continued to increase at a relatively steady pace, which accelerated during the recent bout of inflation, mostly last year and the year before, 2021/2022, at a relative -- with food and beverage prices slightly outpacing the overall inflation rate particularly in recent months.

And that's where those -- toward the right-hand side where everything started going up faster, that was the inflationary period that we have all read about in the last couple of years.

The less aggregated dairy and fluid milk CPIs have shown a greater sensitivity to the price of producer milk, including the 2009 price plunge, the price spikes of 2014 and 2022, and the stagnation of prices between these two

peaks. This closer connection between farm and retail prices for dairy stems from the fact that the cost of raw milk has averaged about 31% of the retail value of dairy products since 2002, while the farm value of most food and beverage products represents a much smaller share of the total retail value of the finished products, which accordingly, reflect more closely the main drivers of overall retail price inflation, including such factors as energy, labor, and transportation.

That means when you have such broad categories, all food and beverages, it's a very specific part of the economy, but it's so broad that the rate of inflation that's affected food is not all that different, slightly faster, than affecting everything in the economy, which is a much broader measure. Because it's -- food and beverage is such a big category by itself, whereas dairy is more specific and a little different because the value of the raw product, milk itself, raw milk, is a much bigger portion of the retail price than, say, how much a box of corn flakes -- how much the price of raw corn affects a price of a box of corn flakes, which is much smaller.

However, those factors have also caused retail prices, price inflation for dairy products, to outpace general and food/beverage price inflation during the recent bout of general price inflation. That's 2022 particularly. But also, it's caused dairy prices to recover more quickly from that bout of inflation with dairy product retail prices actually dropping this year,

while the two more general CPIs, overall inflation and food and beverages, continue to increase.

And you can see from this figure that food and beverage inflation has -- has actually recently outpaced overall inflation slightly, that's the green line, diverging above -- increasingly above the red line, overall inflation.

But you will note that the dairy line has actually -- it went up faster during the -- than the another two broader categories, during this recent inflationary period, but it's now dropping. And fluid milk has stayed generally below the overall dairy rate of inflation during most of this period. It experienced a bout of increased inflation along with all these other categories, but is now dropping down again below the overall dairy line.

Of particular significance to the -- for the current purpose, the overall cost -- and this -- general purpose, we have had a lot of discussion about the impact of prices to consumers and its effect on fluid milk consumption. The overall cost to consumers of dairy products, and fluid milk products in particular, has declined during the illustrated period relative to both overall inflation, as well as general food and beverage price inflation.

One noteworthy datum is that the simple difference by which the monthly CPI for all fluid milk has fallen below the monthly CPI for all food and beverages reached

its highest level ever in July 2023. That's the difference over on the far right-hand side between the green line where it -- where it ends against that right margin, and the duller blue line representing fluid, which is the lowest of these. You can see how that fluid milk has diverged more and more below the overall cost of food and beverages.

Agricultural production enjoys built-in productivity advantages due to its biological basis, which can generate increases in production per animal, or increases in production per planted unit as a result of genetic improvements and other productivity, which are enhancements unique to biological production processes. These advances generate unit cost reductions which the competitive nature of farming passes on up the various agricultural and food marketing channels, eventually to consumers. This consumer cost reduction aspect of agriculture varies in direct relation to the proportion which the basic agricultural commodity represents of the total retail value of the resulting food products, which, as mentioned, is relatively high for dairy products.

This aspect of agricultural production, coupled with the great productivity of U.S. agriculture, has resulted in the general cost of food representing one of the smallest proportions of total consumer income in the United States compared to that in all other countries.

It is, therefore, very difficult to consider the facts presented in Figure 2 which reflect the relative

influence of all economic factors at play in producing general, food and beverage, overall dairy product, and fluid milk product price inflation over the past decade and a half, which is a period that includes the continuous operation of the Federal Order program -- to go back and repeat the beginning -- it is, therefore, difficult to consider these facts and conclude that Federal Orders have had a deleterious effect on consumer welfare via the retail price of dairy products and retail prices of fluid milk and retail prices of dairy products in general.

Skipping then to last section on the bottom of page 10.

NMPF sincerely wishes to thank Secretary Vilsack and the Department for holding this important hearing, and for thoughtfully considering adoption of its proposed amendments to the Federal Milk Marketing Order regulations. NMPF has devoted considerable time and resources to thoughtfully considering and recommending the important changes it considers necessary to correct the growing misalignment between the dynamic changes in the U.S. dairy industry since Federal Order reform and the largely unchanged factors in the critical Federal Order component and Class IV class price formulas originally adopted at that time, the time of Federal Order reform.

Together, NMPF is requesting the Secretary to amend certain provisions of 7 CFR 1000.50.52 -- excuse me -- dash, 52, those three sections, 1000.50, 1000.51, and 1000.52, which are applicable to all Federal Milk

Marketing Orders, and 7 CFR 1005.51(b), paragraph 1006.51(b), and paragraph 1007.51(b). The changes in these regulations that Proposal 19 would entail are as follows, which includes, as we have always portrayed them -- the proposed regulatory changes we are portraying in our testimony at this hearing, include all of the five proposals' language. We have not singled out a single one of them.

And the changes that Proposal 19 would bring are relatively simple on this -- this page.

Section (b) of 1000.50, class prices, component prices and advanced pricing factors, (b), Class I skim milk price: The Class I skim milk price per hundredweight shall be the adjusted Class I differential specified in paragraph 1000.52 -- strike "plus the adjustment Class I prices" in those three sections indicated, which our Proposal 19 would propose that those separate -- separate amended -- or increased Class I differentials in the three Southeastern Orders be reincorporated back into 1000.52. Since our proposal redoes the entire differential surface, there's no need to keep those separated. And to simplify, those would be struck, plus "the simple" -- the higher of the advanced pricing factors, etcetera. That's our language -- proposed language for Proposal 13.

(c), the Class I butterfat price: Similarly, the Class I butterfat price per pound shall be the Class -- adjusted Class I differential specified in 1000.52 divided by 100, strike the language that adds those three

Southeastern Order butterfat differential sections. They'd be reincorporated into section -- paragraph 1000.52, along with the skim milk price factors.

And then we would delete -- propose to delete in their entirety, Sections paragraph 1005.51(b), paragraph 1006.51(b), and paragraph 1007.51(b). Those are the sections in the three Southeastern orders that specify those -- those adjustments to the base Class I differentials that would now -- we would roll into 1000.52.

And then the adjusted Class I differentials, adjusted for location to be used in 1000.50(b) and (c) shall be as follows: We would delete everything that follows in that -- in section -- in the language of paragraph 1000.52 and substitute the list that is on page -- starting page 12 through page 82 of Exhibit 299, which includes the recommended price surface -- Class I differential price surface that National Milk is proposing in Proposal 19.

So that concludes my read/spoken testimony.

MS. HANCOCK: Your Honor, at this time we would make Dr. Vitaliano available for cross-examination.

THE COURT: Thank you.

MR. ENGLISH: Good morning, Your Honor.

CROSS-EXAMINATION

BY MR. ENGLISH:

Q. My name is Chip English for the Milk Innovation Group.

Good morning, Dr. Vitaliano.

A. Good morning, Mr. English.

Q. So let me start off, and I might end here as well, is this the last time you will be presenting for National Milk at this hearing as far as you know?

A. As far as I know, this is the last time I will be presenting testimony. With this hearing, I have stopped making predictions.

Q. And so I thank you for that.

So let me begin at the bottom of page 2 of your statement, and that is the discussion about a two-year long comprehensive study.

When precisely did National Milk Producers Federation begin the comprehensive study?

A. I began probably in the summer of 2021, or two years ago, by looking at all of the current Federal Order product price formulas as shown in the USDA AMS fact sheets that were handed out here, the Class I, Class II, Class III, Class IV. Looked at each of those pieces in every -- every part of those proposals, and looked at, you know, what -- what might need to be updated.

And then there was discussion with it. It probably started rolling into a higher gear in late 2021, when we formally put together a task force of our member specialists. We hired a consultant, Mr. Jim Sleper, to manage that process.

So there was not a kickoff date where we said, we're now in the process. But by the end of 2021, we were

fully engaged in this process.

Q. Would it be fair to say that that was also in line with when the International Dairy Foods Association engaged about Make Allowances?

A. I don't know your exact timeline, but I know that was a -- that was an effort that the International Dairy Foods Association undertook.

Q. So when did Class I come into the equation, at the same time or after the Make Allowances conversation?

A. The Class I surface discussion was the last piece because it was going to be the lengthiest, and we needed the University of Wisconsin study results to begin that. And so that -- that part could not proceed in earnest until we had -- you know, turned out to be the third iteration of the model results to -- to work with.

Q. So -- so actually, there's a lot to unpack there, so I appreciate it very much, because you anticipated about the next eight or nine questions.

So when did National Milk Producers Federation retain the University of Wisconsin to perform the model study -- the first model study?

A. I can't give an exact time, but I would say it was basically in -- sometime in the springtime of 2022.

Q. Which would be consistent with the fact that the runs that Dr. Nicholson provided were for May of 2021 and October 2021, correct?

A. Yes. We wanted to include to -- to include a -- you know, a recent period, but we wanted to avoid using

2022 numbers that were probably subject to this recent bout of inflation that I illustrated in Figure 2, on the assumption that that might be a little non-representative. We may end up being wrong there. But we intentionally did not take the most recent highest cost in that current bout of inflation. We intentionally limited it to 2021.

Q. So when did National Milk Producers Federation receive the first iteration of the model results?

A. Probably would have been sometime in the spring of 2021, 2022.

Q. And what did the University of Wisconsin do for that study, that model run, if you know?

A. That first model run, the University of Wisconsin crew -- there's a long pedigree to that model. They have updated it and run it for various purposes several times, I think including several times since 2021. The model has grown in size and complexity as the computing power in a laptop has grown.

And so I think during -- during recent years, the keepers of that model have updated a lot of the components of it, even prior to us engaging them. But the one thing -- among others, the one thing that they really looked to our help for was to update the plant list, because our task force had a lot of knowledge of current plants, plants that were going to be closed, plants that were soon coming online.

And so the first model run, the University of Wisconsin folks, you know, running the model, had -- had

updated a lot of the parts of it. Then, you know -- well, go ahead. So that answers that question.

Q. Okay. So -- so you received the results of the first iteration.

And what, if anything, did you ask with respect to, say, maybe this plant information with respect to the second run -- now, I am focusing on the second iteration right now rather than the third. What, if anything, did you ask with respect to the second iteration?

A. We took a look at it, at the results, and even after the first run, we concluded that the model results even of that first run were a relatively good representation of what our specialists, with all of their local knowledge, understood might be a -- you know, a reasonable current Class I differential surface.

We -- we didn't -- other than providing some updated plant information, I don't recall we made any major changes. We will -- our -- our next witness is one of the -- is the current keeper of that model, and so he probably would be better -- you know, better informed in terms of what we fed back to them at that time. And so I would recommend you keep that question, make sure you ask him that question as well.

Q. I appreciate your attempt to deflect to him, but for the moment, if I may, I at least want to explore, since you are the witness for National Milk Producers Federation, and the other witnesses, 20 or so, are either Dr. Nicholson or individual NMPF members. I'm trying to

just focus and understand from everybody. So I get it if you don't have the precision, that's fine, I just want to understand what you recollect.

So when did you receive the results of the second iteration?

A. It would have been several months after that, after we received the first one. It took some time between -- between the iterations of the model.

Q. So early summer, mid-summer 2022?

A. Probably around that time, yes.

Q. And then after you received the second iteration, what did you ask of University of Wisconsin before it ran the third iteration?

A. We might have added a few more -- given a few more updated plant information, but I don't recall there was anything of great significance that we -- you know, we fed back. There was some -- you know, all of our individual task force members looked at the numbers in their particular regions because they were gearing up for the task of taking the final run and working through the process of up- -- of adding their institutional knowledge of -- of, you know, the realities of the industry in their regions to those results.

So they wanted to make sure that -- that the model results were -- were reasonably correct, because we did not -- we specifically did not want to end up making major changes to what the model showed. So we wanted to just make sure that the results in all of those areas looked

reasonable enough so that when we applied the -- the art part of the process, that we would stick as close as possible to what the model results showed.

Q. So a few minutes ago you mentioned, whether it was the second iteration or the third iteration -- and I'm going to take it apart -- at first you provided University of Wisconsin information with respect to closed facilities, correct?

A. Yes.

Q. So those were plants that were closed, not closing, correct?

A. There may have been a few that were -- we knew were going to be closing, and so we didn't, you know -- to the extent that we were sure that they were going to close, we -- we felt it was not going to be useful to have that in the model results. We wanted to have it as current as possible.

Q. And what about the plants that you understood to be being built, what -- what categories of plants would that include?

A. I remember there was, I think, a butter powder plant. But again, I would refer you to our task force members' testimony because they would know much more specifically what they fed into that process in their own regions.

Q. You mentioned the art. Other than the plants that were closed or closing, or the plants that were planned or you thought would open, and recognizing I should ask

others the details, did you, for the third iteration, provide the University of Wisconsin with any information about the art?

A. No, because we understood particularly by the third run, what the model could do, which was amazing, all the detail that it could do. But everybody who was involved in that art part had done this sort of thing before, and they knew the kinds of things that was just not likely to be incorporated in the model. Because we had a very good idea of what the model could and what the model couldn't do, and we were planning to, and preparing for, and did, apply that institutional knowledge that the model was not able to take into account. And there will be plenty of testimony about what those things are originally.

Q. I'm very well aware.

A. Yes.

Q. But -- but what kind of experience -- so let's backtrack for a minute.

The last time the Class I differentials were updated nationwide was during Federal Order reform, correct?

A. That's correct.

Q. And then the only other changes were from the Southeast hearing, which was decided at the end of February 2008, correct?

A. That's correct.

Q. So did these -- when you say that these people had

been involved, are you saying that outside the Southeast, these were people who had been involved in Federal Order reform in this art?

A. They were people who were aware of that process of the model results, and -- and what would -- what was generally needed to -- to work with the model results supplying that institutional knowledge of their local areas.

Q. And is it National Milk Producers Federation's view that the use of the art made modest changes to the model?

A. Yes, we think it has.

Q. So to the extent that we have seen on the USDA website the results of the model, you would agree with me that even after the third iteration, the model used the current base Class I differential of $1.60, correct?

A. That's correct.

Q. When did the concept of increasing the base price from $1.60 to $2.20 arise?

A. Throughout the current, the entire process of working with the various runs of the University of Wisconsin model, the University of Wisconsin personnel, Dr. Nicholson, Dr. Mark Stephenson emphasized to us what we already kind of knew, that the model did not solve for the base -- the lowest differential, that it only solved for relative differences. That the model basically came out with -- and, again, the differences between the various locations. And that they continuously asked us

what should we set the base differential, the $1.60, even though that did not affect -- they did not need that information for their actual analysis of the spatial differences.

Our group was preparing to do the hard work of looking at taking the geographic spatial relationships and -- and modifying them for things that the model could not do. We specifically put off the discussion of what the minimum differential should be until we completed that other process, and then turned our attention to what it should be. The $1.60 was maintained through the model runs because it was what was in the current Federal Order provisions.

Subsequent discussions with working with the model results led us to conclude that since the $1.60 was based on several cost factors, and those cost factors had gone up, just like the cost factors affecting the spatial differences had gone up, that we needed to look at modifying that $1.60, and we concluded that that should now be raised. The lowest Class I differential should be raised to $2.20.

Q. So isn't it true that one of the considerations for National Milk was that when you saw the third iteration, or maybe even the first and second at $1.60, there were locations, especially in the West, Southwest, where the differential went down from the current location?

A. I believe there were some of those, yes.

Q. So how specifically did National Milk Producers Federation develop the base $2.20 used in the model to add the $0.60 to the $1.60?

A. There will be, again, extensive testimony on that. But we used the basic framework that USDA used, that USDA and Federal Order Reform identified three components of that $1.60, and we basically updated those three components.

Q. So just to be clear, in the $1.60 today, transportation costs are not part of the $1.60, are they?

A. No. They are part of the spatial differences.

Q. Did National Milk, in considering the development of the $2.20 instead of $1.60, include transportation costs in any way in that $2.20?

A. I'm not sure that it officially incorporated transportation costs. There is a component of the cost of assuring a supply of Class I milk in one of the three factors. But our concern -- our -- our feeling was transportation costs were properly covered in the spatial differences that were solved for the University of -- in the University of Wisconsin model, as modified in some cases by the further work of our task force members who had knowledge of local market conditions that would not be reflected fully in the model.

Q. And I appreciate that. And, yeah, again, I'm going to have that opportunity to examine the other witnesses for National Milk, the members of National Milk. And again, I'm just trying to understand from you what

your understanding was.

So -- so you mentioned that there's the three elements of the $1.60.

As I read the testimony, there's extensive discussion of the issue of Grade A in the testimony that's going to follow you, correct?

A. That is correct.

Q. And there's testimony about the inversion issue, correct?

A. That's correct.

Q. But I did not see any discussion about the other two factors in the base; is that correct?

A. What are other the two factors?

Q. I think one is viewed as balancing, and one is viewed as the cost of the incentive to get milk away from manufacturing facilities.

A. Okay.

Q. I did not see that in the discussion.

A. I thought those were two of the three.

Q. Right. Those are two of the three, and the Grade A is the third, correct?

A. Correct.

Q. I just wanted to be clear that as I read the testimony -- and there's a lot of testimony here and I could miss something -- as I read it, the discussion is focused on the Grade A and then separately this issue of inversion.

Am I correct in the universe there as I understand

it?

A. In terms of our testimony, I can't answer that. I think you will have to wait for the testimony to follow to speak for itself.

Q. Okay.

THE COURT: Mr. English, can you remember where you are and let us take a ten-minute break?

MR. ENGLISH: Absolutely, Your Honor.

THE COURT: Excellent. Let's go off record -- well, first of all, when you come back. Come back at 9:30. Let's go off record at 9:17.

(Whereupon, a break was taken.)

THE COURT: Let's go back on record.

We're back on record at 9:35 a.m.

Mr. English, you may proceed.

MR. ENGLISH: So I want to start where I left off, and then go backwards just for a couple seconds.

BY MR. ENGLISH:

Q. I understand and appreciate your comment that you believe there are other people who know more or the details of the 2.20, correct?

A. Yes.

Q. There's a lot of testimony.

So could you help me, which of the witnesses who are going to come after you are the best ones, in your view, to talk about the 2.20?

A. The first NMPF witness, Mr. Jeffrey Sims, will spend time in his testimony on the 2.20.

Q. Okay.
A. And Mr. Eric Erba is going to spend some time on that as well.
Q. So you think -- I -- I'm not saying others can't or won't, but those two --
A. Right. Those two are going to hit, you know, the main substance of that.
Q. I forgot to ask earlier because -- well, whatever reason.
When did National Milk receive the third iteration of the model?
A. That was, I think, as late as early October of 2022.
Q. And in reference to a question I asked, you said that there were some modest number of changes to the model.
Is there anywhere we can find a summary of the changes?
A. Probably the best way to get that information is -- would be to -- to ask Dr. Nicholson from the University of Wisconsin because he received those changes and was responsible for making them, so he has that knowledge of the actual work of doing that.
But mostly it was basically plant lists, updating plant lists, and specifically the recommendation on the fuel costs to use. Which, as I had mentioned earlier, we intentionally did not want to have -- we wanted to have 2021 fuel costs, which was, you know, prior to a major

escalation of those costs that occurred in 2022. We did not want to use the higher numbers of 2022.

Q. Do you recall whether he declined to accept any of your suggestions?

A. I don't recall that he declined to accept any of them. He was very interested in our knowledge for updating the model, and he very specifically did not indicate in any way that he thought any of the things that we provided him in the way of updated data were inappropriate for -- you know, for the purposes of his analysis.

Q. And I apologize because we actually just digressed, which was my fault.

What I was referring to was, when we were talking very briefly and just initially about the art that was applied after the third iteration, I thought we talked about the fact that there was sort of a modest number of modest changes; is that correct? By -- from the art?

A. How would you describe -- define changes?

Q. Okay. So you received the third iteration --

A. Yes.

Q. -- and after you received the third iteration, that's when your experts got together and consulted and applied, I thought you used the word art, correct?

A. Yes.

Q. And I thought, and I might -- we might have misunderstood or miscommunicated -- that you said that there were -- you know, those -- that art resulted in

modest changes to the results of the model.

Did I have that right?

A. Yes. But there were modest -- modest changes to the numbers that the model came out. We did not ask that any of those changes were incorporated back into the model.

Q. Okay.

A. The model was an objective thing. We were -- we were doing that art part, you know, before -- you know, during -- starting with -- with some of the earlier iterations, because we were under a timeline to present our final recommended price surface to our decision-making bodies.

Q. So -- thank you.

And I think you answered a question that you -- you did not go back to the University of Wisconsin, when -- again, when you made the art changes, correct? You did not?

A. No, we did not.

Q. And so when I asked my question imprecisely and asked about the National Milk modifications to the numbers from the model, I was asking is there somewhere where there's a one-page or two-page or whatever summary of what those modifications were, or are?

A. I don't know of one that is publicly available.

Q. So essentially, one needs to read the 20, plus or minus, testimonies that are about to follow in order to get all of that?

A. The testimonies that follow will describe in considerable detail where those -- those changes to the model results were made, which is very, very regional, very local, and therefore, the most pertinent.

Q. So a moment ago you said that the process to provide the National Milk modifications started at some point prior, I think to the third iteration.

Do you know when they started?

A. Probably would have started sometime during -- during the summer of 2022. I did not keep a log of all of these changes.

Q. Were there central principles involved for the changes?

A. The central principles were basically understood, you know, by the folks -- the task force members that were specifically going to work on that in their regions. And they were made based -- you know, by people who had done this sort of thing before. I can't tell you exactly which -- which process and procedures they were used for, but the people involved had experience with this, and so they kind of knew what was involved.

You take, in this case, you know, the results of a computer model that does a wonderful job of getting you, pick a number, 90% of the way, but there inevitably -- when you are doing something as important as setting -- of recommending what the Class I differential should be, you cannot take the results of a model, no matter how wonderful it is, without adding some particular --

particular things to it that based upon the institutional knowledge of experts who know about moving milk in their particular areas.

Q. Was somebody overall in -- for want of a better phrase, in charge of these committees?

A. Mr. Jeff Sims was formally the chair of the Class I surface working group, but there was no, you know, master plan. There was basically -- it was primarily, you know, getting -- getting the folks to get the work done and putting their individual expertise in. And particularly in the areas where there was no one person who had the detailed institutional knowledge of what the changes to the model for the Class -- you know, for the differentials in a particular region. Nobody in the group had that knowledge of every one of the 3100-some county, city, and parish differentials. It was a rather decentralized process.

Q. But were there sort of common precepts?

A. Yes.

Q. What were the common precepts?

A. The common precepts were things such as -- let me give you an example of the ones, because I was not detailed involved in a lot of this.

As I recall, the model showed that there should be a different differential for the cities in Texas of Dallas from Fort Worth, because those cities are some distance apart with respect to the major milk supply serving those cities in West Texas to the Texas Panhandle. For

institutional purposes, it was decided to -- that the differential, despite what the model said, should be the same for those two cities because of historic price alignment.

There was a considerable -- without being enslaved to the past, there was considerable effort and care taken to make sure that the updating did not do -- you know, I might say, you know, disruptive -- make -- make disruptive changes to existing price relationships, particularly, you know, amongst plants that are located relatively close to each other. We tried to respect the fact that the existing differential surface, even though it was outdated, imposed certain competitive relationships that we did not want to be disruptive of, to the extent possible.

Q. Okay. Anything else?

A. Oh, things like there was a feeling that the differences between cities or plants where there was a mountain range in between, where -- where travel times would be, you know, more difficult than -- than would have appeared based on the model results, some of those things needed to be modified.

And, again, you will -- you will receive voluminous testimony from those who have the expert knowledge in their areas of those -- exactly those kind of things.

Q. Believe me, I'm aware there's voluminous testimony.

Is it your understanding that the model does not take into consideration issues like mountain ranges?

A. It must -- it -- it takes it into account -- the model basically uses standard road mileages between point to point, and it has several millions of those point-to-point arcs. It does not necessarily reflect differences in travel time for terrain. There are a lot of areas where there's a lot of congestion on roads where the travel -- travel distance would be a lot slower, and therefore more costly in terms of driver time than the model was able to take into account.

Again, the model does an incredible job of incorporating an awful lot of complexity, but there is another level of complexity that really needs to be -- to be taken into account to accommodate some changes from the results of even an almost perfect model.

Q. Anything else?

A. Those are things that I would mention at this point. And, again, you will hear many of them in the subsequent testimony.

Q. So on page 6 of Exhibit 299, in the middle of the page, which is the fourth paragraph, and you refer to National Milk used the expertise of numerous individuals responsible for marketing milk in National Milk Producers' member cooperatives, as well as others that have longstanding expertise in the national Class I price surface.

Who were those others that have longstanding

expertise in the national Class I price surface who are not members of National Milk?

A. I did not imply that those were members outside of National Milk.

Q. Okay.

A. Those were particularly people who were -- who had knowledge of things like transportation, trucking costs, as opposed to people who necessarily were involved in the daily movement of milk. The people who were responsible for moving milk on a daily basis are the people we relied on to really have that -- that -- that boots-on-the-ground type knowledge of these sorts of things.

Q. Now, were trucking costs considered in the model?

A. The costs of transportation were included in the model, and I assume that that included however you define trucking costs.

Q. So I think I'm trying to ask -- and, again, maybe imprecisely -- with respect to the modifications, the art that National Milk employed after the model numbers came out, were there persons outside of National Milk who assisted you in providing analysis for those modifications?

A. I guess, how would you define outside of National Milk? I think the vast majority of those -- those changes were made by people who worked for National Milk cooperatives and were direct -- as directly involved in moving milk as -- as we thought was necessary for that purpose.

Q. So for instance, was Select Milk Producers consulted?
A. No.
Q. Was Edge Cooperative consulted?
A. No.
Q. What about the fluid milk proprietary customers, those who are members of IDFA, those who are members of the Milk Innovation Group, who are --
A. The only members of IDFA that I know we -- were involved were those who were also members of National Milk Producers Federation at the time.
Q. Was Organic Valley consulted?
A. Not to my knowledge.
Q. So do you know precisely who it was from National Milk who was in each back room where it happened?
A. I'm not aware there were any back rooms.
Q. Okay. These were closed-door meetings of National Milk members, correct?
A. Can you define closed-door?
Q. Well, we have just said that Select wasn't invited, correct?
A. Select was not a member of National Milk during most of that time.
Q. So what I'm getting at is, you know, you talked about employing the expertise of industry, while I think what you are telling me is the expertise in the industry was limited to National Milk members.
A. The expertise was based upon the task force that

we put together for National Milk, because we figured we had all the information, the objective information that we needed for this process.

Q. But, in fact, you know, you excluded two cooperatives, Organic Valley and Select, correct? Or three, actually, Edge. Edge, Organic Valley, and Select, correct?

A. We -- we invited anybody who wished to participate in the process, in the task force process who was a member of National Milk and was willing to supply the expertise -- time and expertise of their members -- of their staff that had the knowledge we needed.

Q. Was an invitation issued to anybody who was not a member of National Milk?

A. Not that I'm aware of.

Q. Wouldn't it be fair to say that entities like Select Milk Producers, Edge, Organic Valley, and members of IDFA who are proprietary operations would also have local knowledge of the markets?

A. Well, let's say if we wanted to have an open seminar or workshop and invited everybody in the country that might have been able to contribute, we would have had a much bigger process.

We felt that we had all the expertise we needed. We were not trying to exclude anybody. We were trying to get a job done, and we felt that we had the resources to do that.

Q. Wouldn't you agree that there's at least an

appearance of unfairness when some members of the industry get to give input to change the model results and others don't?

(Court Reporter clarification.)

BY MR. ENGLISH:

Q. Wouldn't you agree that there's at least an appearance of unfairness when some members of the industry get to give input to change the model results and others don't?

A. I don't think there's any -- any reason why that -- why that sense would be -- would be significant, you know. If you are telling me that you have that sense, that's your privilege.

Q. Would National Milk Producers Federation accept a model that has been modified by Select to specifically reflect markets where it has plants and understands the conditions in the market?

A. If Select chose to forward a model of that sort, we would take a look at it and see if -- and take a position on it. But that's -- there's -- that is not a proposal at this hearing.

Q. We have to -- we appear to have -- and I said 20 earlier, and maybe that's because I was counting some other witnesses -- 17 National Milk witnesses discussing different regions on the departures from the model.

Are there others involved in the National Milk Producers Federation meetings only who made red-pencil adjustments who are not testifying?

A. There may be some. I don't have a full list of those folks. But we feel that there's a very generous number of our task force members who are involved in the process who are going to provide extensive testimony on what they did in their area, and they will all be available to be cross-examined.

Q. So what kind of horse trading went on in the back rooms given that some members operated Class I plants and others don't?

A. I'm not aware of any horse trading. There were -- no horses were involved, just colored pencils, electronic versions.

Q. So when you look at the model results, the model provided by University of Wisconsin, gave you a May number, which is spring, and an October number, which is fall, correct?

A. Correct.

Q. And then National Milk calculated an average, correct?

A. That's correct.

Q. When National Milk made its modifications, did it consistently use one, that is to say, all spring, all average, or all fall?

A. Could you define what you meant by all spring, all average, all fall?

Q. All right. So you will have an opportunity in a moment to look at the spreadsheets.

The University of Wisconsin provided you a column

of spring numbers, correct?
A. Correct.
Q. Which are generally, not exclusively, but generally lower than the fall, correct?
A. Correct.
Q. And then it provided a column of fall numbers, correct?
A. Correct. That's -- that's the way the model usually --
Q. Yes.
A. -- is run. A spring flush month and a fall -- fall --
Q. Whatever.
A. -- tighter supply period month.
Q. As I asked, and you agreed, that National Milk added a column that was average, correct?
A. Right.
Q. Okay.
A. Because we knew that the Class I differentials in paragraph 1000.52 were a single number. They are not -- they are not seasonably variable. So we knew that we had to work with a single number that combined the two, and the easiest way to do it was to take a simple average. And all of the art part of the process was based upon that -- the average numbers.
Q. Are you sure?
A. As far as I know. But you can, again, ask the -- ask the individual groups that -- that made the

modifications to the model results. But to the best of my knowledge, we always worked with the average because we knew we had to come up with a single number.

Q. So you are not aware whether, for some locations, spring value was selected?

A. Not to my knowledge.

Q. And similarly, you are not aware whether in some instances the fall number was selected?

A. No. I don't recall where the difference between the spring and fall numbers was considered of great significance or taken as a major factor that was used in adjusting the numbers.

Q. What ultimately is the purpose of the model if it is so significantly altered?

A. Define significantly.

Q. I'll move on.

So on the bottom of page 2 -- the good news is I have moved on to part 2. This is page 2 of Exhibit 299, at least I thought it was.

You reference in your testimony that some precepts were followed from the Southeast hearing in 2007, the decision in 2008, correct?

A. That experience was -- was available to members of the task force, yes.

Q. Are you aware that in that case -- I think there were three people in this room who were at that proceeding -- in that case, SMA, followed by USDA, applied an 80% of hauling cost concept?

A. I'm not aware of the details of the considerations in making that 2008 Southeast region differentials.

Q. To your knowledge, is there any 80% of hauling cost concept applied in the National Milk Producers Federation modifications?

A. I don't recall a fixed number because the transportation costs -- the primary impact of transportation costs in the National Milk recommendation in Proposal 19 came from the model, which is based upon the road network, the fuel costs, labor costs, and the like. It was basically from public sources. We did not dictate a particular transportation cost number to the University of Wisconsin personnel.

They -- we wanted their objective model results. The one thing we did ask was that they use fuel costs pertinent to the 2021 months and not the higher costs of the 2022 months that were available at that time.

Q. And candidly, that would make sense, because if you are using May and October 2021 data, you would want to have the data match up, correct?

A. Yes. We wanted it to be consistent. We did not dictate anything of what we wanted the model to show. We simply provide updated plant information, made the recommendation on using the cost from 2021, and most of the other data was already in the model.

Q. So on the bottom of page 4 of Exhibit 299, the last paragraph, you state, "The combination of increased miles milk must move to serve Class I markets and the

significant increases in the per milk cost of moving milk is threatening the reliability for milk suppliers for Class I use in many Federal Orders."

So first I note you say "many Federal Orders," which is not the same thing as all.

So in what Federal Orders is the increased cost of moving milk threatening the reliability of milk supplies in Class I?

A. You know, can you repeat the question again?

Q. Given the fact that you say "many" rather than "all" in this paragraph, which Federal Orders -- in which Federal Orders is the increased cost of moving milk threatening the reliability of milk supplies in Class I?

A. So in which orders it is threatening --

Q. Yes.

A. -- as opposed to --

Q. Yes.

A. Well, the Texas order is one that we have -- you know, that came to mind particularly, and there will be testimony on that.

The Texas market, population is growing. The main urban centers are in east and south Texas, and the milk supply in Texas, the local milk supply is moving from areas closer to those population centers, is moving out pretty -- pretty specifically to the Panhandle area in West Texas.

In areas closer to Dallas/Forth Worth, Houston, San Antonio, those more local milk supplies are declining.

And that's -- that was a kind of a -- a -- you know, a major example of areas where the milk supplies were moving to areas more distant from the consuming centers where the fluid milk plants were. Those hauling distances are increasing.

And there happens -- because the West Tex- -- the Texas Panhandle is an area of production growth, it is a fact of the current dairy industry that new plants are being built in areas where the milk supply is growing. Particularly, as the general patterns of consumption of dairy products are shifting from fluid to manufactured products such as cheese, butter, and ingredients for the growing export market and growing food manufacturing uses domestically.

So we have a situation where the milk supply is -- the availability of manufacturing plants near the areas of milk supply is growing, and the availability of milk supplies closer to the fluid milk consuming areas is declining. And, therefore, hauling distances from where the milk is produced to where it's needed for Class I use are increasing. And you will see that in many of the testimonies to follow.

Q. I'm going to come back there, but -- okay.

Many Federal Orders, so after Texas, which is the Southwest order, what other orders are the increased costs of moving milk threatening the reliability of milk supplies in Class I?

A. I would leave that to the individual testimony.

You will have all the information you need on that.

Q. Okay. So let me come back to Texas. And I'm going to try to avoid pulling Exhibit 39 again, but you have been here for much of the hearing when we have talked about performance standards, correct?

A. Yes.

Q. And I need -- even just yesterday, I pulled Exhibit 39, which is the changes in performance standards, correct?

A. Can you define the performance standards, then?

Q. This is the order provisions with respect to what percentage of the milk needs to be, you know, shipped or -- to Class I plants, diversion limits --

A. Yes.

Q. Okay. That's what I mean.

A. Yes. I don't have particular expertise in applying those because we don't -- I don't -- we don't move milk in National Milk, but I'm aware of those -- those provisions.

Q. But you know, one, that there's been no call for a hearing in Order 126, which is the Southwest Order, since some time in the mid-2000s to change those performance standards, correct?

A. Not that I'm aware of.

Q. And there's been no increase in the performance standards by the Market Administrator, correct?

A. Generally, the -- I'm not aware of increases in performance standards, but I -- I would not swear to that

under oath.

Q. Okay. So isn't it true that to the extent Class I handlers, who do not have an opportunity to depool, to the extent there is any quid pro quo for paying a Class I differential, that the point of that is to get milk to their plants, correct?

A. Can you repeat that question, please?

Q. You agree -- I'll break it up. You agree that Class I plants are the ones who are captive to the system and must always be in the pool, correct?

A. Pool distributing plants must pool their milk, yes.

Q. And whether explicit or implicit, the quid pro quo for that payment of a Class I price that is higher or at least generally higher than the other class is that they will have priority to get milk to the fluid plants, correct?

A. Could you define the parties to the quid pro quo that you are referring to?

Q. The order expressly provides, one, that Class I handlers will pay a Class I differential, the very thing that's at issue in Issue 5, correct?

A. Correct.

Q. Okay. The order also provides performance standards, that is to say if you want to be in the pool, for those people who don't have to pool, you have got to do certain things, correct?

A. That's correct.

Q. The point of those performance standards is to move milk to Class I plants, correct?

A. That's correct.

Q. Okay. I think we have heard a fair bit of testimony this hearing, maybe not by you, that a purpose of higher Class I plants is to cause or otherwise -- I think one person used the phrase "force" -- other classes of milk to pool.

Isn't it the case that since that pooling is voluntary, when you say that the increased cost of moving milk is threatening the reliability of milk supplies of Class I in Texas, what you really mean is that the Class I differential that is already being charged is so diluted that the people actually incurring the cost of delivery don't have an incentive to do so?

A. I don't know all the mathematics of that, but -- but the -- our members are telling us that the return they are getting from supplying Class I milk, which is expensive, is not returning enough revenue given all of the costs that they are incurring to do it.

There's a parallel that I have pointed out, and you will hear it in other testimonies, that just as IDFA has provided testimony that the cost of manufacturing dairy products has increased and is not being covered by the current Make Allowances, a point in which our members generally agree, similarly, the cost of supplying Class I milk to fluid plants has increased, and that -- and the fundamental mechanism for ensuring that fluid plants get

adequate supplies of Class I milk are the Class I differentials. That's the basic foundation of the Federal Order program. Those current differentials are no longer adequate to the task, and we're proposing that they be adjusted for -- to conform with current realities.

Q. What I'm sort of specifically getting at here, is my understanding was when you say, on the bottom of page 4, that the combination of increased miles milk must move to serve Class I markets, and the significant increases in the per milk cost of moving milk is threatening the reliability for milk suppliers for Class I use, that you are making that statement as a justification for modifications of the University of Wisconsin model results.

Am I correct?

A. We believe the University of Wisconsin model results reflect that the reality of supplying milk, the cost of supplying milk to -- for Class I plants throughout the United States, and we use that as a basis to come up with our recommendations in Proposal 19.

Q. But as you have stated -- and I'll have the pleasure or opportunity, and so will Mr. Sims, to discuss at some length Texas -- you have gone through -- you, National Milk members, have gone through some significant effort to justify modifications to Texas from the University of Wisconsin model results, correct?

A. Correct. In general, the modifications that National Milk made based on the institutional knowledge of

their -- you know, our members' staffs that have expertise in their local markets were relatively modest compared to the -- to the results of the University of Wisconsin model, which is a greatly expanded and improved version of the model that was used by USDA to establish the current Class I differentials.

We didn't come with -- we didn't invent this process of using the University of Wisconsin -- previously Cornell University -- models as the basis and then making some fine-tuning adjustments from that. That was -- that was the procedure that the Department initiated in Federal Order reform to come up with the current differential structure which was considerably different than the previous one, which kind of zoned everything out of Eau Claire, Wisconsin.

Q. Well, let's not talk about Eau Claire.

So I think I'll probably move on, but I confess, I'm very confused about what's going on in Texas. And for those who know me, when I entered this wonderful business in 1985, it's because of Texas.

So I -- I -- what I'm trying to get at is if, as you say, there's all this new cheese production coming on in the Southwest because of the value of milk used in cheese versus fluid milk, why when we have declining milk supplies -- I'm sorry -- declining fluid milk consumption, if that is the case, why are we further increasing Class I prices?

A. We are proposing an increase in Class I prices to

account for the increased costs of supplying milk to Class I fluid plants for all the reasons of I have outlined, and you will hear in great detail by further witnesses.

The fundamental purposes of the Class I differentials is to provide -- facilitate the provision of an adequate supply of fluid milk for -- for Class I manufacturing. And, therefore, we are basically just updating the standard procedures for evaluating and, you know, the proper level of the Class I differentials, which have not changed, mostly, in almost a quarter of a century, while the costs that -- that -- and the structural changes in the dairy industry that are pertinent, directly pertinent to the proper level of the Class I differentials, have not changed.

We're simply proposing an update to the -- to the current Class I differential structure based upon the provisions of the -- of the Federal Order and its principles.

We are -- we are not aware that the 1937 Act indicates that the Federal Order program is responsible for making changes in the consumption of Americans -- of the American population of fluid milk.

Q. But shouldn't it be relevant -- you said in the quarter century since they've been modified, those costs have gone up. The same time in that quarter century, Class I utilization in Federal Orders, which now includes California, is down to 28%, and if you exclude Federal

Orders, it's 18%, correct?

A. Yes.

Q. So leaving aside all the testimony we have had about the Southeast, don't we really have a plentiful supply of milk, it's just that the incentives we have aren't getting to where it's needed?

A. Define plentiful supply of milk.

Q. I'd say 82% of milk being used in other than Class I is plentiful.

You don't agree?

A. No, I don't agree with that. Because manufacturing those -- transforming milk into those other dairy products in fluid is just as important to the -- you know, to the dairy industry as trans- -- as transforming that milk into fluid products.

Q. So both in your testimony on page 6, second paragraph, and in response to some of my questions, you have referred to alignment as one of the criteria for the National Milk modifications, correct?

A. Say that word again?

Q. Alignment.

A. Alignment?

Q. Correct.

A. Yes.

Q. Are you quite certain the National Milk has honored alignment in its private meetings?

A. Yes, to my knowledge. Our members who are actually responsible for supplying milk for Class I use

are acutely aware of the disruptions that can be caused by Class I differentials in, you know, nearby counties being out of alignment --

Q. Are you --

A. -- and they have sought to correct some of those.

Q. Are you aware of examples where National Milk Producers Federation's intent to ensure historical price alignment were made even if the model concluded that the -- that the values were significantly different?

A. I'm not aware that we made major changes in the alignment from the model results to the final Proposal 19 results. I mentioned an example in Dallas/Fort Worth where the model showed, as you would expect, you know, where there's, what, a 30-some-mile difference between those, that there would be, you know, a small difference in the model results. For -- for -- you know, for other reasons we decided to -- to make them the same. We did not consider that to be a major deviation.

I'm not aware of anything where we -- where the model said the two nearby areas should be, you know, the same or, you know, roughly similar, and we ended up making them vastly different. We respected the general alignment scenario that the model gave us in almost all cases.

Q. For the red -- I think you used the word electronic pens, or computers, alterations, was there a limit on the modification size? That is to say, could it be more than $0.10?

A. We looked at trying to keep the modifications from

the model as minimal as possible, but we did not, to my knowledge, say this is the maximum. We had a general sense of that and -- and again, the results show that those changes from the model results were relatively modest, particularly as a percentage of the Class I price, but I'm not aware that there was a binding limit, you know, you cannot -- you cannot come up with a change that was more than X dollars per hundredweight, or cents per hundredweight.

Q. So in answer to questions from your counsel, you indicated that the pages 12 through 82 of Exhibit 299, marked originally as Exhibit National Milk Producers Federation 35, contains the proposed county-by-county Class I differentials with the two corrections you made today, correct?

A. Correct.

Q. Where in National Milk Producers Federation's pre-submitted testimony can I find the county-by-county Class I differentials that resulted from any -- one or more -- of the University of Wisconsin model runs?

A. We submitted in our -- in everything we submitted to USDA in our petition, in our testimony, we basically used the structure of the Federal Order regulations in paragraph 1000.52 as a model, which -- which did not -- which basically stated these are our recommendations for the differential. It was not a didactic exercise that we supplied that information where we wanted to show everything we did. We're not trying to hide anything, but

we did not feel in our formal request to the Department and our testimony that it was necessary to provide all that information.

Q. So let me just be clear. The one set of numbers that I believe -- and I could be wrong -- that are pre-submitted or at this point you have submitted as Exhibit 299 for the proposed class and differentials and any justification for them in terms of the -- as opposed to what testimony I'm going to get -- is found on pages 12 to 82 as corrected of this exhibit, correct?

A. That is our Proposal 19. You will hear plenty of testimony from -- from task force members in their own areas of the specific changes they made to the model results and how they modified them based upon their additional information.

Q. Now, to be clear, as you referenced a minute ago, the petition that you made to USDA and information supplied to USDA, absent somebody putting that into this record, whatever you filed with your actual petition and the backup materials that might have been submitted, are not part of the record unless somebody makes them part of the record, correct?

A. The only thing I'm aware of as part of the record is the differentials that we proposed in Proposal 19.

Q. Which are found in Exhibit 299, correct?

A. Correct.

Q. But, in fact, National Milk Producers Federation submitted to USDA significant spreadsheets with respect to

the model runs and National Milk's -- back in May and June, correct?

A. Yes. I believe that we provided our -- you know, the model information to the Department as pertinent information to support our proposal.

Q. Okay. But at least as of this moment, they are not in the record, correct?

A. I have not seen them in the record.

Q. Is National Milk planning to put them in the record?

A. I can't answer that because I don't know the answer to that question.

Q. All right.

MR. ENGLISH: Your Honor, it may make sense to go off the record as I pass out -- we pre-filed MIG-29 and MIG-30, I have lost track, Monday night, so it's been available since, you know, USDA posted it at least Tuesday morning. And, of course, what I will pass out has been on the USDA hearing website, if not an exhibit, since this summer, so it's not a surprise to anybody I believe. But if I may hand them out.

So pursuant to the rules, my understanding is that we must provide four printed copies as a courtesy. Notwithstanding the expense, we have 25 with us. We can't share, you know, one for every single person, but we wanted to make available obviously to Your Honor, the witness, myself, and a few others. But we have the four, I believe in color, and to save a few pennies, the others

are black and white. So if we can go off the record to distribute these.

THE COURT: All right. Let's do. I need to stretch some, too, so let's take ten minutes. So please be back and ready to go at 10:40.

We go off record at 10:27.

(Whereupon, a break was taken.)

THE COURT: Let's go back on record.

We're back on record at 10:41 a.m.

MR. ENGLISH: So, Your Honor, we have passed things out. I think USDA is still maybe marking. I don't believe you have a copy at the moment. I don't believe the witness has a copy.

THE COURT: So mine comes from Emily. And are they already marked? Okay.

MR. ENGLISH: Okay. So I earlier said MIG-29 and 30. I should have said MIG-28 and 29.

So I would ask that MIG-28 be marked as 300. I believe National Milk is disappointed but -- you know, they are not 300 on this but -- and that MIG-29 be 301.

Is USDA going to supply a copy to the witness or do we need to provide that?

MS. TAYLOR: We can give a copy.

THE COURT: Okay. We remain on record. I just want to state how we mark these. It is, as Mr. English requested, Exhibit MIG-28 is Exhibit 300.

(Exhibit Number 300 was marked for identification.)

THE COURT: Exhibit MIG-29 is 301.

(Exhibit Number 301 was marked for identification.)

THE COURT: I am one of the blessed people who has colored copies, but there's not much colored, actually, is there, Mr. English? The person that has black and white is not disadvantaged.

MR. ENGLISH: Well, since I don't have one in black and white, I can't say. Even with my eyesight, I believe they are not disadvantaged.

And by the way, I want to note that as we passed them out, we passed them out in one binder clip so that -- that those people in the audience should note that MIG-28 is the first 54 pages of what was passed out with one binder clip, and then MIG-29, which is now Exhibit 301, is the 54 pages that follow. So if you are confused because you have only one big document, it's because we -- in order to produce them and pass them out, we did it that way, but they are two separate documents.

THE COURT: And just for the record, Mr. English, what size paper is this that they are printed on?

MR. ENGLISH: I believe it is 11x17.

THE COURT: Thank you.

MR. ENGLISH: And the people who actually know say I'm right.

THE COURT: Very good.

MR. ENGLISH: So as I said before we went off the record, Your Honor, electronic versions were submitted to

USDA Monday night, but also I would note that these were submitted by National Milk to USDA.

It's my understanding that Exhibit 300 was submitted in May of this year, and that Exhibit 301 was submitted in June of this year. But I can -- I can ask the witness some questions.

Further, Your Honor, I represent that these documents that were submitted, were downloaded from the USDA website, and the only change is the header and footer where we added MIG Exhibit Number 28 or 29, and pages 1 of 54 as requested by USDA for submissions.

I also note that each document at the bottom has the URL where they can be found -- very small print, but it's there -- and I'm not going to attempt to read that, as they are on both the paper copies and the electronic version.

THE COURT: Thank you, Mr. English. And you may continue to question.

BY MR. ENGLISH:

Q. So, Doctor, do you recognize Exhibit 300?

A. Yes.

Q. And this was submitted to USDA by National Milk in May of 2023?

A. Yes, I believe so.

Q. And similarly, do you recognize Exhibit 301?

A. Yes.

Q. And was that submitted to USDA in June?

A. I will take your word for it, those dates of

submission. We did -- we did supply this information to USDA. And to my understanding, that the -- Dr. Nicholson is intending to also enter these similar information into the record.

Q. Well, actually, that anticipates my next question, because it is -- would you agree with me that -- so let me say for the record that there are column letters A through S on Exhibit 300, and column letters -- well, it goes through S, but there's no numbers past O, so A through O on 301.

And so when you say that Dr. Nicholson will supply something, in fact, he can supply only a part of this, correct? Because --

A. I'm not sure what he's planning to supply, but in terms of the basic information, we -- we have not intended to keep this private. This is -- we have made this information available.

Q. Sir, I did not mean in any way, shape, or form to imply that's what it was. I, frankly, was concerned -- lest somebody think it was part of the record, I have had an off-the-record conversation with one of our colleagues here who was, like, oh, I didn't realize this wasn't in the record. So it certainly is not implied. Obviously we have had access to it, so I don't disagree that it's been public.

A. Yep.

Q. Absolutely. But -- but let me -- let me see if I can be clear. And so let me run across the columns with

what has been called for me, my magic decoder pen.

So I want to start and discuss Columns A through E, and then Columns F and G.

Column A is simply a model county identification number, correct?

A. Yes. Sequential numbers 1 through presumably 3100-something.

Q. And Column B is the county -- county name, correct?

A. County, city, or parish.

Q. County, city, or parish, thank you for the clarification.

And Column C is the state name, correct?

A. Correct. I'm working from the first page.

Q. The state abbreviation, correct?

A. Correct.

Q. And then the Column D is actually the full state name, correct?

A. Correct.

Q. Then we have column E which is called the FIPS code.

Do you -- we may have to ask Dr. Stephenson, but do you know what the FIPS code is?

A. It seems to be a code that identifies individual counties.

THE COURT: And just for the record, would you say the letters that comprise "FIPS"?

MR. ENGLISH: F-I-P-S.

BY MR. ENGLISH:

Q. Okay. And those all came from the University of Wisconsin model, correct?

A. Correct.

Q. They were delivered to National Milk as a --

A. They correspond to what's currently listed in terms of identifying county, cities, and parishes in paragraph 1000.52.

Q. And then Column F is the model result for the spring, or May of 2021, correct?

A. Yes.

Q. And this is the result of the third iteration, correct?

A. I believe so.

Q. And so Column F came from the University of Wisconsin, correct?

A. Correct. But you will need to direct that question also to Dr. Nicholson to confirm.

Q. And I -- I have a cross-examination for him. So, yes. Thank you, though.

But -- but you -- your understanding is that Column F came from the University of Wisconsin model?

A. This is the way we received the model results. I cannot confirm every single number in there. But I -- I assume that this is -- if it came from the website, I assume this is the correct final model results.

Q. Okay. And then we have Column G, which is the equivalent of Column F, but this time, however, it's the

fall or October 2021 University of Wisconsin model result, correct?

A. Correct. Correct.

Q. Okay. Am I correct that once we get past Column G, everything else on columns -- Exhibits 300 and 301 were derived not from the University of Wisconsin directly, but from National Milk?

A. It appears to be so. You are taking differences between the May and October results, you are taking differences between the May results and current, and same thing with October.

Q. So to be clear, if we just put, you know, something over the document, you know, everything left of the line between G and H came from the University of Wisconsin, correct?

A. Specifically E -- excuse me -- F, G really were the main things that came from the model.

Q. Okay.

A. Everything else, you know, the model results included a lot of these calculations, but the guts of what came from the model are Columns F and G.

Q. Okay. And I guess what you are saying is Columns A through E are basically effectively lining up with the Federal Order language?

A. Labels.

Q. Labels, okay.

A. Yes.

Q. And then -- but everything to the right, so to

speak, so Columns -- on 300, Columns H, I, J, K, L, M, O, P, Q, R, S, were added by National Milk, correct?

A. I assume so, because they are -- just knowing how spreadsheets work, these look like they are fairly simple calculations from Columns E, F, and the current differentials, and basically what's currently in paragraph 1000.52.

Q. And so maybe this would be the better way to ask the question.

Dr. Nicholson did not provide the information in those calculations done in Columns H through S, correct?

A. I don't recall exactly what -- what -- what was -- there were some calculations that the -- Dr. Nicholson's provided, just as output. But these were -- in all cases, those are simple comparisons, very simple calculations. And anybody -- whoever made them, they were pretty straightforward calculations.

Q. So while you and I may believe they are straightforward calculations, for purposes of the record, let's see if we can quickly go through.

So Column H is labeled October to May differences. So what is that, exactly?

A. That is a difference between the numbers on each line and from -- between Columns G and Column F.

Q. And Column I labeled current differential at -- is basically if you go to part 1000.50 adjusted for the Southeast in 51, that's the current differential, correct?

A. Yes. Adjusted for the Southeast, yes.

Q. And then Column J says May-current.

What is May-current in Column J?

A. That's the difference between the number in Column A on each line and the number in Column I.

Q. I'm sorry, did I hear you say A or did you mean --

A. Excuse me, F. Column F and Column I.

Q. And then -- so K would be the difference between Column G and Column I?

A. That's correct.

Q. Okay. And then Column L, what is Column L?

A. Column L should be the average of the numbers in Column F and Column G.

Q. And then so Column M is the difference between Column L and Column J?

A. Column -- Column I.

Q. I. Thank you.

THE COURT: State again in one sentence what it's the difference of?

MR. ENGLISH: Thank you.

BY MR. ENGLISH:

Q. Column M is the difference between Column L and Column I, correct?

A. That's correct.

Q. And Column N is certainly the Federal Order number where the county is located, correct?

A. Yes. If the county is located in the marketing area of the Federal Order, that Federal Order number is given in Column N.

Q. Okay. And then Column O is proposed Class I, correct?

A. Yes. That is the -- that is the proposed number that was in Proposal Number 19.

Q. So I'm a little confused. Column O is labeled Proposed Class I, and Column S is New Proposal.

How are Column O and Column S different, if you know?

A. Can you repeat that?

Q. So I'm looking at Column O, which is labeled Proposed Class I, and then I look over at Column S, where the label is New Proposal. And I don't know if they are duplicative or not.

Can you explain why there are two columns and whether or not they are the same or different, if you know?

A. No, I don't know. They appear to be the same.

Q. Then Column P is proposed versus current, which would be, I believe, Column O minus Column I, correct?

A. That's correct.

Q. And then Column Q is proposed versus -- so it says proposed versus model average, which I take it would be Q minus L; is that correct?

A. Yes.

Q. And then there's a column labeled R, average monthly pounds, 2022, in millions.

Can you please explain that?

A. I would assume that that is the average monthly

pounds that the -- that the model had assigned to each of those individual counties, cities, and parish. But that's a question, again, for Dr. Nicholson.

Q. Well, are you sure it's for Dr. Nicholson? Because I don't know if he provided that data or you did.

A. I don't recall that we went through and -- and interpolated the more aggregated numbers that were available for the pounds of milk. I assume that refers to pounds of milk.

Q. Okay.

A. I'm not aware that National Milk did a disaggregation to the county, city, parish level for all 3100-plus counties.

Q. Okay.

A. My sense is this calculation was made by somebody else, but that can be clarified -- that can be clarified if you ask it to enough of our witnesses.

Q. Thank you.

THE COURT: Mr. English, I want you to go back to Column Q and again ask the witness how that is calculated.

MR. ENGLISH: I believe, but the witness can correct me, that Column Q is Column P minus Column L.

THE WITNESS: Minus Column?

BY MR. ENGLISH:

Q. L.

A. Yes.

Q. Am I right?

A. That's correct.

Q. Okay. I'm sorry, it's Column O. I apologize, it's Column O --

A. Column O minus Column L.

MR. ENGLISH: I'm not sure how many times I'm going to get that wrong, Your Honor, so let me try it again. And I thank my extremely helpful colleague.

BY MR. ENGLISH:

Q. So Column Q is Column O, labeled Proposed Class I, minus Column L, which is labeled UofW v3 -- for I think iteration 3 -- average.

Would that be correct?

A. That's correct. So, for example, that very first line of Autauga County, Alabama, that indicates that the changes made to the final model results resulted in a lowering of the differential in Autauga County, Alabama by $0.20.

MR. ENGLISH: May I consult with my colleague for one moment, Your Honor?

THE COURT: Certainly, yes.

Let's go off record. It's 11:00 a.m.

(An off-the-record discussion took place.)

THE COURT: And let's go back on the record. It's still 11:00 a.m.

THE WITNESS: Time is standing still.

BY MR. ENGLISH:

Q. So as it happens, I needed a tiny bit of help from my consultant, and I probably should have known myself, given the fact that I am from the Commonwealth of

Virginia.

(Court Reporter clarification.)

BY MR. ENGLISH:

Q. So I think, again, for the benefit of the record, when we turn -- because Your Honor noted color, but I think there's some modifications.

Pages 49, 50, and 51, do have some additional color, not blue, but yellow or orange. And I believe you're closely enough connected to the Washington, D.C., Metropolitan Area that you can probably understand where I'm going with this.

A. I don't have a color copy.

THE COURT: The witness should have a color copy.

MR. ENGLISH: Can I hand it to him for a moment, Your Honor?

THE COURT: No, I'm going to exchange. I'm going to take what he's got.

THE WITNESS: If you are going to ask me a question about colors, I need to see what the colors are.

MR. ENGLISH: I apologize.

THE COURT: And I don't -- I can follow along without them, and I have not marked them in any way. Thank you so much.

THE WITNESS: Thank you.

BY MR. ENGLISH:

Q. So if we look -- let's just start with 49, and I'll try to keep this really short.

THE COURT: But don't go fast.

MR. ENGLISH: Point taken, Your Honor.

BY MR. ENGLISH:

Q. So Virginia is a jurisdiction where there are cities that -- and counties, and sometimes cities are inside counties, correct, Doctor?

A. Virginia has cities and counties. I'm not sure that the cities are incorporated in the counties or whether they are separate.

Q. Okay.

A. Like, I live next door to City Falls Church and Fairfax County, but I do believe that those are separate.

Q. They can be separate. But you can live in Falls Church for Postal Service purposes, and yet be in Fairfax County, correct?

A. I'm not aware of exactly what's the territory of Fairfax County and whether it incorporates it.

MR. ENGLISH: Your Honor, maybe I'll just shorten it. I don't think there's any controversy here.

THE WITNESS: If you know the facts, I will accept your word.

BY MR. ENGLISH:

Q. I want to make a representation for the record.

Having, you know, gone to the University of Virginia, which is in Charlottesville, Virginia, and Charlottesville, Virginia is inside Albemarle County, and, in fact, the Albemarle County courthouse is across the street from the Charlottesville courthouse.

A. I will take your word for it to speed things

along.

Q. And similarly, as I look through what are marked as yellow and orange, every single one of these is an instance where there's a -- there's a city that is located in or connected to a county. And I also grew up in Falls Church, but I grew up in the part of Falls Church that is part of Fairfax County.

And so I think to simplify the conversation, it would just say that when we see these yellow and oranges, they are not significant in any material way because they just describe a peculiarity of the Commonwealth of Virginia.

MR. HILL: Mr. English? For those following electronically, could you tell us what line you are on rather than the page number --

MR. ENGLISH: Okay.

MR. HILL: -- to the left.

MR. ENGLISH: Okay. So I'll go through the line numbers: 2790 is Alexandria City; 2801 is Bristol City; 2805 is Buena Vista City; 2811 is Charlottesville; 2812 is Chesapeake City; 2815 is Colonial Heights; 2816 is Covington; 2820 is Danville City; 2823 is Emporia.

THE COURT: Now, let me stop you. Even with my black and white copy, I can see the highlighting of everything that you are reading, so I don't think you need to read them all, but --

MR. ENGLISH: I'm fine stopping, if that's okay.

MR. HILL: It's just that online it doesn't have

the page numbers. I just needed to know where you were.

MR. ENGLISH: Okay. So it's Virginia, starting at 2789, which is Albemarle, and it runs through the end of Virginia, which is line number 2920, York.

MR. HILL: Thank you very much.

MR. ENGLISH: Okay. Thank you, sir. I'm happy not to read them all in.

THE COURT: And is the Commonwealth of Virginia the only batch of lines that has this polarity?

MR. ENGLISH: Looking through it very quickly, Your Honor, yes.

THE COURT: Makes you proud, doesn't it?

MR. ENGLISH: Wahoo-wa.

BY MR. ENGLISH:

Q. All right. Okay. So I am really not going to spend a lot more time on all this, but I am going to try to clarify.

So let's start with -- let's turn to Exhibit 301.

A. Do you want me to keep the pages that you just referred to on number 300 or are we done with those?

Q. We can give those back to the judge and switch if you want.

THE COURT: No, no, no, I want the witness to keep that. Thank you.

MR. ENGLISH: I just remembered the answer. All right.

BY MR. ENGLISH:

Q. So we turn to 301, first it's labeled at the top,

June 2023, at the very top in the header.

Are you in 301?

A. Yes, I am.

Q. Okay. And so would this refresh your recollection that if it's labeled June 2023, it was probably submitted in June 2023?

A. I see it listed as such, yes.

Q. I should have started there. So this -- this is different in one, at least to me, obvious respect, which is that through Columns A through Column N appears to be identical to Columns A through Columns N on Exhibit 300.

Do you agree?

A. It would appear such.

Q. Okay. And then it appears that this omits Exhibit 300, Columns O, P, Q, R, and substitutes with a caveat Column S for Column O. And I'll come back to the caveat in a second.

Is that -- is that correct that -- that maybe there's some differences between S and O in between 300 and 301, but in essence, you have fewer columns and you have omitted O, P, Q, R from Exhibit 300?

A. Columns O, P, Q, and R are basically -- Column O is significant because that's the final results on Exhibit 30, the rest are just calculations. But I cannot testify exactly what -- in Exhibit 300 is -- Column S is labeled as New Proposal and Column O is listed as Proposal.

Q. Okay. And do you know -- if you don't, that's

fine -- whether there's any differences between the numbers that appear in Column S and the numbers that appear in -- Column S, Exhibit 300, and Exhibit 301, Column O?

A. I do not know the answer to that question, because I have not had time to go through and compare them line by line.

THE COURT: And, Dr. Vitaliano, you mentioned Exhibit 30, and you were looking at 300 at the time.

THE WITNESS: 300 and 301.

THE COURT: Thank you.

MR. ENGLISH: Your Honor, I only have a few more questions, but for housekeeping, I move the admission of Exhibits 300 and 301 having laid, I think, a sufficient foundation.

THE COURT: Is there any objection to the admission into evidence of Exhibit 300?

There is none. Exhibit 300 is admitted into evidence.

(Exhibit Number 300 was received into evidence.)

THE COURT: Is there any objection to the admission into evidence of Exhibit 301? 301?

There is none. Exhibit 301 is admitted into evidence.

(Exhibit Number 301 was received into evidence.)

///

BY MR. ENGLISH:

Q. So keeping the two exhibits handy -- and I want to go to --

THE COURT: Be closer to the mic.

MR. ENGLISH: Thank you. It's a little hard, the size of the documents, but thank you.

I want to go to FIPS, F-I-P-S, Column E, code 27053, which is on page 23 for those in the hearing room.

THE COURT: The line number?

MR. ENGLISH: I'm getting there.

THE COURT: Oh, okay.

MR. ENGLISH: I'm sorry, I had it and then I lost it.

27053 is -- so it's line number 1307 ironically under ID, because there's one number off, it's 1307, which is Hennepin County, Minnesota, otherwise known as Minneapolis.

THE WITNESS: I see that as 1308.

BY MR. ENGLISH:

Q. I understand it's 1308 on the line number. So let's just omit Column A for this, because the way the line numbers work --

A. Okay. And they are sequential.

Q. They are off by precisely one between the ID and the line number.

So let's use line number 1308. And the Column E is FIPS Code 27053, and it's Hennepin County, Minnesota.

And I note, you would agree, that the model spring

is 2.60 in Column F, correct?
A. Correct.
Q. And for Row 1308, Column G, the October number in Column G is 2.70, correct?
A. Correct.
Q. And --
THE COURT: Now, do you want the transcript to show $2.60?
MR. ENGLISH: Yes, $2.60 and $2.70. All of these numbers are in dollars. I will try to remember to say that.
THE COURT: Thank you.
BY MR. ENGLISH:
Q. And if we go over to Column L, which is labeled University of Wisconsin version 3, average, the average is 2.65, correct?
A. Correct.
Q. And if we go all the way over to the right in Column S, the proposal, under 2 -- new proposal, it's 2.80, correct?
A. Correct.
Q. Now let's go to Exhibit 3. So let's remember that's 2.80 from Exhibit 300.
So let's please go to Exhibit 301, the June submission, same FIPS code. So I will repeat, 27053, page 23 for those who have a copy here, line 1308, Hennepin County. And I would ask you to go all the way over to the right in Column O, and you see $3, correct?

A. That's correct.

Q. So what changed, in National Milk's view, from the May submission to the June petition where Proposal 19 went to $3, which is $0.20 higher than was submitted in May?

A. Well, to get the definitive answers, again, you need to direct that question to the witness who will testify in that area. But it was an iterative process. Anybody who's done this kind of analysis knows that you don't often get the perfect number the first time. You need to double-check, you need to look at a number of things, and, you know, those things will change. At some point you have to say this is final and -- and submit, in this case, your final numbers in the form of a proposal. And so that number changed by $0.20, given these documents, and you'd have to ask the person who was more directly involved what caused that change.

But as an analyst, there's nothing very surprising about this process to me.

Q. Now, if we stay on Exhibit 301 in the same FIPS code, for Hennepin County, you have a proposal for $3, and a Column I, current differential, and $1.70.

So you would agree that you are proposing, in Proposal 19, to increase the Class I differential in Minneapolis by $1.30, correct?

A. Okay. Which exhibit are you in?

Q. I'm still in Exhibit 301.

A. What's the MIG number?

Q. 29.

A. Okay. Are you still on Hennepin County?
Q. I'm still on Hennepin County. In Column I is the current differential is $1.30; in Column O is $3.
And you would agree with me that that difference is $1.30 higher, correct?
A. I see Hennepin County, Column I is $1.70.
Q. Right. And Column O is $3, correct?
A. Correct.
Q. And maybe the easiest thing we're going to do today is you subtract $1.70 from $3 and you get to $1.30, correct?
A. That's correct.
Q. And that's an increase, correct?
A. That's an increase in the number in the column labeled Proposed from the current differential.
Q. Okay. Going back to our conversation before either break, given the Class I utilization in the Upper Midwest, which I think is around 5 to 8%, what is the justification for increasing the Class I differential in Minneapolis by $1.30?
A. The justification is basically the purpose of price alignment. We had to look -- each county, particularly counties with a -- with a city, or you know, milk plants in them, had to be aligned with those from other areas, and that was one of the overriding considerations in coming up with our proposed differentials.
Again, in terms of the specifics, you need to

direct that question to the person who will be testifying specifically in that region that includes Hennepin County, Minnesota.

Q. And I am reminded that maybe I have been imprecise in my questions, so let me backtrack for one moment.

Is it your understanding, if we look at MIG-29, which is what you have, which has been marked as Exhibit 301, that except for the two changes you told us about earlier today, what is found in Column O is -- in your understanding, is what is NMPF-19?

A. NMPF Proposal 19?

Q. Yes.

A. I'd have to double check that to give you an affirmative answer, but I have no reason to question why that is not the case. I don't have -- I don't have the numbers in Proposal 19 as I submitted them in front of me.

Q. Okay. So I want to turn next, I want you to remember what we did in Minneapolis with the $1.30 increase, which, by the way -- let me go back. Let me strike that.

So I want to go to FIPS code 12086, which is Miami-Dade, Florida.

THE COURT: Which is what?

MR. ENGLISH: Miami-Dade, Florida.

MR. HILL: Line number?

MR. ENGLISH: I'm getting there. 12086 for those in the room. It's on page 6, and 12086 is line number 335.

MR. HILL: Thank you.

BY MR. ENGLISH:

Q. I'm looking on Column F, FIPS code. And I'm only looking at Exhibit 301, which is Exhibit MIG-29.

And I want to walk you through -- so under Column F, from the University of Wisconsin, for May we have $7.40?

A. Yes.

Q. And for Column G, we have $8.40?

A. Correct.

Q. And then the average under Column L, University of Wisconsin average, is $7.90, correct?

A. Correct.

Q. And Column O is also $7.90, correct?

A. Correct.

Q. And so for all of this conversation in this hearing about the need for more milk in the Southeast, if you look at Column M, you are increasing the Class I differential in Miami by $1.90, correct?

A. That's correct.

Q. As compared to raising Minneapolis by $1.30, correct?

A. Correct.

Q. Why is it that for the greatest, as you said in your testimony, the milk that needs the milk to -- the county that needs the milk to move the farthest from the farthest reserve supply, you used the average in Column O, but for Minneapolis you use a number higher than either

Column F or Column G or the average for Minneapolis?

A. We felt that the model results for Miami-Dade were adequate for the purpose of price alignment, all of the purposes we looked at for which we commissioned the model and made adjustments to it. We chose not to make adjustments to the model results for Miami-Dade. We chose to do those for Hennepin County, Minnesota.

Q. Wouldn't it, if we need to move milk to Florida, make more sense to increase that spread as opposed to decrease that spread?

A. That question would spring from a much, much simpler understanding of the whole process. And, again, I then -- then we used -- and I would recommend you direct that question to Dr. Nicholson first and -- to speak for the model, and to the person who is -- to the people who are going to testify on those two different regions for the modifications that National Milk made to the model results. They will give you much better answers to those questions.

Q. But we already said that Dr. Nicholson didn't calculate the average or any of these columns included in the proposal, correct?

A. What average are you referring to?

Q. Column L, University of Wisconsin didn't provide you Column L, did it?

A. Probably not. But they provided the two numbers that we decided to use as the starting point in the process of making further adjustments to the model

results. We did not necessarily use the average in all cases, but we calculated the average as a starting point. For the primary purpose that our eventual proposal had to have one number, the Class I differentials listed in the Federal Order regulations have a single number, they do not permit us to use seasonal numbers. And we saw no reason to recommend further disaggregating paragraph 1000.52 into regional -- or excuse me -- seasonal -- seasonal parts.

Q. I want you to turn to FIPS, F-I-P-S, 80 -- I'm sorry, whoa, 08031, which is Denver, Colorado, and I will give page and line as soon as I have it.

The very bottom on page 4, line number 233.

A. Are we still just on Exhibit 301?

Q. Yeah, we'll stick -- unless I say otherwise -- and thank you very much. Yes. I -- let's -- I -- I think that -- I only have a very few more of these, but I think from now on we're not going to look at the fact that there was a change, we're just going to look at 301.

So if we look at 301, and line 233, Denver, you would agree that Columns F and G are identical at $2.50, correct?

A. Correct.

Q. And if you look at Column I, the current differential is $2.55. And so if you look at Column J -- I'm sorry -- well, yeah, Column J or Column K, the -- it actually is down $0.05, correct?

A. Correct.

Q. And the average in Column M is down $0.05 on the average, correct?

A. That's correct.

Q. So how did we get from a model number that went down to 2.50 to an $0.80 increase to $3.30 in Column L?

A. As I explained, the model results were very accurate in many cases, very, very, very close. If you go through and look at those differences, you will see that they are generally pretty modest, but -- but in some cases, based upon the institutional knowledge of our -- the members of our task force that were looking with expertise in those regions, we chose to make a change. And, in general, those changes were -- were relatively modest, but were not in all cases modest, and you will have to direct that question to the witness that speaks to the changes made to the Colorado numbers.

Q. So this allows me, I think, to ask and hopefully get an answer to a question that had puzzled me for a while until Ms. Keefe helped me understand it.

To the extent that a base price increase occurred from $1.60 to 2.20, I don't see that directly reflected in MIG-29, which is 301. I believe it appears for the first time in what I think is a hard code in the Excel spreadsheet in Column O.

Would I be correct?

A. Could you repeat that question? In other words, you are asking about the $1.60 base differential?

Q. No, the 2.20. I'm asking about a change -- so you

agree with me, you said earlier, that the model results from the University of Wisconsin, so Columns F and G, were run in each of the three iterations at $1.60, correct?

A. That's my understanding, yes.

Q. Okay.

A. But you will have to confirm that with Dr. Nicholson, because we did not -- I don't recall that we -- that we decided on the 2.20 until after the model runs were made.

Q. And my point is, am I correct that there's no column that delineates a change in a base price from $1.60 to 2.20? There's just no column that says, here it is.

A. I don't see one in these documents.

Q. And so would I be right that the place you need to look at in order to find and maybe then backwards derive what the base price increase is would be Column O?

A. Column O was the final number. And I'd have to confirm that with looking at my list of these counties, cities, and parish numbers. But my understanding is that our final numbers would include the 2.20. But, yes, that would have been because it was June 2023.

Q. So it does, doesn't it? It must include --

A. Sure.

Q. Yes, correct?

A. It must include the 2.20, yes. Again, I'm seeing all these numbers for the first time in this particular spreadsheet format.

Q. But you, National Milk submitted it, correct?

A. Yes, it's labeled National Milk.
Q. Okay.
A. I have no reason to doubt that that's those numbers.
Q. All right. I only have two more of these for you.
Let's go to FIPS code 48453, which is Travis County, Texas, also known as city of Austin. And as you say, there's a lot of pages. So I think we're on page 47 for those in the room, and we're looking at line 2717, which is Travis, Texas, and I represent to you that it is Austin.
And if we do what we have done before exhibit -- and that's MIG-29, 301 -- if we look at Column F for Travis, it was a $4 from the run for May, 4.20 for the run for October, and back under Column L it's 4.10 for an average, correct?
A. That's correct.
Q. And before your counsel made corrections, or you made corrections with your counsel, the number under Column O for Travis County is $4.70, correct?
A. It is listed as -- as such in Exhibit 301.
Q. And you have corrected it to 4.35, correct?
A. That's correct.
Q. Can you explain what happened between June and now, if you know?
A. No. I assume that -- no, I don't know. I do not know the reason for that correction. There were only two such corrections out of all of these numbers, so it's not

surprising that some further examination determined that further adjustments those two corrections needed to be made.

Q. And finally, let us turn to FIPS code 06065, Riverside, California, which is another state with a lot of counties but not as many as Texas, I think.

So page 4, line 191, FIPS code 6065, and we see for Column F, $2.30, for Column G, $2.50, correct?

A. Correct.

Q. The model average under Column L is $2.40, and the proposal under Column O is $3, correct?

A. Correct.

Q. Which is $0.60 higher than the average, correct?

A. Correct.

Q. So California has a lot of milk, doesn't it?

A. In parts of the state, yes.

Q. So why is Riverside, California $0.60 higher than the model average; Denver $0.80 higher than the model average; and Miami, Florida, which we have heard a lot about for being the biggest deficit, the model average?

A. Well, your question derives from probably a somewhat too simplistic understanding of what the whole process was. But I would again direct you to direct those questions to the witnesses that are going to be testifying specifically to the changes in those regions.

Q. Is it too simplistic to think that Miami should have gone up the most?

A. Not necessarily.

MR. ENGLISH: Your Honor, I am going to go to a different section. I am mindful, I think, of certain travel plans. I don't know whether we need to have a conversation, and so maybe we need to confab, but my understanding is that Dr. Nicholson needs to be done -- done today, and if it's --

THE WITNESS: Same here.

MR. ENGLISH: Well, okay. I will let National Milk decide. I mean, if -- I have more to go. I am more than halfway done, but not two-thirds. On the other hand, this was probably the longest section. So I just want to be courteous and try to give National Milk an opportunity to figure out what they want to do.

THE COURT: Ms. Hancock, are you able to talk to us now about a proposal as to how we proceed with those two witnesses?

MS. HANCOCK: Yes, Your Honor. We have -- Dr. Vitaliano will be back next week. He does have to leave today for another commitment that he has, but Dr. Nicholson also needs to be done today, if possible, and he won't be back.

So I think if everybody is okay, we could put Dr. Nicholson's primary testimony on before lunch, and then after we return from lunch, have his cross-examination conducted, and then Dr. Vitaliano could pick back up next week when he returns.

THE COURT: Let me first ask, Dr. Vitaliano, how does that sound to you?

THE WITNESS: That sounds fine. I can be here until -- I have a flight at 6:15 from this airport.

THE COURT: So you possibly could be recalled today, but it's kind of unlikely.

THE WITNESS: Depend -- given the length of the cross-examination, particularly of these key witnesses, I would guess that if Dr. Nicholson goes on -- which I'm happy to yield my time to him -- he will be kept occupied until he has to leave for his flight.

THE COURT: You yield back to the gentleman from where?

THE WITNESS: Wisconsin, sorry.

THE COURT: That sounds the smartest. Do you agree, Ms. Hancock, just to have Dr. Vitaliano be interrupted now to be resumed next week?

MS. HANCOCK: I think that's fine. And further optimism, maybe that will help truncate some of his examination.

MR. ENGLISH: Your Honor, first of all, I'm happy to yield. I think what happens when you are the first witness, you don't know who else is going to say things. And I actually agree. I think it may very well be the case that if -- assuming Mr. Sims gets on and off, and Mr. Erba gets on and off, you know, I may have fewer questions. So I do think it would make sense.

Besides which, I think we have routinely in this proceeding recognized that the -- you know, the non-member witnesses, like Dr. Nicholson and others, should have some

priority. Not quite the same priority as dairy farmers, but I think next up.

So I am prepared to mark where I am. And I do promise, I really do, that if I get the answers to the questions before he gets back on, I will subtract them. All right?

THE COURT: If you get the answers to the questions what?

MR. ENGLISH: The questions that appear on pages 11 through 17 of my cross-examination, having finished 10, if I get those answers prior to his coming back on -- the reason I'm asking him is he's the National Milk witness, he's the first witness. I don't know for a fact what other people are going to say. If I get answers to questions that are otherwise posed for him, I will not duplicate him. I make that assurance for everybody.

THE COURT: Very good. Well, let's take a ten-minute break while everyone repositions. Is that a good idea? No? Well, yeah, that's a good idea.

We can at least -- if we take, what, you want a five-minute break? Can you be ready?

Okay. We'll take a five-minute break now. Please be back and ready to go at 11:46.

We go off record at 11:41.

(Whereupon, a break was taken.)

THE COURT: Let's go back on record.

We're back on record at 11:46 a.m.

Would you state and spell your name for us,

please?

THE WITNESS: My name is Charles Nicholson, C-H-A-R-L-E-S; Nicholson, N-I-C-H-O-L-S-O-N.

THE COURT: Thank you. I'd like to swear you in. Would you raise your right hand, please.

CHARLES NICHOLSON,

Being first duly sworn, was examined and testified as follows:

THE COURT: Thank you.

DIRECT EXAMINATION

BY MS. HANCOCK:

Q. Good morning, Dr. Nicholson. Thank you for being here. Did you just provide your address?

THE COURT: I did not ask.

BY MS. HANCOCK:

Q. Sorry, for some reason I couldn't remember if you just did. Could you provide your business address, please?

A. My business address is 1675 Observatory Drive, Madison, Wisconsin, 53706.

Q. Thank you.

And did you prepare Exhibits 36 and 36 -- well, did you prepare Exhibits NMPF-36 and 36A in support of your testimony today?

A. Yes, I did.

Q. Okay. And is Exhibit NMPF-36, is that the full and complete written testimony that you have provided?

A. Yes, it is.

Q. And is 36A a summary that you are intending to put into the record today in support of the full testimony?

A. Yes, it is.

MS. HANCOCK: Your Honor, if we could give those Exhibit Numbers 302 for NMPF-36 and 303 for NMPF-36A?

THE COURT: We shall. Thank you.

(Exhibit Numbers 302 and 303 were marked for identification.)

BY MS. HANCOCK:

Q. Before we turn to your statements, I'm wondering if you can provide an overview of your educational background.

A. Okay. I have a bachelor's degree in economics and statistics from the University of California at Davis. I have a master of science degree in agricultural economics from Cornell University. And I have a Ph.D. in agricultural resource and managerial economics, also from Cornell University.

Q. And can you give us an overview of your professional career?

A. So I have, post-Ph.D., now experience going on close to 30 years. Much of it has been devoted to economic analysis of dairy industry issues, both in the United States and globally.

Q. And we heard yesterday about a group or a kind of a brain trust of agricultural economists.

Do you belong to that group as well?

A. Yes. So that is what is now known as the Program

on Dairy Markets and Policy, primarily led out of the University of Wisconsin. Prior to that, when it was based at Cornell University, it was known as the Cornell Program on Dairy Markets and Policy, and it was a group of academics who met to discuss dairy industry issues and offered an annual workshop for dairy economists and policy an analysts.

MS. HANCOCK: And, Your Honor, at this time we would offer Dr. Nicholson as an expert in -- as a dairy economist. I should expand that for all the other areas he's testified to as well but primarily for our purposes --

THE COURT: I will write them all down, so go ahead and say what else. Dairy economist?

MS. HANCOCK: And applied economics.

THE COURT: Applied economics?

MS. HANCOCK: Or agricultural and applied economics.

THE COURT: And any others?

MS. HANCOCK: Any others you would like to be characterized as an expert for?

THE WITNESS: I would actually say that supply chain management would be an area of expertise.

THE COURT: Good.

Does anyone like to -- would anyone like to voir dire Dr. Nicholson about his qualifications to be accepted as an expert witness in the areas of dairy economist, applied -- no, agriculture and applied economics, and

supply chain management? Is there any objection to my accepting him as an expert in those three fields?

There is none. I accept Dr. Nicholson as an expert witness in those three areas, as a dairy economist, as an agricultural and applied economist, and as a supply chain management expert.

MS. HANCOCK: Thank you, Your Honor.

BY MS. HANCOCK:

Q. Dr. Nicholson, would you proceed in providing us your testimony?

A. Yes. Thank you very much.

So, Judge Clifton and personnel of AMS Dairy Programs, I am appearing before you to offer a summary --

Q. And I'm just going to interrupt you really quick. We have a court reporter who is taking down everything that we say, and so if you could read at a much more moderated pace, that will help ensure that she captures everything.

A. Thank you for that.

I am appearing before you to offer a summary of my written prepared statement describing in more detail the results of a recent research project that analyzed differences in the spatial values of milk in the contiguous United States, in particular the spatial differences in values at fluid milk processing plants. I'm an agricultural economist with more than 30 years of experience in the analysis of dairy markets, including the spatial evaluation of milk values.

Importantly, I am not here to advocate for any specific policy action, but rather to offer my insights into the spatial differences in the economic values of milk. This is a summary of research performed in collaboration with Dr. Mark Stephenson, who recently retired as the director of Dairy Policy Analysis at the University of Wisconsin, Madison, but also does not represent an official statement of the University of Wisconsin, Madison.

The analyses that I will report are based on spatial economic models that have a long history of development, beginning in the 1980s at Cornell University. Earlier versions of these models have provided evidence about spatial milk values for previous Federal Milk Marketing Order hearings, notably in 1998.

For the past 20 years, I have been the lead researcher responsible for the further development and updating of data for these detailed spatial economic models, again, in collaboration with my former Cornell and UW colleague, Dr. Mark Stephenson. Analyses based on these models have appeared in refereed academic journal articles -- a number are cited in footnotes -- and book chapters -- again, cited in footnotes -- and have been used by state government and industry groups to support investment decisions.

A summary of the key findings of this research is as follows:

1. Analysis with a detailed spatial economic

dairy supply chain model that accounts for all sources and uses of milk and dairy components, provides location-specific milk values consistent with the lowest possible systemwide costs, providing a competitive benchmark for those values;

2. The analyses suggests that there are considerable differences between the values of milk at fluid plants derived from the spatial economic modeling and the current values of Class I differentials, differences as large as $3 per hundredweight;

3. These differences between current spatial economic values at fluid milk plants and current Class I differentials arise due to substantive changes over time in the locations of milk production, the composition of dairy product demand, changes in the location of demand for dairy products given regional population shifts, and the costs of transporting farm milk to plants, transporting dairy products between plant locations, and distributing products to final demand locations;

4. Review and adjustment of spatial values generated by the model for the purposes of revising Class I differentials are appropriate to account for local circumstances and institutional factors not included in the model analysis. Any quantitative model is, by definition, a simplification of reality, and the USDSS (U.S. Dairy Sector Simulator) does not directly represent existing commercial relationships that can be important determinations of the locations and volumes processed in

existing operations.

I would now like to move to a description of the U.S. Dairy Sector Simulator.

Spatial milk values are calculated using the U.S. Dairy Sector Simulator. The USDSS is a highly-detailed mathematical spatial optimization model, but at its core it solves a practical problem, how to get milk from dairy farms to plants to be processed into various dairy products, and distribute those products to consumers with the lowest cost possible. The model takes the total milk supply, plant locations, and product mix, and consumer demand as it existed for an individual month. It indicates how to move that farm milk to plants via the existing road network and distributes the finished products to consumers, also according to the road network.

For the U.S. dairy industry as a whole, the USDSS minimizes the systemwide cost of assembling milk at plants, making final and intermediate dairy products, and transporting them to other plants and locations of final demand. The model includes the principal cost between the farm gate and the retail locations for the consumer. The model minimizes this total cost subject to the physical constraints, such as mass balance and required product composition that we have imposed upon the system.

The most recent spatial milk values derive from two versions of the USDSS model: A large version with data disaggregated at the county level, 3,108 counties, and a smaller version with a few hundred multicounty

regions. Both the large and small models yield similar quantitative values and patterns of spatial milk prices.

Three, I'd like to talk about the USDSS model outputs.

There are two types of results that are provided by the USDSS. One is a primal solution, and the other is a dual solution. The primal solution describes the physical flows of product through the dairy supply chain network. The dual solution represents the relative monetary values of milk and dairy products at each model location.

An example of the primal output from the smaller USS -- USDSS model -- Figure 5 in the full written testimony -- and now if we can go to the slide that should be there -- is shown here. This shows milk assembly flows, processing locations, and distribution flows to final demand locations. The green lines represent milk assembly flows from farms to plants, whereas the orange lines represent the distribution of finished products from plants to demand locations. The plants are shown as black triangles. The size of the assembly and distribution flows are represented by the relative thickness of the lines, the green and orange lines. And the size of the plant location triangles indicates the relative volume of product processed at each plant.

And you will see that this figure is actually showing the milk assembly at fluid plants and packaged milk flows for May of 2021.

The dual solution shows the spatial value of milk or, more specifically, the marginal value of milk at a processing location for a supply location for raw milk. Thus, the dual values provide estimates of the spatial value of milk and are the key results reported for the purposes of this component of the hearing.

Dual values are calculated by the USDSS at all milk plant locations across the country, although our focus here is on the values for fluid milk processing plants. This price surface indicates estimated spatial values of milk for each county location in the contiguous United States, consistent with the spatial aggregation used for Class I differentials. However, the indicated spatial milk values should not be interpreted directly as Class I differentials. The values should be thought of as price relatives, that is, the difference in values across locations.

The Agricultural Marketing Service of USDA used results from a previous version of the USDSS model results as input into the 1998 Federal Order hearings. Differences between the model-generated relative spatial values of milk compared to those of the current Class I differentials suggest a potential need to modify Class I differentials.

Four, factors affecting the price relatives in the USDSS model.

The USDSS shows the spatial milk values at a given point in time, but it is also relevant to consider the

drivers of changes in these values. Three factors constitute the important causes of change in the spatial milk values, the price relatives. These factors are changes in the milk supply, demand for dairy products, and transportation costs.

The detailed written statement describes the substantive changes in the location of U.S. milk production during the past decade. It also documents changes in the product mix for U.S. industry and in the locations of the population. Transportation costs have changed over time due to the cost of purchase or lease of the vehicle, driver wages and benefits, and fuel costs.

I'd now like to discuss specific results for the spatial milk values at fluid milk plants.

The USDSS was simulated using both the smaller multi-county and large county-level versions with 2021 data with similar quantitative results and patterns. The models are run for the months of May 2021 and October '21, to represent both the flush and the short months of the year.

The general pattern is lower values in the north and western regions, and rising into the south and eastern areas of the U.S. The pattern of these values mirrors the current Class I differential structure and reflects the relative surplus and deficit regions of milk. However, the current differentials range from $1.60 to a high of $6, while the model suggests that the price surface is steeper moving towards the Southeast, high values more

than $7, reflecting both changing regional production and demand and higher transportation costs.

Spatial milk values for October '21 have a pattern similar to that in May 2021, but with the spatial values in the Southeast indicating an even steeper price surface and reaching a maximum value of more than $8.

The seasonal differences in value, which are Figure 17 in the original full written testimony, indicate a fairly steep rise in values from St. Louis through Atlanta, and down to Miami, along the I-75 corridor. The western portions of the U.S. show very few seasonal differences in the calculated spatial values of milk.

The differences between the May 2021 spatial values and the current Class I differentials are considerable.

Let me refer, then, to the second of these figures. In particular, there's a band from about Norfolk, Virginia, through Montgomery, Alabama, where the current Class I differentials appear to be well below the model calculated spatial value of milk at the assumed $1.60 per hundredweight minimum differential. There are also a few cities, such as Charleston, West Virginia, Cleveland, Ohio, and Chicago, where Class I differentials are considerably below USDSS model estimated spatial values.

The U.S. is roughly divided between east and west approximately along the Mississippi River, which separates regions where differentials are modestly low, west up to

about $0.80, to areas where the difference may cause difficulties encouraging milk to move where it is needed. Probably the reason that there is a ridge where there is a northern edge in the Southeast where current differentials are significantly below calculated values is because of the changes made in 2008 to the previous 2000 differentials.

At that time, the biggest changes, up to $1.80 per hundredweight, were made to Florida values. More modest increases were made to Georgia and Alabama, and even less to states further north. So a similar pattern of differences exists between USDSS-calculated differentials for October '21 -- 2021 -- show that here in this figure -- and the current Class I differentials, but with somewhat smaller differences in Florida, Georgia, Tennessee, and Kentucky.

Okay. So my concluding comments. There have been formal studies of the spatial value of U.S. milk for about a century. However, it has been approaching three decades since nationwide spatial values of milk have been systematically evaluated using the U.S. Dairy Sector Simulator (USDSS) model. Over this time, there have been considerable changes to where milk is produced and where population growth has taken place. There have also been substantive changes to transportation costs. Milk supply, demand, and transportation costs all have an impact on the spatial value of milk.

The USDSS captures many aspects of these

fundamental determinants of values in U.S. dairy supply chains to estimate spatial milk values that can inform the setting of Class I differentials. The USDSS provides a competitive benchmark for the differences in spatial milk values, and analysis for two months in 2021 indicates value at fluid milk plants considerably different from the current Class I differentials.

As noted, the differentials arise from the combined effects of changes in the locations and amounts of milk supply, changes in the nature and location of dairy product demand, changes in the locations and capacities of dairy processing facilities, and changes in transportation costs.

The USDSS provides evidence of the need for a change in Class I differentials because it represents an economic -- a spatial economic benchmark, but other factors such as existing commercial relationships can be important determinants of spatial organization. The model results provide relevant input for differences in county values, but may need to be adjusted based on additional information about the characteristic of the particular locations.

Any quantitative model is, by definition, a simplification of reality, and the USDSS does not directly represent existing commercial relationships that can be important determinants of the locations and volumes processed in existing operations. In fact, a review of results from a previous version of the USDSS model was

used as input into an adjustment process employed by AMS to specify differentials in 1998.

And because I'm a weather nerd in addition to being a modeling nerd, I would like to use an analogy here. So there's an analogy here to the use of models that generate the weather forecasts familiar to all of us. The outputs of large-scale weather models are used as key inputs, but forecasters often adjust this so-called model guidance with professional judgment to arrive at a more accurate forecast for a particular locality.

That concludes my statement. Thank you very much.

Q. Thank you so much, Dr. Nicholson.

MS. HANCOCK: Your Honor, I just have a few direct examination questions before we turn him over for cross-examination, but because we're after noon, and I fear that Dr. Nicholson probably read that as fast as he could without getting reprimanded by us, it might be a good time for lunch, and then come back.

THE COURT: That sounds good. Now, I spent all my time looking at 302. And I, most of the time, found out where you were.

Did you also cover 303 while I was in 302?

MS. HANCOCK: He read 303.

THE WITNESS: I read 303, and 302 is the full written testimony.

THE COURT: Well, it was a lot more fun to be in 302.

THE WITNESS: That's what people say about

economic analysis all the time.

MS. HANCOCK: Nope.

THE COURT: Very good. Let's see.

Agricultural Marketing Service, that sounded like a good plan, yes?

MR. HILL: That's fine.

THE COURT: All right. Great. So we'll just leave everything where it sits, we'll have lunch, and we normally take an hour. Is that still good?

MR. HILL: Yes.

THE COURT: Good. Please be back and ready to go at 1:15. We go off record at 12:11.

(Whereupon, a luncheon break was taken.)

WEDNESDAY, OCTOBER 4, 2023 - - AFTERNOON SESSION

THE COURT: Let's go back on record.

We're back on record at 1:16 p.m.

Ms. Hancock.

MS. HANCOCK: Thank you.

BY MS. HANCOCK:

Q. Dr. Nicholson, thanks for being back here with us and providing your testimony. Just a few questions to help clarify some of the things that you have in your statement and the work that you did.

The USDSS model, I'm wondering if you can talk about the dual values that are -- that's utilized in that -- in that model. Maybe we can start there.

A. Okay. So as I indicated in a previous statement, the dual values are the things that are providing us with the spatial milk values, and in particular, that lead to the mapping of the pattern of spatial milk values across the United States.

And without trying to get too much into the complications, essentially what those dual values represent are, in the math of the model, we have a large number of constraints. And the constraint would be something like, if you are going to make a dairy product, you have to have a sufficient amount of milk to be able to make that dairy product based on the physical yield relationships. Okay?

So the dual value is essentially saying, how much would a dairy plant be willing to pay to have an

additional hundred pounds of milk at that plant, based on the mathematics of that particular constraint? And so it is kind of a mathematical result. But it indicates the marginal value of milk, how much more would a plant be willing to pay for milk at that location.

Q. And so, for example, if you had two plants that were across the street from one another, so same location essentially, and you had a cheese plant on one side and a butter nonfat dry plant on the other, how would the model take those into account to quantify that?

A. Okay. So in the example of a cheese plant and a fluid milk plant right across the road, the model has a fairly myopic view of what the value difference would be between those two plants. We know that the component utilization in the cheese plant, like, in terms of the butter and the protein and the other nonfat solids, would be a little bit different at the cheese plant from the fluid milk plant, but we also know that the model is really only taking into account the transportation costs between those two plants based on difference.

And if we, dare I say it, imagine a thought experiment as a logical outgrowth of previous conversations, we would think about the fact that if those plants are really right across the road from one another, the transportation cost difference that would be captured by our estimate of transportation costs would be really pretty small. So we would have every expectation that just looking at those values from the model, they ought to

be fairly similar. And that is, in fact, what we see.

Q. And if -- if -- if instead of being a cheese plant and a butter nonfat dry milk plant, what if it was a Class I plant and a Class III plant, would that output -- would that outcome change?

A. No. Essentially if you have two plants essentially of any type across the road from one another, again, the model is only taking into account to estimate those marginal or dual values. Any difference in component utilization and the transportation cost difference, that will be very minimal between those two plants.

So, no, we would, again, not expect, regardless of the two plants that are being compared, that we would see a significant difference between those two plants in the marginal value of milk. Thank you.

Q. Okay. I want to talk for just a second about this model, this -- you understand that previously Class I differentials were set based on 1998 modeling that was done previously; is that right?

A. Modeling done in 1998 or prior to 1998, I understand was one of the inputs into the Class I differential surface that was promulgated in 2000.

Q. And what is your understanding about how the current model that you have deployed compares to the model that was used in 1998?

A. Well, there are some basic similarities in the sense that we're using the same mathematical approach to

try and minimize the cost systemwide of moving milk from farms to plants and to final products. But there are a number of significant refinements that have taken place since 2000 that make this model much more appropriate for today's dairy industry.

So some of those refinements are increasing the number of spatial locations where farms, plants, and consumers can be located. This most recent version of the model went from a number in the hundreds of multi-county aggregations for milk supply, for example, to a milk supply in every county, 3,108, a significant scaling up of the analysis.

Also, and perhaps more importantly, what we're looking at is a very different set of product categories that are now in the model that the 1998 model version, if I'm recalling correctly, really only had four products to represent four product classes. We now have in the tens of different product categories, and we account for a larger number of what we call intermediate products, products that flow from one dairy plant to another, such as the use of nonfat dry milk and cheese making.

So other refinements on this really relate to the data which we have updated. We have a very different set of population distributions, we have a very different set of dairy product demands, and we have a very different set of both farm production locations and components in farm milk than we had back in 1998.

So all of those things represent a major overhaul

to the model structure since the time it was originally used.

Q. And National Milk approached you, was it in 2021, to help them with some modeling work?

A. So my recollection is that National Milk approached Dr. Mark Stephenson in March of 2022 to ask about the possibility of us updating the USDSS model from its 2016 database to 2021.

Q. And how is that you got involved to take over that modeling work?

A. So I originally became involved in taking over the responsibility for the USDSS when I went to Cornell University in 2000. I had previously done graduate work, as I noted in the earlier session this morning. I came back to be a senior researcher at Cornell and was tasked with the job of updating the particular model that we're talking about, the USDSS.

So since 2000 I have been the primary programmer of the model, and the primary person who has collaborated with others to put together the datasets that we need to run the model.

Q. And so at some point -- so Dr. Stephenson asked if you would do the modeling work that National Milk was asking to be done because you were the one that was in charge of this database and the information?

A. Typically this has been a team effort between Dr. Stephenson and myself. My role has been primarily to make sure that the programming code and the model results

are run. I'm the guy who flips the switch on the model on a computer to make it actually generate the numbers, and I'm the one who knows how to do that.

We have shared responsibilities for the collection and updating of the data that the model needs to actually do its magic in a particular month of a particular year. So it's been a shared effort.

And so when Mark was approached as the better known of the duo doing modeling by National Milk, he would need to ask me if I'm interested in collaborating to make that happen.

Q. Because you are the one that's in charge of the model?

A. I'm the one who is in charge of the model. I'm the one who has the model on my laptop, and I'm the one that needs to flip the switch.

Q. And did National Milk give you any kind of directives or guidance or any kind of outcomes that they were hoping to achieve when they asked you to perform this modeling work for them?

A. What I recollect is, whenever somebody has asked us to do an update to the model, and this has happened on a number of occasions, they always want to know what's the latest information that you can use so that it's the most recent.

So we had to have a little bit of a conversation about what year. And that's why, even though we were midway into 2022 at that point, the data availability was

such that we could only do 2021.

We also have typically, as I noted in the statement this morning, used the approach of doing two months within a given year to represent more of a flush or surplus season for milk, and a fall season in which milk is in shorter supply, so that we have the contrast between those two months.

So we have, on occasion, used months other than the May and October that you see reported, so we had a bit of a conversation about, are May and October okay? And that seemed to be okay.

But other than that, it was up to us to update the data and provide some initial results to the National Milk team for discussion.

Q. Okay. So did they tell you, we're hoping to at least increase it by a certain amount, or here's some information that might help influence where the numbers are going to go?

A. No. The initial model analyses that we undertook were completely independent of any direct input from National Milk, other than the things that I have mentioned.

Q. Okay. And so that first time that you ran it in May of 2022, you were using 2021 data; is that right?

A. Yes.

Q. And what was the transportation -- what was the transportation costs that you were using in the initial run?

A. So the transportation costs that we have in the model, what we do is create a large matrix of costs that link every origin point to every destination point in the model. To do that we use a transportation cost function that relates distance to the amount that it costs to move either a hundredweight of farm milk, or an intermediate plant product like cream, or a distribution route like packaged milk.

The things that are easier for us to change to make it more applicable to 2021 would be something like a fuel diesel price and a wage rate. And so we did adjust the diesel price to 2021, and we did adjust the wage rates to 2021 based on Bureau of Labor Statistics data and data from -- I think it's the U.S. Department of Energy on the fuel costs.

Q. Okay. And -- and that was so that you were matching the transportation costs with the year in which you were evaluating the other data as well?

A. Yeah. To be consistent, I mean, one can imagine running a scenario, we had originally did this, where we used the much higher 2022 diesel fuel prices, which would generally tend to raise the nature of that price relative surface. In part based on our assessment and in part based on conversations with the folks at National Milk, we decided it was probably better to be consistent because we had 2021 data for farm milk supplies, dairy product demands, and processing plant locations, and used 2021 diesel fuel values, even though they were lower than the

high values that we saw in 2022.

Q. And did you feel like that was National Milk attempting to be fair about ensuring that the data that they were using in the model was going to be more accurately representative of the 2021 calendar year?

A. It struck me as being both fair and also more consistent, given that the rest of the data in the model were 2021.

Q. Okay. And certainly not National Milk trying to puff up its numbers, right?

A. I guess I don't want to speak to what National Milk's intentions were, but I can say I never had any impression that -- other than providing us with relevant input to help us do our job, that they were trying to influence the result in a particular way.

Q. Okay. And after running those initial results, National Milk asked you to run them again in June of that year; is that right?

A. That's correct.

Q. What additional information did National Milk provide you, or what additional guidance did National Milk provide you in order to have you re-run the numbers?

A. Yeah, maybe it's helpful here for me to point out that we have always tried to be folks that are more in the role of an analyst and not of an advocate. So when someone asks us to do modeling work such as this, we can have legitimate discussions about what scenarios are relevant, that is, what assumptions we will use when we're

going to run a model like this. And an example would be, should we use the 2021 May and October diesel price or should we use the 2022 diesel price as a way of evaluating what that price surface would be?

So we had conversations with them about what scenarios would be most appropriate, and one of the conversations related to the diesel price.

We had another conversation that was related to what we call the plant lists, which is the processing plant locations and processing capacity values that we have for plants in the model. And at that point, the National Milk team had reviewed our plant list and suggested that maybe we should not use the plants that had already closed. And so we made some minor modifications to a couple of specific plants based on the area of specific knowledge of the National Milk team in order to run an additional set of scenarios.

Q. And that original plant list that you had for the initial run, did -- was that something that you already had prior to National Milk?

A. Yes. So that plant list has been something that has been developed over a long number of years and adapted from information on various sources. And that can actually include personal contacts with people in the industry, where they will say there's going to be a plant coming online, it's going to make these products. We also have some states where there are lists of licensed plants. Like, in Wisconsin, we have a licensed dairy plant list

that we can look at. And we also have information that comes from public press announcements about plant closures or plant openings.

And so we had developed that list over a long number of years and agreed to share that list with National Milk to solicit their input on how we could make the list more accurate.

Q. And so National Milk, in providing you with some updated information about plants opening or closing, did you take that into account when you re-ran the model?

A. So we kept the results from the first of our simulations, and then through two iterations, we made adjustments based on allowing plants that were scheduled to come online to be included, so that meant we had to add those into the entire structure of the model for the analysis, and then also to sort of disallow processing of facilities that had either already been closed or slated to be closed, so we made those adjustments.

I don't remember the exact number, but I think we're probably talking about a total of six to eight plants switching from one category to another out of several hundred, that are across the different product categories.

Q. And how much did this affect the model results?

A. So not -- not very much. And actually, I remember remarking to Mark that we were going to have to do a lot of work to review the entire plant list when it wasn't going to make a dang bit of difference. So it can make

some difference if you have a very large plant in a specific location, that can be impactful.

We did analysis when there was a Kraft Foods plant in Canton, New York that was going to shut down and stop making cheese, and we saw that right in that localized area, yes, it actually had a fairly significant impact, like $0.50 hundredweight, on the producer value of milk in that area, but it did not affect the overall price patterns for the United States. And the same is true for the changes that we made to either close plants, not allow them to be part of the model solution, or to allow plants to enter.

Q. And notwithstanding the additional work that it required from you, and even understanding that it might have nominal or no effect on the results, you understood that National Milk was just trying to get to an accurate result?

A. Yeah. I think -- so one of the things that happens when we do a model like this, is people often want to know why is that number $3.50 at this particular location? And that's a difficult answer to give for this kind of modeling approach, because there are millions of pieces of information that all come together and interact to create that $3.50 number.

So when National Milk team reviewed the model results, people are always trying to wonder, "In my particular area, why did you get that $3.50?" And that leads them to say, "Well, did you have the right plants in

place for the analysis? And if you'd had that one open, then you shouldn't have. And if you had that one closed, then you probably should open it up."

And I think that was the motivation for making the plant list more up to date, even though we recognize that in the broad picture, it was not going to change the nature of the results we were going to get.

I think that was what motivated in part, let's make sure that you are not getting an answer for my particular part of the world that I'm familiar with that is different than what I think because you don't have the right plants.

And so we appreciated the fact that we could update and make more accurate the plant list, and also try to say, we still think we're getting the right numbers for the right reasons.

Q. And what are the major drivers of the model's dual price results?

A. So the model, again, has both the dual results, which have no values, and then also the primal results, which are the physical flows through the supply chain.

And as I noted in the statement this morning, there are some key things that are part of those millions of pieces of information that drive that. So the key things really are, where do we have milk, and what is its composition spatially throughout the United States? Where is the milk located? What's its composition? What's the composition and location of dairy product demand? What is

the location and processing capacities of different dairy processing facilities?

And what are the transportation costs that link a farm to a processing plant in terms of milk assembly, the movement -- excuse me -- of intermediate products from one dairy processing facility to another, and the transportation costs associated with distribution.

So all of those are part of the core database that make up the USDSS analysis, and all of those things are a part of why we get the spatial price surface that we get.

Q. And I think in your testimony throughout, you refer to the model results as a benchmark.

Why do you consider them to be a benchmark?

A. So the terminology that I have used is a competitive benchmark. And in this case I'm kind of drawing upon the economic idea of perfect competition where we don't -- we say, everybody is sort of equal, they are all small, they all take the same price or receive the same price from people, and that means that we're not really fully accounting for a number of institutional factors that could be relevant to refining the model results to come up with what might be a more appropriate industrywide Class I price surface.

So what I'm saying competitive benchmark, what I mean is, this is sort of like the lowest possible systemwide cost that we can imagine in a perfect world. Right? And so we recognize, though, that that perfect world isn't the world in which the dairy industry lives.

There are lots of other factors that might be important, even if this provides a basic scaffolding for thinking about what those price relatives should be.

Q. Okay. And we heard Dr. Vitaliano talk about some -- some -- what I would -- that he called art, or what is an overlay over the numbers that -- that come out of the benchmark.

Do you recall him talking about that?

A. Yes, I do.

Q. And is that the additional information that you believe would -- is -- is used or applied to the model results that come out of this model?

A. I guess I -- I don't know exactly what information was used in the process, not having been a part of any of the discussions of what has been called the colored-pencils sort of adjustments. All I can do is comment on the things that I think the model does not fully incorporate that might be relevant.

Q. Okay. And what would those be?

A. I think they come into maybe three categories -- well, four.

So one is really we use average transportation costs on the basis of difference in distance between a start and an endpoint for moving milk. We do actually adjust those for local conditions in the sense of having a different fuel cost and a different wage cost. But what we don't account for, for example, is like the density of the milk supply in a particular county.

So I used to work at Penn State University in the top-ranked supply chain management department, and from that I know that there are counties in Pennsylvania where there are a lot of plain sect folks, Amish, who have small farms. And our model would say, all that milk is at one location in the county, and to move that county down to the next county would all be the same costs. And the reality is that if you're trying to serve that particular set of farms, the cost would probably deviate a bit from what the model would say would be the cost to move it from one county to another.

Another example from when I worked in California is I'm quite familiar with how traffic can be in the Los Angeles area. So our model assumes all the costs are on the basis of a distance movement, which would say there's such and such a distance going from Bakersfield to Los Angeles, and the cost would be this, but we don't account for the fact that that time cost and the driver cost associated with it could be much different. Right?

So those are transportation cost examples that are probably more widely relevant for places that I haven't lived and worked that the others from the National Milk team may want to speak to.

Second thing is that the model has no compassion about keeping plants open because there's always been a plant there. In presentations that I have given about this model previously, I like to use the example of a model being a dairy dictator, like the Vladimir Putin of

dairy supply chain allocations. And it would say, if you have a plant that's not in a good location, the model is not going to keep that plant operating. But for an individual company, that would probably not be an easy decision for them to make, especially in the short-term. So the model doesn't account for that existing capacity that an organization would want to keep using.

Another example is commercial relationships. Again, we're hardhearted, we just want to get the milk and the dairy products from the farm to the plant, and to the consumer as a low cost as possible, with the analytical approach we're using here. We don't know anything about the commercial relationships that might link a particular farm milk supply to a farm, to a plant that actually has a contractual obligation on that milk. All right? So the model is going to show more flexibility than the real world in terms of not respecting that contractual obligation.

And the one last thing that's kind of important that often people have maybe been a little bit confused about is we use the model to generate these price relatives to provide a base of information for Class I differentials, but the model itself is a competitive benchmark from a supply chain perspective, it does not know anything at all about Federal Orders. It does not know anything about pooling provisions, it does not know anything about current order boundaries.

And so one of the things that can arise -- and

although I was not a part of the team at Cornell that did the modeling work in 1998, my understanding was that when the folks at Dairy Programs AMS were doing their version of the adjustment process to the model results, one of the things that they were interested in understanding and making sure was okay was sort of price alignment at Order boundaries. So we don't have any Order boundaries in the model, and therefore, we could come up with price relationships in nearby space that would be perfectly fine from a model perspective, but may not be acceptable from an Order boundary or price alignment perspective.

So we have sort of those four things that I think are relevant for why adjustments might be necessary to the raw results from the USDSS model that include some more detailed knowledge of local transportation conditions, the existing contractual arrangements, the existing capacity in wanting to maintain open a plant that you have invested in, and the issue of price alignment across orders in particular.

Q. Okay. And these four areas, these are the areas that you believe would be taken into account on top of the model results which are the benchmark that you have described?

A. Now, again, I can't say what was taken into account in coming up with any differences between the model results and the proposal that's being put forward by National Milk. What I'm trying to do is point out that there are factors that I would consider relevant factors

that would mean adjustments to the model would be appropriate.

Q. Okay. And one of -- one of the elements that we have heard about, and maybe you will hear more about as your cross-examination continues, is what the base was that was included in your model.

Can you talk about that?

A. Yeah. Sure. So another thing that's important for me to maybe clarify is when we run this model, we get a series of price relatives, as I've said. And it's basically about how steep is the price difference, so the marginal value difference between two locations.

So typically what we need to do to actually convert that to something that is equivalent to what we might think of as the current Class I differential surface is we need to establish $1.60 as the minimum. So it would be fairly typical in a model simulation run to have one location that says the marginal value of milk is zero. We don't need any more milk here. There is no additional value from having another hundredweight of milk at this location.

Well, we don't fully believe that the value of milk at any location is zero. And so what we do to come up with the results that have been shared in the written testimony, and parts of here in the oral testimony this morning, is if we have a value of zero, we say, to align that with the current Class I differential surface, we're going to add a value of $1.60 per hundredweight to that

and every other location. So it maintains the price relatives the same, but it takes the level, the minimum level, up to the current minimum level of Class I differentials of $1.60.

And that's important, in part, to be able to compare the apples to apples that you have. Our model simulation results start with $1.60 per hundredweight, so do the Class I differential current surface, and then it makes it a lot more consistent to evaluate the differences between the spatial values of milk in our model and the current Class I differentials.

Q. Okay. And that's what you did here in this case?

A. Yes. That's what we did.

Q. And so for all of the different iterations that you ran, did you always use that $1.60 base?

A. Yes. So we always made sure that the minimum marginal value of milk was $1.60 throughout the entire U.S. for fluid milk plants.

Q. And then at some point did National Milk come to you and say, "We would like you to increase that to $2.20"?

A. No. I have no idea where the $2.20 number came from.

Q. Okay. So that's not something that National Milk tried to direct you to do?

A. They did not direct, and it did not happen, I guess.

Q. And we also -- and maybe along those same lines,

was there anything that National Milk ever told you to try and influence your results?

A. So I mentioned before that the only influence was really on the design of the experiments that we were going to do, these scenarios. And those were really limited to what were the months and year we were going to look at, what was the diesel price, and let's be sure that we have the appropriate plant list that is consistent with updated information. Other than that, the scenarios that we ran were entirely based on our own data.

Q. Is there anything that you could have done differently in any of the iterations that you ran that would have made it more accurate or more reflective of the market conditions?

A. I think we have about as accurate a representation as we can with the available information, and it did actually help, even though it did not change the model solutions very much at all, and created a lot of additional work on a weekend that I didn't want to do, to have the additional information to update the plant list. And so that was the source of information that we were able to tap into the knowledge of the National Milk team to be able to improve in that sense.

Q. And Mr. English, when we was conducting the cross-examination of Dr. Vitaliano, he looked at a change that your model had predicted, or that your model had -- the model results for Miami and the increase that was -- the increase that was proposed by National Milk based on

that model, and then as compared to Minnesota.

Were you in the room when he was asking those questions?

A. I had the pleasure of hearing that discussion.

Q. Is there any insight you can provide as to, if -- if the Southeast is in such dire need of milk, why the results didn't come up with something even more significant?

A. I guess I'd make two points in that regard. One, in the testimony that I gave this morning I noted that the largest divergence between the spatial models predicted by USDSS and the current Class I differentials are not in Florida, they are north of Florida. And I also offered a suggestion that one reason for that may have been that the differentials in that part of the country were already adjusted in 2008.

Q. Okay.

A. And one other point that I make on that is we still actually do see the largest spatial values of milk in that South Florida area, up to $8, and so there's a considerable difference between what the model is suggesting would be the spatial value of milk at that location and the current Class I differential.

Q. Okay.

A. Just not the biggest divergence at this point.

Q. Meaning that area specifically had already had an update since the 1998 model results.

A. We can't correctly analyze that with the model.

But in comparing the current Class I differentials to the model spatial values, we can begin to understand that that is a possible explanation for why those -- the differences are higher north of that area than they are in that area.

Q. And would you mind pulling up your Figure 3 from your testimony in Exhibit 303?

A. I can ask the -- there you go.

Q. Can you talk about whether this helps illustrate what you were just describing?

A. Yeah. This is the pattern that I talked about in the summary this morning. The darker colors there, the oranges and the reds, are the places where there is a larger divergence between the current Class I differentials and the model-generated values.

And so you can see in that area down in Florida, that green area, it's a little bit hard to see the scaling on this, but that kind of generally falls in the $1.50 to $1, maybe $2 range. Whereas, north of that we actually get up into things that look more -- well, definitely above $2, maybe 2.50 to 2.75. And the brightest red spot there, which I think is around Charleston, West Virginia, is the thing that I cited as the largest of the difference of $3.

THE COURT: What location is that red spot?

THE WITNESS: I don't know if I have my geography right, but I'm thinking it's Charleston, West Virginia?

THE COURT: We're getting nods "yes."

THE WITNESS: Okay. Thank you for helping my

geography-challenged brain.

BY MS. HANCOCK:

Q. And when you were talking about the transportation costs that are built in to the current model, were those same transportation costs built into the model back in 1998 when it was originally run?

A. So some of like I mentioned before, the basic structure of the model had some similarities. But I was not part of the modeling team in 1998. What I do understand is the initial version of that model had a straight line transportation function, where the cost of transportation increased linearly mile by mile.

One of the things that we have, I think, learned through the additional analysis of data on the transportation costs is, at least up to a certain point where you might run into an hours-of-service limitation, the costs increase with distance, but they don't increase linearly. They taper off. They increase a little bit more slowly because you have covered some fixed costs initially, right? If you do hit that hour-of-service limitation, and you've got to go another day or have another driver, then actually that could make that cost go up again, but that's not captured directly in our transportation cost analysis.

Q. Okay.

A. So there's a very big difference in terms of the data that's been used, and also the form of the relationship that determines the cost between two

locations.

Q. Okay. And back to my original question, which was, the modeling that was -- this model that was used in 1998 to set differentials, that, likewise, took into account transportation costs, it's just that the methodology of how it was taken into account has become more precise with updates to the system?

A. Yes. Both models includes some representation of the transportation costs for farm milk assembly, interplant flows, and distribution routes. It's just that the nature of the estimation and the updating is different.

Q. Okay. And in this very tight-knit world in which we live in the dairy industry, you're familiar with Dr. Stephenson using the modeling in support of MIG's proposals for their differentials; is that right?

A. I recently became aware of the fact that Dr. Stephenson had used model results to provide input to the MIG proposal.

Q. And I think you said earlier that you're kind of the keeper of the model.

Did he have to come to you and ask you for some information?

A. So we have shared a lot of the information, both the inputs and the outputs, throughout the modeling process that was undertaken for National Milk.

In regard to this particular question, I shared information with Dr. Stephenson to allow him to confirm

that he had the correct values of spatial milk values from the model. I did not realize the purpose to which that information would be put.

Q. Okay. And what do you understand is the difference in the methodology that he's deploying as compared to what you are doing?

A. Well, the same model is generating the information. And what's happening, somewhat like I described, we make a calculation that makes sure we have a $1.60 minimum Class I differential.

Dr. Stephenson is taking the information from the same model and using it to do some alternative calculations and for a different purpose.

Q. Okay. And what do you understand is the differences in how he's doing his calculation?

A. Okay. So what I understand is a core part of the analysis that's been submitted is to consider the model-generated differences in spatial milk values at Class III and Class I plants, without incorporating the $1.60 differential that is included in our analyses.

Q. Okay. And in your opinion, is it appropriate to use a Class I and Class III comparison in order to evaluate these numbers?

A. So it's a perfectly fine calculation to do to look at the difference between a Class III price and a Class I price, not including what the $1.60 differential would be.

Where I think I have a bit of a difference of opinion is that we have never used this model to try and

determine what that minimum Class I differential should be. That is, we have never used this model to try and determine whether $1.60 is an appropriate number. And part of the reason that we have not done that is the model does not really represent the factors that underlie the justification for that $1.60 minimum Class I differential.

So my assessment is, given that the model was not really designed to evaluate what the minimum differential should be because it doesn't incorporate those factors, it is probably not appropriate to use the difference between a Class III model-generated value and a Class I model-generated value to suggest what the minimum Class I differential should be.

Q. Okay. And then I want to take us full circle, which was all the way back to my very first question that I asked when we started, which is, now we're back to we have two plants across the street from one another. And I posed you the question early on, if you have a Class I plant and a Class III plant across the street from each other, how the model impacts the decision to go one way or the other.

Do you remember that?

A. Yes.

Q. And I asked you, well, if you just took those plants and you replaced them with a cheese plant and butter nonfat dry milk plant, would the results change?

And what was your answer?

A. My answer was that regardless of the plant types,

because of the factors that are included in the model, we would expect to see very similar differences regardless of what class plant or what product plant type that would be. So we would not expect to see large differences based on the factors that are accounted for in the model for the hypothetical situation where a cheese plant and a fluid milk plant are right across the road from each other.

Q. So is the point there that this model doesn't tell you one way or another which one is the bigger driver between the -- between the classes of milk?

A. So I guess I would say that the model is not going to accurately represent what a fluid milk plant should pay to get milk into the plant relative to what a cheese plant should pay. It's really good at describing how the differences across space exist for different fluid milk plants, but it's not designed to account for the fact -- or the factors that affect what that minimum Class I differential should be.

Q. And your role here today, Dr. Nicholson, are you here as an advocate for National Milk's proposal or to object or oppose any other proposal?

A. No. So I -- you had mentioned earlier that I was a part of something called the Program on Dairy Markets and Policy, and that was a group of academic economists with an interest and focus on dairy. And one of the things that was a requirement for membership in that group was some kind of commitment to the fact that we want to play an educational role and we want to play an analytical

role by providing information that can help the industry to make better decisions, and that we were not to be advocates for any particular position, in part, because as you mentioned, this is a small industry. We have worked with people on all different sides of different questions. We wanted to maintain the credibility that we were a neutral, unbiased source of information.

So I'm here at the request of National Milk, but I'm not actually here to say I think the National Milk proposal is a wonderful idea or it's a bad idea, or MIG's proposal is good or bad. I'm here to try and help provide some insights about the spatial milk values and how they changed over time.

Q. And we heard Dr. Bozic here yesterday, or a few days ago, I can't remember when it was, and he said that he's going to be stopping the work that he's doing within that Program for Dairy Markets because he's leaving the academic side; is that accurate, your understanding of what's happening?

A. With all due respect to Marin, who I've known for a long time, that was an appropriate decision. And it's not as if we kind of are gatekeepers. We actually sort of semi-lost a number of people through retirement that go back many years in my time. Most recently we can still count a little bit on folks like Mark Stephenson and Andy Novakovic, but essentially it's down to Dr. Chris Wolf at Cornell and myself that are the ones that are trying to make that program happen.

Q. And that's because Dr. Stephenson is retiring as well; is that right?

A. Is retired.

Q. Okay.

MS. HANCOCK: I have no further questions at this time. We would make him available for cross-examination, Your Honor.

THE COURT: Dr. Nicholson, would you state again and spell the names of your two colleagues who still work with you in this program?

THE WITNESS: Okay. So there's one colleague who is definitely not retired and still working, and his name is Christopher, C-H-R-I-S-T-O-P-H-E-R, Wolf, W-O-L-F.

Members that are still available to us, although they have retired, are Mark Stephenson, I can spell that if you wish.

THE COURT: I don't need that one.

THE WITNESS: Okay. And Andrew Novakovic. I can spell those if you would like as well.

THE COURT: Yes, please.

THE WITNESS: Okay. I hope Andy is not listening because if I get his name wrong, it's going to be trouble for me. So Andrew, A-N-D-R-E-W, and Novakovic is N-O-V-A-K-O-V-I-C with a special Serbian accent over it.

THE COURT: So -- so I got N-O-V-A.

THE WITNESS: K-O-V-I-C, I believe. Help me out in the audience if I'm not getting it right.

THE COURT: N-O-V-A-K.

THE WITNESS: O.
THE COURT: V-I.
THE WITNESS: V-I-C.
THE COURT: Pronounced?
THE WITNESS: "Novakovich," proud Serbian heritage.
THE COURT: Excellent. Now, I see we already have someone else who wants to ask questions.
Would you identify yourself, please, sir.
MR. ENGLISH: Certainly, Your Honor. My name is Chip English for the Milk Innovation Group.
And I had a little time to get up here because you were going through some spelling of -- of names.

CROSS-EXAMINATION

BY MR. ENGLISH:

Q. Good afternoon, Dr. Nicholson.
A. Good afternoon, Chip. Mr. English, excuse me.
Q. So I think, although I may get corrected, I just want to have, I think, one question based upon the last line of questioning, and I'll let Dr. Stephenson speak for himself.
But when you talked about the data -- or the request for information, I want to be clear that my understanding is that because of proprietary information, that is to say the work you did for National Milk was proprietary, that the data that Dr. Stephenson used was not the 2021 data, but rather 2016 data for another project; is that correct?

A. Yes. Excuse me for that. Yes, that's correct.
Q. Okay. So I want to be very clear that whatever he did was not use the data that was paid for by National Milk, correct?
A. Correct.
Q. Okay. And that was important to him, correct?
A. Yes.
Q. So I am going to try very hard to shorten my cross-examination because a number of questions that I had were questions that National Milk Producers' counsel asked. And forgive me if I do duplicate, but I'm going to try hard not to.
A. Thank you.
Q. So you were not, as you said, part of the work for Federal Order reform, correct?
A. The 1998 effort? No.
Q. Yep. And in fact, just to be clear, the 1998 effort was USDA's proposed rule, but it was actually based upon a report dated July 1997, correct? Do you remember?
A. That's the best of my knowledge, yes.
Q. And are you familiar with that report?
A. I have reviewed that report, but it has been quite some time.
Q. But you reviewed it, you certainly reviewed it in light of the fact that you have been, over time, updating the underlying data, correct?
A. Yes.
Q. And you couldn't update that without having looked

at it some time in the past, correct?

A. At some time in the past, yes.

MR. ENGLISH: So, Your Honor, one of the things I want to try to do -- and I believe I have agreement of all counsel so I got to speed it up -- but that's -- is that rather than asking him to go through in some level of detail that report, I represent the following:

The 1997 report, July 1997, known as RB 9709 -- and why don't I make this simpler by handing you a copy.

THE COURT: Thank you. So that's RB, as in boy.

MR. ENGLISH: Yes, 9709. Entitled --

THE COURT: That's 97-09.

And then what were you going to say?

MR. ENGLISH: It's entitled "A Description of the Methods and Data Employed in the U.S. Dairy Sector Simulator, Version 97.3," authors: James Pratt, Phillip Bishop, Eric Erba, E-R-B-A, Andy Novakovic, whose name you just got spelled, and Mark Stephenson.

This study, Your Honor, is cited six times in the Federal Order Reform proposed rule. But I also specify, and let me read from preface, page ii: "Funding for this project has been provided by the U.S. Department of Agriculture through the National Institute for Livestock and Dairy Policy and through USDA's Agricultural Marketing Service Dairy Division and Federal Milk Market Administrators."

As -- as such -- and, by the way, it is cited, like I said, six times in the Federal Order reform, and it

is specifically footnoted. And within Federal Order reform it says, "We, USDA, had two partnerships, one with Cornell University and one with Texas A&M to assist us with Federal Order reform."

Rather than making --

THE COURT: To assist us with what?

MR. ENGLISH: "To assist us with Federal Milk Order reform."

I -- I believe that this is basically a public document funded by the federal government, submitted to the federal government, recognized by the federal government.

Rather than making it an exhibit and, you know, helping the paper companies sell more paper, I simply propose -- with a citation I'll give in a moment -- to take official notice of it. I believe I have agreement of all the parties. Maybe it will shorten my cross-examination by 30, 45 minutes.

THE COURT: Now, are you going to put this -- if I take official notice of it, are you going to submit it so that it's part of what USDA receives as a document, or are you just going to leave the citation in the record be adequate?

MR. ENGLISH: Yes. The second is the case, Your Honor.

THE COURT: All right.

MR. ENGLISH: So the citation I have is --

THE COURT: Just one second before you do that.

I want to ask if there's any objection to our proceeding in this manner?

There is none.

Thank you, Mr. English. Now you may tell me everything that you want in the record about this citation of this document of which I will take official notice.

MR. ENGLISH: All right. The citation is dairymarkets.org/pubPod/pubs/RB9709.PDF.

THE COURT: Great.

THE WITNESS: So, Mr. English, if I may? So that is an online reference through the DairyMarkets.org website, which, since Mark has retired, has been less well maintained. But that document, the RB stands for research bulletin, and it is also available perhaps in a more permanent and accessible form at the Charles H. Dyson School of Applied Economics and Management web page under research bulletins. So just in case there would be any issues with the link that would make that available, there is an alternative source.

MR. ENGLISH: I'm grateful. The link worked this morning.

THE WITNESS: Excellent.

MR. ENGLISH: I don't guarantee it works this afternoon.

THE WITNESS: I don't either.

THE COURT: I'd like you to spell the name that is part of the identification of where a person would find this report.

THE WITNESS: So this is Cornell University, the Dyson School, D-Y-S-O-N, School of Applied Economics and Management. And I imagine that a Google search of research bulletin, Cornell Dyson, would take you somewhere close to accessing it through that set of links.

THE COURT: Excellent. Thank you both.

I do take official notice of this document, R.B. 97-09, the name of the document -- well, first of all, the date of the document is July 1997 (printed December 1997). Name of the document is "A Description of the Methods and Data Employed in the U.S. Dairy Sector Simulator, Version 97.3." Down at the bottom it says "A Publication of the Cornell Program on Dairy Markets and Policy."

BY MR. ENGLISH:

Q. So now, Doctor, counsel for NMPF took you through some of the updates since that time, correct?

A. Yes.

Q. So I just want to, as quickly as we can, nonetheless, talk about the robustness subject of the updates, nonetheless so this record has the robustness of what was in there in 1997, to the best of your recollection.

I'm going to give you some ideas, and you can tell me whether I'm right or not. Does that work?

A. Yeah. Okay.

Q. And part of that is, and for your Honor's benefit, since this was -- you know, we had informal rulemaking for

Federal Order reform. That is to say Congress passed a statute that said, you know, go do all this stuff, but don't be here in this hearing room. And for whatever reason, people decided they prefer this process.

And so -- but this is a different process. It's a formal rulemaking, and so things that were just -- there's no -- there's no hearing record, to my knowledge, from that proceeding, but there's a hearing record here, so I -- just bear with me, and again, I'm trying to move as fast as I can.

THE COURT: I don't want you to go fast. I know that Dana Coale wants you to go fast.

MR. ENGLISH: And I think Dr. Nicholson wants me to go fast.

THE WITNESS: And my students, and the Department of Ag in the State of Wisconsin, but other than that, we're fine.

MR. HILL: Mr. English, this is Brian Hill. Before you get started, I know Your Honor wanted to have a break at some point because of the test. It's now 2:14, and so I wanted to alert you to that before we started moving.

THE COURT: Six minutes until we're to get FEMA's emergency system test --

MR. ENGLISH: Turn off all our phones.

THE COURT: -- this is just a test. We're supposed to have, yeah -- I'll go off record, you can move around, and see if you get it. It's supposed to go on to

televisions, mobile devices, and the like. It's just a test.

All right. Let us do go off record now at 2:14. You are free to move around. Come back by 2:25.

(Whereupon, a break was taken.)

THE COURT: We're back on record at 2:25.

MR. ENGLISH: Thank you, Your Honor.

And thank you, Mr. Hill, for reminding us about how our phones are going to blow up.

BY MR. ENGLISH:

Q. So before the break I was going to attempt to summarize with the witness some of the robustness subject to -- robustness of the 1997 materials which have been subsequently updated, some of which the most recent materials came from counsel for National Milk Producers Federation.

So as I understand it, there were objective functions, such as raw milk assembly costs, correct?

A. Are you looking at the Table of Contents?

Q. Yes.

A. Is it possible to have you guide me through that a bit?

Q. Yes. So I'm thinking about page -- starting on the Table of Contents, United States Dairy Sector Simulator, Explanation of Objective Function and Constraints, the fifth line down, there's a series of functions listed, and one of them is, you know, Raw Milk Assembly.

A. So the -- I guess what I would like to perhaps help distinguish is the objective function is the overall set of costs for everything in the model that has a particular equation. It is not similar to the remaining ones which are constraints which must be satisfied. So --

Q. I appreciate --

A. -- they are all -- they are all equations, but they are of a different type when you go from the first line to the next line.

Q. All right. Then in that case, help me out understanding what they are, because that's exactly what I'm having a problem with.

A. Okay.

Q. Just identify the reason why you are testifying and I'm not.

So let's start with that. So what is a function versus a constraint?

A. So a function is any mathematical relationship, and in an optimization model like the one that provides the information from the United States Dairy Sector Simulator, the objective function has got a combination of the variables in the model. And typically, in this case, it's also going to have the associated costs that go along with the variable.

So, for example, a variable would be the movement of milk from one county location to a plant in a different county location. A cost associated with that would be the cost to move the milk that distance if it's a farm milk

assembly movement, right? So you would have a combination of a cost per unit, times a volume of milk flowing from one location to another. You multiply those two things together, and you actually get a dollar value. And then you do that about 6 million more times, and you've got the objective function for the current version of the USDSS.

So it's adding up the total value in terms of the costs for the month either of May or October 2021.

Q. And so when you said 6 million more times, that's just for the raw milk piece?

A. Those are all the variables that are part of the objective function, which would include the milk assembly flows, the processing at different locations, the distribution flows, the interplant flows, all those things are variables that are included.

It's not -- that 6 million number is not just for milk assembly.

Q. Okay. So that's -- the milk assembly, the receiving of milk components at plants are included?

A. So -- so the objective function is all in terms of values. The other functions tend to be in terms of physical quantities, because they are putting constraints on that for the most part represent a mass balance that says, if you are going to have so much cheese come out of a cheese plant, you have to have so much milk and other ingredients come into that cheese plant to be able to mathematically describe the relationship between the milk inflow and other products I mentioned already, nonfat or

cream, and the cheese product that comes out.

Most of the other of those equations that are described as the constraints are in terms of physical units. The main one that's in terms of dollars is the objective function.

Q. And is the restriction on use of components from intermediate products a constraint?

A. Yes. So that would be, for example, you can't make cheese entirely from nonfat dry milk.

Q. And when you talk about -- so actually, I'm going to turn to the data now.

So what is involved in these data and how many data points are there, if you know?

A. I can talk about that. Do you want me to talk about the 1997 version or talk about the --

Q. I'm happy -- I'm happy -- I'm happy to have you sort of --

A. Okay.

Q. -- combine. The whole point was to give people a chance to see how much was there, but I do think we want to talk about present time rather than 1997.

THE COURT: You are just going too fast, Mr. English.

MR. ENGLISH: That's because I'm not reading anymore. I will slow down.

THE WITNESS: Okay. So I had previously mentioned that the key data inputs in the current version of the model are the amounts of milk and their composition at

different supply locations, either the multi-county regions or the 3,108 individual counties, many of which in the United States will have zero milk, the locations of plants of different processing types and their capacities to the extent that we know them, and the dairy product demand at different locations based on population and per capita dairy product demand values that we have calculated based on publicly available data.

The other part of the information that is included in our version of the model is the transportation costs, which I have described a little bit before as being based on functions that differ for farm milk assembly and differ for interplant flows from, say of cream, from a fluid plant to an ice cream manufacturer, and for the distribution routing of final products from a plant to a customer location.

So if it's -- if it's helpful for me to go through and say which of the things that are listed on data here are things that are data that are included in the model, I could do that.

BY MR. ENGLISH:

Q. That would help, yes.

A. Okay. So cities and distances, yes, we have a network of cities, and we have the distances that connect them. It's greatly upscaled in the county level version of the current model. I have mentioned previously farm milk supply, the areas of quantity, and composition. I have mentioned previously processing locations, and

actually maybe if it's helpful, I can refer to the page numbers that are cited on this, if that helps those following along. Okay.

All right. So cities, and if we're on page iii of the Table of Contents, down at the bottom under Data, the Cities and Distances are listed on page 26 of this document. Okay. Are you with me? Okay.

Farm Milk Supply, Areas, Quantities, and Composition, 30.

Processing Locations, I have mentioned, page 34 described here.

Intermediate Products, Description and Composition, yes, although the number and form of intermediate products was greatly expanded in the current version of the model.

Consumption Areas, we have demand locations. That's what I would call those consumption areas.

We have the Consumption of Final Dairy Products --

Q. Wait a minute, that was page 41.

A. Page 41, excuse me.

Consumption of Final Dairy Products, that's essentially the demand that needs to be met at different geographic locations in the United States. Here you see that's divided into two basic product categories, fluid and manufactured dairy products.

In the testimony, the written testimony submitted, there's a complete listing of both the final intermediate and tradable products that are included in the current

version of the model.

Dairy Product Composition, so Components in Fluid Milk Products, line 56. Okay? Components in Manufactured Products.

One difference that I'll note with the current version of the model is, I believe I'm correct in stating -- and I'd have to go to page 56 to be sure about it -- that fixed values were used for the composition of fluid and manufactured dairy products.

One of the modifications that we made -- and I recall this in part because it took a great deal of programming effort and time -- was to actually make the product composition, say, of cheese be endogenous to the ingredients that were used at the processing facility.

So there are a number of different ways in which you can make cheese. Not that I'm expert in that category, but I've studied enough the math of the cheese yield process, and we decided that milk coming into a plant would not be the same -- not sort of yield the same product yield as milk from another farm that had a different composition. So we expanded the role of components to account for the fact that milk with a different farm composition could result in a different product yield or require a different sort of make formula that is alternative ingredients to be used to account for an appropriate composition of a product, particularly cheese, that would be complicated mathematically in this case.

So I believe I'm correct in recalling that the original formulation was for fixed components, and one of the things that the updated version of the model does is allow those components to be used more appropriately to indicate the product composition when the product is manufactured.

Q. If I could interrupt for one second.

A. Yes, please.

Q. Turn to cost data and transportation cost. And before you go into what was, I think my understanding is that there's been a significant change since 1997 that, at some point, there was a separate transportation function created, separate function model created, that I think probably replaces all of this material about transportation; is that correct?

A. So I would have to go remind myself of the specific equations that are here.

Q. And I don't want to ask about the specific equations, and I think they're proprietary, and we respect that.

So I just -- it's my understanding that some time after 2010, USDS created a separate transportation model that is used to input into the USDS; is that correct?

A. Yes. It's different than what was used in this version of the model in 1997.

Q. Okay. And so I would rather, in this case, not talk about what was in 1997, because I think what's relevant -- because I assume that that model was then used

for purposes of what has been submitted for this hearing, correct?

A. Yes.

Q. Okay. And I do not, first of all, think I understand all the equations. Secondly, I don't think that they are necessarily public, and so I don't want to go into equations.

But if you could generally describe the broad parameters of the equations and what they cover from the separate transportation model.

A. Okay. So one of the things that's important that I have somewhat noted before is that this was a joint effort to develop the data sources that were used for any of the updates that we have done to the USDSS since the 1997 model formulation. And that joint effort has involved both Dr. Stephenson and myself, and it may be helpful to clarify who did what.

So whenever we did this, we relied upon Dr. Stephenson's expertise in looking at farm milk production data and allocating that farm milk to places where the model needed to have a value appropriately in assessing the composition of the farm milk at those different locations. And Dr. Stephenson also contributed to the development of the transportation cost function, and I'll come back to that in a moment if I may. And also, Dr. Stephenson contributed the data on the processing costs for the different products at the different facilities. Okay?

So to come back to the transportation costs. What I understand Mark Stephenson to have done is there is a program that is available that -- actually it was an outgrowth originally of an extension related transportation calculator for milk haulers that allows one to estimate the costs of transportation, particularly for milk assembly, but also for final product distribution and for interplant flows.

And that cost of transportation function would take into account the core costs for a trucking company that would include overhead and maintenance and replacement of equipment. It would include some notion of the fuel costs, it would include some notion of the driver time required. And Dr. Stephenson would, in a sense, simulate the values of transportation that were required for a particular set of routes, some number of them, and then he would develop a statistical relationship that would show the cost relationship to distance travelled by that particular transportation movement.

And so over time, we have used that same basic approach, but to update the transportation cost functions we go back and look at new data for things like fuel costs and wages and -- and overhead and tires and things like that, that are associated with usual trucking costs. And I have to say I work a little bit in transportation logistics, but I don't know how to operate a trucking company. So I'm not sure all the things that might be included in that, but I trust Mark's judgment for that

particular thing.

Q. Do you understand that tire costs are included?

A. Tire costs are included. Apparently that's some kind of big deal. You blow out a lot of tires on a heavy truck and trailer unit. I see them on the road.

Q. So Mark was very comprehensive, correct?

A. I believe these are reasonably comprehensive estimates of what the transportation costs would be.

Q. And in fact, do you know whether for you or for Dr. Stephenson, the model -- this particular -- the transportation model, has been used to consult with members of the dairy industry to help them understand their hauling costs?

A. I don't know if anything like the current version of this program has been used to consult. I know that Dr. Stephenson has maintained contact with trucking companies who haul milk in Wisconsin and Minnesota. I don't know if they were providers of information or whether they were receivers of information or both.

I do know that a much earlier version of this was actually an extension tool that was available online to help hauling companies understand what their costs might be in part, so that they could set appropriate contractual rates to avoid going out of business. I think that was the original purpose for the tool.

Q. So I understand and appreciate National Milk Producers' counsel's questions to you about using 2021 data.

How much impact does hauling cost have on the actual model results, say, the relationship between locations?

A. So that's actually a little bit of a difficult question to answer, because it's fairly common for people to ask me, as I mentioned earlier, why did this change in this way? And so I can say intuitively, if we have higher transportation costs, that will tend to raise the steepness of the pricing surface.

But to actually say something other than like, what effect does the change in the diesel price have, and to generalize that to what effect does transportation cost have, to come up with the best answer I would actually need to go away and do two model versions where I have one set of transportation costs, so it includes all the stuff, including the tires, not just the diesel, and then run another of those, and then I can say, here's what difference this makes.

If it's helpful, for the purpose of this question, what we do find is that something like a diesel fuel price can have a significant impact on the steepness of the slope but does not tend to change the basic patterns that exist in the spatial milk value surface.

Q. I think that was the question I was trying to ask.

A. Okay.

Q. It's fair to say that the current model has a lot of constraints, correct?

A. Yes. I -- I can't exactly remember the number,

but I believe it's something like 250,000, maybe more for the bigger of the models.

Q. And it has a lot of variables, correct?

A. In the millions, yes.

Q. And it also has, I think, something called activities.

A. Activities are the synonym in linear programming world language for variables.

Q. Okay.

A. So they would include things like how much milk moves, how much milk is processed at a plant, how much product is produced at a plant, how much product is consumed at a location.

Q. Does the model make any assumptions about whether it is the producer or the processor who bears the hauling transportation cost?

A. No, it does not.

Q. So in terms of, say, maybe one example of what has changed over time, I think I understand from one conversation I had with somebody that -- and I don't know when it changed, but at one time, the model produced a surprising result in terms of moving milk from the west side of one of the Great Lakes to the east side.

Does this -- do you have a recollection about this?

A. I can envision this being a kind of conversation. I don't remember a specific instance that I can say, yeah, it was this location to that location.

Q. I think -- so, for instance, one of the -- the kinds of things you do is when you learn about that, you say -- you put a limitation in that says, you can't cross a lake without a bridge, correct?

A. Well, let's -- maybe I can clarify. That the current version of the model is based on the existing road network. We don't assume that the truck is going to get on a ferry and go across Lake Michigan, even though maybe in principle that's possible for some trucks. So it does rely on the existing road network.

And if I'm remembering correctly, there were times in past years where there was milk that could not be processed in Southern Michigan and actually ended up going into Wisconsin. So it went around the lake and through Chicago and up into Wisconsin.

But the -- all the movements have to be consistent with the existing road network. And so there's no kind of imaginary line that connects the city on one side of the lake with another side of the lake.

Q. So recognizing -- so let me go back to federal order reform.

Do you know that USDA itself, in Federal Order reform, took the results of the model and made adjustments? That is to say, USDA made the adjustments based upon its knowledge. Do you know that?

A. So I was not a part of the process of doing the modeling work that contributed to this document in 1997, and to the discussions, and I certainly was not in the

room, if there was a room when AMS was having conversations about this. So the knowledge that I have is secondhand knowledge that comes from the people who were involved in that process. And that's the basis for my statement that I believe there's a similarity between the use of model results and making adjustments and -- in that era and what is being done here.

Q. The difference being that one thing maybe -- if USDA is doing it versus private industry.

A. I would say that's a difference.

Q. So if an adjustment is made, say, to, you know, one county, and just by hypothetical, $0.50 to the value, does that then alter the entire model because you are talking about the relative value of milk, or does it create some -- if you don't build it back in, some inconsistencies because the model would have said it should be X and now it's Y?

A. Again, maybe it's helpful to clarify that, again, the model doesn't know anything about Federal Orders, it only knows really about transportation costs. And also, all of the adjustments that were made, again, as I understand it in the previous 1997, 1998 process, and the adjustments that were made here, were made after the fact based on the existing model results. Okay?

So what we can't say with this particular model and tool is if you added $0.50 here, is that going to mess everything up in Federal Orders, because the tool is simply not designed so address that question.

Q. I understand.

But leaving Federal Orders aside for a moment, does it impact the value in other counties if you have altered one county but not others? In the model itself, if you left out Federal Orders, would it alter the value in other counties?

A. The model does not allow us to actually change a value in one county arbitrarily. The model provides a result of what the value in the county would be, and it is what it is, again, based on the millions of interactions that are part of the model structure.

So there's no way to go in -- you can make a change to something like there's no plant there anymore, or there is a plant there, or we lost all the farms in that county, and you can evaluate what the impact of that would be in a multi-county area. But we can't actually go in and change one value and then see what happens with everything else. It's just not the way the model is designed.

Q. Okay. So I want to turn to your discussion with the counsel for National Milk for Canton, New York. And part of it is, I want to make sure I understand it, and then I want to understand if there is a limitation.

It sounds like by making a change for an individual plant, it wouldn't change the big picture. It doesn't alter the big picture as you said, that's -- that -- I think that's understood; is that right?

A. So if you were to open or close one plant of a

modest or moderate size, it would not change the bigger picture.

Q. But would it change the localized impact? Would it have a localized impact?

A. So changing the availability of a plant, either bringing one online or taking one offline, can have an impact close by that plant, but it depends on a number of factors.

One factor would be, are there any other plants anywhere near that location? In the Canton case, that really was the only plant within a number of counties, and it was actually processing a fairly large volume of milk.

So if there are other plants that can take up that milk, then the impact is likely to be fairly small. And it also, as I mentioned, depends on how big a plant was that. If it was a fairly large plant, the impact would be likely to be larger; if it was a fairly small plant, then even the localized impact -- there will be some. The numbers will always be somewhat different. But in general, it takes a fairly large plant in a location where there aren't alternatives to have a significant localized impact.

Q. And what happens if you add a demand center in a county that doesn't otherwise already exist?

A. I guess we'd actually have to be creating people somehow to make that happen. But essentially we have -- we have full coverage of the population of the demand for dairy products now. We could do something, and we have

done things like this in the past, where we say, add an export demand.

It's actually one of the things that's also different from the current version of the model to the previous version of the model. We actually account for the specific product exports by port district in this model, and we allow dairy product imports. The export side, of course, is much more important now than it used to be.

So if we had, say, a scenario where there was increased export demand, we could actually evaluate sort of the systemwide impacts of that, and we could actually do it either in a particular port location like Los Angeles, or we could do it spritzing a percentage increase across all the different port districts. And we have done some of those kinds of analysis as a part of work that we did for the state of Pennsylvania in 2017.

Q. So I want to go back to your answers to questions about the sort of the base.

A. Okay.

Q. How would the gradient change if the base was 2.20 versus $1.60?

A. So the price relatives are the same regardless of you choose $1.60 base or 2.20 base. Because the model starts from the assumption that we have a minimum value that would be, in the case of what we have actually presented, $1.60, and then we build the price relatives off that.

So on a percentage basis, maybe the slope changes, but the slope would actually be the same regardless of what the base would be. And that's kind of consistent with the idea that this model was not designed to figure out what the base should be.

Q. The gradient is -- a gradient is independent of the base, correct?

A. Yes.

Q. Okay. So could you go back to showing Figure 3 that National Milk just counsel brought up?

So I think maybe there was -- perhaps, on somebody's part, and it may be mine -- a misunderstanding of what I thought I was driving at with respect to the questions about Miami.

And I certainly understand the fact that I was there in 2007, so I know about the Southeast decision. And I know, I think, what that creates, a bit of a ridge to the north of it.

But Miami is green -- I know I'm -- my eyesight's not great, but Miami is in the green section, correct, of the map?

A. Yes.

Q. And Minneapolis is somewhat in a blue section, correct?

A. Yes.

Q. And blue is a smaller increase in this than green; is that correct?

A. Yes. Confusingly, based on the color scheme in

this diagram, it's not a defined gradient, yes.

Q. Okay. So I think the point of my questions was what about -- well, let me start over.

The model suggests that the Miami price should go up more than the Minnesota price, correct?

A. Well, the model suggests that the difference between the model-generated spatial of milk price values in the current Class I differentials is larger in Miami than it is in Minneapolis, yes.

Q. And Denver is in a blue -- I think dark blue area, correct?

A. I actually -- I can't exactly tell. I think it's to the west of that dark blue --

MR. ENGLISH: Blue or purple --

(Excessive crosstalk.)

THE COURT: Which one of you would like to talk?

MR. ENGLISH: He would like to talk.

THE WITNESS: I believe that the Denver area is to the west of the blue.

BY MR. ENGLISH:

Q. So in the purple?

A. It's purple or some shade of purple, yeah.

Q. And purple's even --

A. Purple is a smaller value than the blue --

Q. Okay.

A. -- in this scheme of colors.

Q. Okay.

A. Which, by the way, I must give full credit to Mark

Stephenson for also doing the mapping.

Q. He'll appreciate that.

So that would suggest, as with Minneapolis, that the relative value spread between Denver and Miami has gotten larger, correct?

A. Yes. Because that is a smaller value difference there than in Miami.

Q. And finally, for Riverside, which I believe is also purple, it's a -- that would be the same as Denver, correct? It should be a greater spread?

A. Yes. Roughly approximately equal to the Denver value.

Q. So I would like now to have you turn to Exhibits 300 and 301.

A. I was hoping you would ask.

THE COURT: So you have those?

MR. ENGLISH: He has his own set, but I guess Your Honor may need a set again.

THE COURT: I have two sets. Does anybody need one? I do. I have two.

MR. ENGLISH: My briefcase is full enough. All right.

BY MR. ENGLISH:

Q. So first, as I talk about this, I have been told to stop calling them line numbers and call them row numbers.

So you were here, as you said with counsel for National Milk, riveted in the conversation I had with

Dr. Vitaliano, correct?

A. I was hoping you would do more line numbers, yes.

Q. Well, I'm actually hoping not to do any line numbers. I think I mostly want to do column numbers, or column letters.

A. Okay.

Q. Can you confirm with me -- and I'll try to shorten it -- that Columns A, B, C, D, and E are literally there because of that's how the Federal Order uses them?

A. Yes. Can I actually ask, though, are you referring to 300 or 301?

Q. For now, 300.

A. 300. Okay.

Yes. Those are reporting columns.

Q. Okay. And then the results of your model were Columns F and G, correct?

A. Yes.

Q. Have you ever seen, before today, columns after Column G?

A. Yes. So in fact, in the results that were provided to National Milk, we had Columns F, G, H, which is the October to May differences; Column I, the current differentials; Column J, May current; and Column K, October to current difference. That was information -- the core information that was derived from the model were Columns F and G; the core information from the existing Class I differentials was Column I; and the others were basic calculations reporting differences.

So Columns F through K were things that were reported to National Milk from us.

Q. Okay. Thank you for that clarification.

But after that, did -- did you do Column L?

A. No.

Q. Okay. Or Column M?

A. No.

Q. Column N -- well, that's easy, that's just an order number.

A. Yeah.

Q. Basically, to your knowledge, none of the other columns after you get past Column K?

A. No. None of the other columns past Column K were -- had anything to do with the information we provided.

Q. Let me specifically ask about Column R. This is the average monthly pounds you -- have you ever seen that column before?

A. So we actually do have that information in the model because we have to have -- actually, no. Sorry. No. Column R is not something that we reported, because we only have monthly information on pounds of milk for the months of May and October 2021. So we -- and I also do not believe that we provided that information on the milk pounds for those two months to National Milk. So Column R is something different.

Q. Okay. So do you have with you, or can you make available if National Milk permits, what you gave National

Milk so the record can have that?

A. So I actually was checking my computer to see what I did and did not have. It turns out that the model can run on a laptop, but actually runs on a University of Wisconsin laptop that has more bandwidth, and most of the files that are associated with that are on that laptop and not on this one.

So the question of whether or not it can be made available, I suppose, is up to discussion by the National Milk team since they had sponsored this particular research.

Q. I only asked -- just -- this is not for you, this is for the record. In terms of the foundational piece, I just -- it seems to me it would help for foundation, but I leave that to National Milk.

A. May I also add, though, that I don't have any reason to doubt that the information that's here is what was provided.

Q. And that's fine. Thank you. I appreciate that.

And I think -- I think I got an answer from National Milk, but -- and maybe there was also a question; I may have missed it from counsel. I don't believe that National Milk consulted with you about your columns in terms of any modifications that they proposed, correct?

A. No.

Q. Okay. Are there any areas from your model results that indicated -- apparently one of us had a double negative or something.

THE COURT: What -- it was unclear exactly what you just established.

MR. ENGLISH: So that's two people who advised me of that. Obviously it was.

BY MR. ENGLISH:

Q. National Milk Producers Federation did not consult with you about any of their modifications, correct?

A. That is correct. They did not consult with either me or Mark Stephenson about any of their modifications.

Q. Are there any areas, any counties for your model, that indicated using the $1.60 base, the Class I values would decrease rather than increase?

A. Yes.

Q. Hasn't production grown faster than milk requirements for Class I in a number of areas?

A. Can I ask you to repeat that? Sorry.

Q. Hasn't milk production grown faster than the requirements for Class I in a number of areas?

A. That may be true, but I guess I don't have data before me to help establish that.

Q. Would -- would a value at a $1.60 that is lower than the present suggest that at least as to that location, production has grown faster than the requirements for Class I?

A. So if we're looking at -- let me again, maybe make a little bit more of a lengthy explanation of this.

So what determines the values at a particular location, I have previously said is somewhat difficult to

assess because it relies on not just the values at that particular location, but also the system values, which, again, involves these millions of points of data.

So the factors that influence whether that value would go up or down or be higher or lower than the current Class I differentials do depend on the local milk supply and demand balance at that location, but they also do depend on the interaction of all of the other connections within the modeling structure.

So I guess I would say it's maybe a little bit oversimplistic to say, well, if it went down by a nickel, that must mean that there was more than enough milk available at that location, because it depends on the systemwide impacts to really be able to say that. And as I indicated before, highlighting the change at any one location is actually pretty difficult given that it's part of this broader system set of outcomes.

Q. Thank you for that correction/clarification.

A. Trying not to be too much of a lecturing professor.

Q. So could you put Figure 3 back up again? That was fast.

So given what you see there in the purple sections in the central part of the country, does that at least suggest that, say from the Great Plains from the north to south, at least until you get to Central Or East Texas, that the value for milk in Class I relative to other locations has gone down?

A. I'm sorry, can you maybe parse that question out into the different components for me again?

Q. So going back to Colorado for a moment.

A. Okay.

Q. Relative to places to the east where you see the green, I think what we're talking about -- you know, for Miami would apply also, say, comparing to, say, where we are today in Indiana, that the value -- the relative value of milk used in Class I has gone up more in Indiana than in Colorado, correct?

A. Again, the difference in the spatial milk values between the model and the Class I differentials, yes, is larger in Indiana than in that part of the country. And maybe it also helps, I like to think about this as having the slope is now steeper, right?

Q. The slope is steeper --

A. The slope is steeper in the model than it is in the Class I price surface as we have it today.

Q. It is steeper moving west to east.

A. Yes. I guess either way, it depends whether you are going up slope or down slope. But, yes.

Q. Steeper up?

A. Steeper up.

Q. You agree with me that prices in the -- that values in the fall are generally going to be higher than the spring, correct?

A. So we actually report a seasonal price difference, I think it's in the column here on H on Exhibit 300, and

we also have a mapping of that in the full report. It's at testimony. And, yes, that generally is the pattern, although there can be exceptions where there is no change. And I believe there may be a couple of places where there is a decrease in between October compared to May, but generally the pattern is higher values in October.

Q. So recognizing the model doesn't know what Federal Orders exist, nonetheless, this is likely to be used in some way for Federal Orders, correct?

A. I guess I have no idea whether this will be used or not. I guess I kind of like to think there's some input that's valuable.

Q. If we set prices based upon the fall run when values are generally higher than the spring, given the fact there's a minimum pricing system, would that suggest that we result in pricing being too high during the spring flush?

A. I guess we can't really conclude that on the basis of the model analysis, because the model does not know about Federal Orders.

And I will remark here that about five years ago we recognized that one of the limitations of a tool like this is that it's primarily got a supply chain value focus, and so it does not allow us to examine the implications of making changes to the Class I differential surface in terms of what that would mean in terms of blend prices or supply responses or demand responses.

And so with some fairly minimal support from AMS,

we actually began working on an alternative to that that would allow for more of that responsiveness, in essence, to develop a model that would allow me to give you a better model-based answer to your question about, is this kind of change too high?

But we actually can't do it on the basis of the analysis that we have here, because it relies on understanding the impacts of that change, and this model is just reporting what is, not what would happen.

Q. Since this is a minimum price, since the Federal Order system is a minimum pricing system, do you have a view about using the minimum over the average or the high value from your model?

A. I don't have a recommendation to make in that regard, because I think I -- as I mentioned, this model doesn't allow us to think through from a research perspective what the implications of using one of those values versus another would be, because it doesn't include the regulation structure under orders.

Q. So how is organic milk accounted for in the model?

A. It's included in the total milk supply, and it's not treated any differently than the conventional milk supply.

Q. Would you expect -- I understand it's included that way, but if it were separated out, would you expect a different result for organic milk?

A. So what I know of the distribution network for organic milk and its processing differences from

conventional milk are that it tends to move longer distances, because there are smaller processing volumes and smaller shipments going into individual stores. That would tend to suggest that there would be a higher supply chain cost for that distribution network, but I haven't done any work to analyze what that difference would actually be.

Q. And following up on -- on some of the questions from National Milk, would you agree that any model has inherent limitations?

A. Yes.

Q. Can this model tend to reinforce current market conditions?

A. So I'm not sure this model has a lot to say about whether it reinforces current marketing conditions or not. Because as -- again, as I mentioned, it's not actually modeling a market, it's modeling the logistics of milk assembly and distribution. So it's providing what I think of, again, as a competitive benchmark for the costing structures.

And it -- again, it -- it knows something about what milk goes into what plant. The only place that it really recognizes a class distinction is really through the addition of the 1.60 minimum value that's applied to Class I milk. Otherwise, it doesn't really know or doesn't really care where the milk is being used or what the current market structure is or whether some product was at a Class IV plant or Class III plant.

Q. And as you have stated to me and also to counsel for National Milk, the model doesn't consider the existence of Federal Milk Marketing Orders, correct?

A. That's correct.

Q. And so it doesn't consider depooling or performance standards or PPDs or anything like that, correct?

A. It does not.

Q. So would it be fair to say that the USDSS is more like a traffic cop but not a driver of the cars? Sort of reports on what's going on, but it doesn't actually drive the cars?

A. So the USDSS takes existing market conditions and provides us with an assessment of what the spatial milk value surface would look like. And in economics, we can talk about different kinds of models where a key distinction is whether or not the model has a behavioral component, right?

And by that I mean people will base their decisions or the behaviors on the outputs of the model. In this case, this is a pure, let's minimize costs throughout the system. I described it earlier as being an impassioned -- or a dispassionate dairy dictator that did not care about where a plant was currently located, it wants to get the lowest overall costs.

In that sense, this is not a behavioral model, because the only behavior that's being represented here is that ruthless cost reduction idea. So it doesn't include

the responses of any potential dairy producer or dairy processing facility or dairy consumer to the imposition of these Class I differentials. But we actually don't have any model that would allow us to analyze those questions at this point, which is the reason that we began working on an alternative several years ago.

Q. So I want to go back to your very last statement -- your last sentence in your statement, which sort of used an analogy to weather forecasting.

Do you remember that?

A. I absolutely do.

Q. And you reference sort of like the national weather forecast, and then there's the local forecasters, correct?

A. Yes.

Q. You are a fully neutral expert applying this model, correct?

A. Yes.

Q. And in the case of local weathermen, they don't have a financial stake in whether or not it rains or the sun shines, do they?

A. I guess it depends on whether they have invested in solar panels or something like that, but generally I would say, no, they do not.

MR. ENGLISH: Thank you. That's all I have.

THE COURT: Well done, Mr. English. Thank you.

Do we need five minutes to stretch before the next cross-examiner comes forward?

MS. TAYLOR: Yes.

THE COURT: Yes. Okay. Please be back and ready to go at 3:22. We go off record at 3:16.

(Whereupon, a break was taken.)

THE COURT: Let's go back on record.

We're back on record at 3:26.

Who next has questions for Dr. Nicholson?

Mr. Miltner.

CROSS-EXAMINATION

BY MR. MILTNER:

Q. Good afternoon, Dr. Nicholson.

A. Good afternoon.

Q. This is a change. My name is Ryan Miltner. I represent Select Milk Producers.

So I want to start by perhaps exposing my ignorance. You noted that the model does not, you said, doesn't recognize Federal Orders or it doesn't take into account Federal Orders; is that correct?

A. It does not take into account the full set of regulations under Federal Milk Marketing Orders. It does address different class plants as a part of calculating what a spatial price surface would be, but it doesn't represent the full range of incentives that would be available to dairy farmers, dairy co-ops, dairy processors, or consumers.

Q. That's helpful.

When the model attempts to create or determine the spatial value of milk, is it looking to determine the

value of that milk to a plant that is purchasing it or the value received by the producer who might or might not be pooled on a Federal Order?

A. I guess I'd say the model is not really representing either of those things. What it's looking at is what I call the price relatives: The margin, the differences in marginal value, the value of an additional hundred pounds of milk at a location. So it's not, for example, representing the pay price that a producer would get or the payment that a Class I plant would make. It's only looking at based on essentially the supply chain and logistics costs that are relevant there what the differences are in spatial values of milk.

Q. So for that additional hundred pounds of milk, when it's -- when it's determining that value -- and I hope I'm -- we're not ships passing in the night or whatever -- but is it -- the value that is determined, whose -- whose value is determined?

A. Yes, I come back. It's no one's specific value because it's a marginal value of having an additional hundred pounds of milk at that plant at that time.

Q. Okay. I'd like to ask about the $1.60 base.

And do you still have a copy of Exhibit 300 with you?

A. Yes, I do.

Q. Excellent. I brought my copy as well.

So this is Row 518, Ada County, Idaho.

Which one is Ada -- that's where you live --

that's where Ms. Hancock lives, so --

A. Must be an excellent location.

Q. I'm sure it is.

When I look at the row for Ada County, Idaho, I see as I look down Column F, that the May '21 model returned $1.70 as its output, and then October '21 returned $1.60 as its output.

Aside from the fact that that -- that's a bit of the inverse that the fall would usually be a higher value than the spring, does that reflect that that value for Ada County in October was no higher than the base value?

A. So -- yes. So the $1.60 implies that that is the value with the addition of $1.60 to the original model result.

Q. Okay. Granted there's over 3,000 rows to look at, and I suppose I could have done some sort of sort function too, but I did not see $1.60 show up anywhere else in either of May '21 or October '21.

Do you happen to recall if there was another instance where $1.60 appeared?

A. So I have to admit that I don't recall of the 3,108 different values that we're looking at in two months, so over 6,000 values, but perhaps I can shed a little bit of the intuition of what is happening there.

Q. Great.

A. So that October value for Ada is suggesting that at that month, at that county location, the model was saying there is no positive marginal value for milk in

that month at that location. That is, nobody would want to pay to have an additional hundred pounds of milk at that location in that month, right?

So that is the raw output of the model that would be used to adjust to the current Class I differential surface by adding $1.60. So essentially the model says that value for us at that month is zero. To make it consistent with the minimum current pricing system so that we can compare apples to apples throughout the spatial analysis, that value is set to 1.60.

I don't know if there are other values for May that are equivalent to 1.70, but what that's suggesting is that the value of an additional hundredweight of milk at that location in May was $0.10. Somebody would be willing to pay only $0.10 to have an additional hundred pounds of milk at that location at that time. And then we added the 1.60 to get to 1.70.

THE COURT: Mr. Miltner, may I ask probably an ignorant question, but I -- I am just puzzled. When an area is not regulated, where do you get your inputs for the model?

THE WITNESS: So you are saying that to me?

THE COURT: Yes.

THE WITNESS: Okay. So, again, the model does not rely on information about whether an area is regulated or not regulated, it only relies on the core data of the milk supplies and composition, the population and the demand for dairy products, the plant locations and their

capacity, and the transportation network that connects them.

So the model itself is not trying to capture the current full regulation, it's trying to represent a competitive cost benchmark in the absence of regulation.

THE COURT: Is milk composition readily available online for an unregulated area?

THE WITNESS: So much of the milk composition information comes from state-level national statistics offices. They -- for major dairy states, they tend to report more information than for states that are not major dairy states. For some states what we need to do is use a statistical relationship that compares the butterfat value to the other components in the milk because that information is not reported. Information is also sometimes reported through the Federal Milk Marketing Order statistics for things like milk composition that we can also use to develop the composition at different locations, whether they are regulated or not.

THE COURT: Thank you very much.

THE WITNESS: Thank you.

MR. MILTNER: Changing gears a little bit.

BY MR. MILTNER:

Q. Mr. English asked you about the relative values of milk in Colorado and here in Indiana.

Do you recall that questioning he asked of you?

A. Yes.

Q. Okay. I understand that the model when making --

if you are comparing those two locations, what the model shows is that the change in the incremental value of milk in Colorado is a lower magnitude than the change in the incremental hundredweight in Indiana.

A. Again, I think I would be careful about using change so much as saying there is a divergence between the current Class I value at that location that is bigger in Indiana than it is in Colorado. So -- because we're not actually making a change in the values, we're just looking at the fact that there is a difference between those values and those locations and the size of the difference is different.

Q. And so it's not that the -- it's not that the value -- I'm not going to get my terms right. It's not that the value of milk in Colorado has declined since 1998, it's that the rate or the magnitude of the difference between the measurement in '98 and the measurement in '21 is smaller in magnitude than the same measurements for Indiana?

A. Again, so if we take the current Class I differential surfaces representing 1998, but actually we should also probably incorporate the changes that were made in 2008. That's why I want to be a bit careful about this.

What it's saying is that the divergence has become bigger in a place like where we are here in Indiana than it became in -- in that supply location in Colorado for that plant location in Colorado.

Q. Much more articulately stated than I tried to.
A. I'm trying.
Q. Okay. Do you have a copy of your testimony as you presented it, NMPF-36A?
A. Yes, I do.
Q. Great. I'm looking at Figure 1 there. And so I'm looking at the state of New Mexico, and you have got a plant there in Albuquerque. And, again, the yellow lines show the flows of the product from the plant to the consumer, correct?
A. That's correct.
Q. Okay. Now, I note that for that plant in Albuquerque, as least as it's presented here, there are no green lines.
Can you explain how -- how milk inflows to plants are represented on here?
A. Okay. So the absence of a green inflow line of that Albuquerque location is indicating that the milk that went into that plant originated at that same location. So one of the things that's important to note about this particular figure is that the mapping is based on the smaller model configuration that did not have -- it had multiple counties aggregated into one supply location, like at Albuquerque, and therefore, it doesn't pick up the full disaggregated information that would be all of the counties which would actually definitely show a green line if that was going to be a supply plant that was distributing to those other locations.

And the reason to use this small model version rather than the big model version, is if you have 3,108 different lines going to every consumption point in the United States, you basically can't discern any reasonable patterns with that information.

So this is trying to represent the kind of information that is provided by the model, but there's a much more detailed distribution routing that would be present in the full 3,108-county model that's not shown here because it's just too messy.

Q. So, for example, in as -- if the milk supplies in Albuquerque and Bernalillo County had -- had declined as farms had gone out of business and milk was being pulled from the Roswell area in Eastern New Mexico, those counties could be aggregated under -- under the model as it was used to create this map, and it wouldn't show that milk movement across the state graphically?

A. Yes, that's correct. So it's not going to show the movements of milk that would come from anything other than the multi-county region that's represented here.

Q. And the same would be true for the plants in El Paso there, correct?

A. Yeah. A similar situation applies there, though I'm -- I think there may be a green line underneath that that's may be coming from Las Cruces going down to El Paso.

Q. There could be.

A. I can't tell. Yes.

Q. Okay. Now, New Mexico is the ninth largest state in dairy production, and they have lost production that's down about 10% year over year in '23.

So that loss of production, since it occurred since this model was run, wouldn't be incorporated into the model, correct?

A. That's correct, because the model is based on 2021 data.

Q. Time still flies. I mean, from -- because it's a spatial model, if -- if a significant milk shed had a decline of 10% of its milk supply, would that -- do you think that would have a meaningful effect on the output?

A. So it could have a meaningful effect on the output. It does depend on the -- as you mentioned, the percentage decrease, the magnitude of that, but also what the base was that we started from. So I don't know what the milk production is in Rhode Island, but if we lose 100% of it, it doesn't make any difference to anybody.

Q. Right.

A. So to give you a better answer to the question, we would actually have to look at that magnitude of milk production reduction, preferably in the full county model to have the better spatial disaggregation, and we can assess what the impact would be. In general, we would expect that the marginal value of milk in that region would be lower, sorry, might be higher with the lack of milk that's available from that location.

Q. Mr. English did a fine job of eliminating lots of

my questions. Actually, I think he's done a fine job of getting rid of the rest of my questions, so I don't have anything further.

MR. MILTNER: Thank you very much, Dr. Nicholson.

THE WITNESS: Thank you.

THE COURT: Mr. English?

CROSS-EXAMINATION

BY MR. ENGLISH:

Q. So a bit of a follow-up, and from what Mr. Miltner just asked, I'm not sure if we need to bring the map up or not.

How big are the multi-county regions?

A. They vary depending on the state location. I actually wonder if there is -- yeah. So I do have in 97-09, R.B. 97-09, these have been modified somewhat for the small version of the model, but you get the basic idea that we have denser representation.

Q. Sorry, what page are you looking at?

A. Sorry, 32, and thank you for asking me about that.

MR. HILL: What exhibit?

MR. ENGLISH: This is not an exhibit. This is the official notice document.

THE WITNESS: Yeah. This is not the exact replica of the multi-county regions that are present in the small version of the model, but it indicates that areas where we have a greater proportion of the milk supply, at least at that time, received smaller aggregations of counties into the multiple-county region.

BY MR. ENGLISH:

Q. So that's, of course, back in 1997.

What are the multi-county regions now?

A. Well, they are similar to this, but I can't tell you just by looking at this what the differences are between the current version of the multi-county, what we call the small model, and the county-level analysis.

Q. But we know, of course, it has definitely shifted west, correct?

A. Yes. So the dots that are represented on that Figure 6 do indicate the locations and the relative magnitudes of the milk supplies in those multiple-county regions.

So for example, if you look at the Central Valley of California, it's nearly every county has its own representation. And each of those dots is large. There's a somewhat similar story in Wisconsin, and there's a similar story in New York.

So the principle that's being applied here is the same. I can't tell you without actually doing further checking what the differences are.

Q. So just to be clear, we don't have in the record what the multiple-county supply areas are in 2021 for the purpose of the model?

A. For the small version of the model, we do not.

Q. Okay. I'm sorry. I may have missed something.

Is there a large version of the model that we do have it for?

A. Yes. Actually in my -- well, we don't have a map -- well, we do not have, I think in the record, a map that shows the county-level milk supplies in a way similar to that Figure 6 on page 32 of this document. We also don't have the similar version for the multi-county regions for the updated version of the model.

All I was trying to do by showing you that figure is to illustrate the basic idea that back in 1997 we couldn't solve a model that was bigger than this, and it was a challenge at the time. It required actually like mainframe computing. And so the multiple-county regions were put together to allow the problem to be tractable, to be solved, to provide information.

Q. So how many -- there were 240 multiple-county supply areas back in 1997.

How many are there today, do you know?

A. I don't know off the top of my head.

MR. ENGLISH: Thank you, sir.

THE WITNESS: Thank you.

CROSS-EXAMINATION

BY MR. MILTNER:

Q. Just to quickly follow up on that. The calculations that are really the output that National Milk has utilized, that was based on an analysis of all counties, right? The aggregation of counties was really limited to providing that figure showing flows of milk; is that correct?

A. That's correct. Although I would note that the

differences between the analyses, we actually ran the smaller model first because we had difficulties getting the larger model to solve because of its extended size. But we also recognize that it's a lot easier graphically to show the flows from that model, even if it loses some of the spatial detail.

I'd also -- I guess I would say that the flows are there more to illustrate the kinds of outputs from the primal side of the model than to be a focal point for what the marginal values of milk would be.

MR. MILTNER: Thank you.

THE WITNESS: Thanks.

THE COURT: Mr. Rosenbaum.

CROSS-EXAMINATION

BY MR. ROSENBAUM:

Q. Steve Rosenbaum, International Dairy Foods Association.

So you described the map as establishing, if you will, the value of marginal milk at a particular location, correct?

A. It's the marginal value of milk at a particular location.

Q. But, obviously, for these purposes, we're considering whether to what extent to use these for purposes of setting Class I differentials, correct?

A. That's my understanding.

Q. So that at that point, they become an actual payment obligation by processors, correct?

A. Well, so --
Q. Differentials --
A. -- the -- let me be clear. The model is generating spatial milk values at a differential surface. Whether that is used to create a system that results in processor obligations is not -- that's not part of what I have analyzed. It's -- it's not part of what the model is designed to do.

It's suggesting that there are differences in the spatial value of milk that might be accounted for in setting or making adjustments to a Class I price surface.

Q. And I mean, to the extent that they are relied upon for that purpose, they will then help set the actual minimum price that has to be paid, right?
A. That depends on the extent to which any of the results are relied upon for that purpose, yeah.
Q. But you do understand that's the reason we're looking at this information, right?
A. I do understand that there is interest in evaluating whether our current Class I differential price surface is appropriate in the world of now as exemplified through model analysis from 2021.
Q. Okay. But you're here presumably because you think this information has something to contribute to the conclusion?
A. I'm here because I think this information has something to contribute to the decision-making processes related to whether or not those Class I differentials

should be modified.

Q. Okay. And -- okay. And just so we're clear, to the extent that they are modified based upon this information, then that becomes a mandatory payment obligation for Class I handlers, correct?

A. So I can certainly say that if the Class I differentials are changed, it becomes a mandatory obligation on handlers.

Q. And when you are assessing value, let's say at a place like Miami, that value reflects the cost of getting the milk to Miami, correct?

A. So as I have stated on a number of kind of previous responses, yes, that's one of the factors that affects what the value is in Miami. But it's not just what happens in Miami. It's not just about the transportation flow from any particular location to Miami. It's about the broader systemwide interactions that create that value at Miami.

Q. One of the factors affecting the value in Miami is the cost of getting milk to Miami; is that fair?

A. Yes. I previously noted that both the farm milk assembly, the interplant transportation costs, and the distribution costs are part of the transportation costs that are considered in the analysis.

Q. And -- and captured by your -- to the extent -- hopefully captured by the numbers that your model establishes as values, correct?

A. They are definitely a part of the computations

that lead to that value being established.

Q. Okay. So -- and you have said more than once and -- that the model is, if you will, ignorant as to the terms of the Federal Order system, correct?

A. The model does not take into account the -- what I would call the behavioral incentives that Federal Milk Marketing Orders provide. It is simply a supply chain model designed to evaluate milk values.

Q. Does it take into account the provisions of the orders with respect to, for example, transportation credits?

A. No, it does not.

Q. Okay. So that -- okay. So that -- that sort of goes beyond behavioral aspects of the model to payment obligations of the order -- let's start that question again.

That goes -- that goes beyond the behavioral aspects of the orders to the payment obligation to the orders; is that right?

A. So this model does not determine the payment obligations under the orders because it does not contain most of the Federal Order structure. It's simply a supply chain model. It's trying to come up with the spatial value differences for milk used in different classes.

Q. To the extent that the model would be relied upon to set Class I differentials, the people using the model in that fashion should recognize that the model does not reflect, for example, whether there are transportation

credits provided for in the orders; is that fair?

A. Yes. As I have previously stated, this is a -- what I think of as a competitive benchmark that is ruthless about trying to have the system costs be the lowest possible that they can be. And so it does not take into account, as I mentioned before, anything related to passion about keeping a particular plant open, it does not think about the pooling provisions, or any of the pool dollars that are generated, and how that might influence behavior.

Q. And so to the extent that, for example, there is a recommended decision, awaiting final decision to require Class I handlers in the Southeast orders to pay for the transportation of milk into those locations, wholly apart from the Class I differential, that's -- that's something that your system -- your model just doesn't account for at all, correct?

A. So the model accounts for the transportation costs that would be -- and throughout the dairy supply chain, but it is not dealing with specific obligations on the part of anyone to make that payment.

Q. It -- so it does not account for the fact that Class I handlers may be required by law to pay for those transportation costs under the recommended decision, wholly apart from whatever their Class I differential obligations are; is that right?

A. It does not include any of the payments that would be required under Federal Milk Marketing Orders because it

focuses only on logistics costs.

Q. And -- all right. Are you willing to go so far as to say it would be wrong to use the values established by your model in setting Class I differentials to the extent that there's another provision in those three Southeast orders which is on the cusp of being adopted that requires Class I handlers separately to pay for the cost of getting milk to those locations?

A. Actually, first, I have tried to state previously that I'm here to provide information as an analyst. So questions of right or wrong are not really, I think, generally within my purview.

And second, if I were trying to understand the implications of having a transportation payment requirement in addition to the transportation costs that are represented in this model, I would actually want to have the ability to model that and analyze it to come up with a better answer to say, here's what I think the implications would be. And that's kind of different than saying right or wrong.

Q. I take it you were not asked by National Milk to take a look at the recommended decision regarding transportation credits in the three Southeast orders and determine to what extent that might affect how the work you had done that we have been looking at today might need to be adjusted?

A. So I was not asked to look at that decision. But I also think that the nature of what is included in the

model and what is not included in the model really implies that it would not be possible to consider that even if I had reviewed that decision.

It's actually not saying who pays what is essentially what we're talking about here. So it's not saying who pays those things. It's considered as a broad systemwide cost.

Q. Right. But I mean, we both know this whole exercise is being undertaken for the purpose of determining what Class I differentials should be, correct? That's why we're here, correct?

A. I would not disagree.

Q. Okay. Let me switch to a different topic, which is the question of adjustments being made after your model was completed, okay? Do you know what I'm talking about?

A. Uh-huh.

Q. You should say yes or no.

A. Yes.

Q. Okay. So your model attempts to determine value based upon the current locations of milk supply.

Obviously, you do a lot more than that, but I mean, that's part of what you are doing, correct?

A. Yes. That's part of what we're doing.

Q. Let's assume a situation which 25 years ago when the model was last -- the precursor model was last used to determine what the Class I differentials would be. And let's assume at that time you had two large cities, 30 miles apart, and the milk was being supplied, at that

time -- I'm going to make the example somewhat oversimplified -- from the south of those two cities, okay? And those cities lay east and west of each other, okay?

So under that scenario, it would be -- it would have been the case the model would have potentially showed values the same in those two cities because the milk was coming from south, and cities were equal distance from those sources of milk; is that fair? That would be how the model would work?

A. So I think you have captured some of the logic. But I do have to remind us all that we can talk about one milk supply and two cities, but the values and the surface are determined by the interaction of all of the millions of variables and possibilities.

So in general, we see a certain kind of gradient. We might say if we had a different demand at a different location, that could modify somewhat what that gradient might be. But it's difficult to state if you have two cities and one milk source, what the implication of that would be in the basis of a modeling event, even like what we did in the simpler version in 1997 -- well, they did in 1997.

Q. What's the -- there's a term -- I think I could say it, but I'm going to ask you to say it instead -- in Latin, where economists use it all the time, all other things remaining the same? Is it ceteris paribus?

A. Ceteris paribus.

Q. Okay. Ceteris paribus?
A. Uh-huh.
THE COURT: Do you know how to spell that in Latin?
MR. ROSENBAUM: C-E-T-E-R-U-S (sic)? Ceteris paribus?
THE WITNESS: C-E-T-E-R -- and I think it's "I," but you're saying "U" -- I-S, paribus, P-A-R-I-B-U-S. And that's some card I should carry in my wallet as an economist that I always have it available to me to spell that, but I don't.
THE COURT: And it means everything is always the same?
MR. ROSENBAUM: Everything else remaining the same.
THE WITNESS: Other things being equal.
THE COURT: Oh, of course.
MR. ROSENBAUM: Yes.
THE COURT: Thank you.
BY MR. ROSENBAUM:
Q. So if -- if now the milk is coming from the west rather than from the south to those cities, then other things remaining the same, your model today could well produce a value in the -- in the western of the two cities that would be lower than the value in the eastern because now the milk has to go an extra X miles to get to the -- to the eastern city.
Is that -- is that just a fair way to -- a

simplified way to think about how the model would work?

A. It's a simplified enough example, but I get the idea. So generally if you have to move milk a longer distance along the same trajectory from the same source, you would expect to see a higher marginal value of milk at that city location than a city closer to that same supply source, again, ceteris paribus.

MR. ROSENBAUM: That's all I have. Thank you.

THE WITNESS: Okay. Thank you.

THE COURT: Are there other questions before I call on the Agricultural Marketing Service?

There are none. I invite the Agricultural Marketing Service to question Dr. Nicholson.

CROSS-EXAMINATION

BY MS. TAYLOR:

Q. Good afternoon.

A. Good afternoon.

Q. I was thinking we might not be done by 5 o'clock today, but you might luck out.

A. I'm counting on USDA to come through for me.

Q. Okay. Well, let's see how we can go through these questions.

I'm going to try to stick to questions out of Exhibit Number 302, which is your longer statement.

A. Is it okay if I pull it up on my computer?

Q. Yes. Because I'll probably refer to some page numbers, etcetera.

A. I have that up now.

Q. Okay. Some of the questions is just to help us kind of synthesize what we have heard over the past few hours just to make sure we're all clear, and there will be some other kind of more technical questions.

So in the start, in your summary you talk about how the model is -- produces these location-specific values to be used as a competitive benchmark. And I think what I heard you define that earlier was it's kind of like in the perfect world that's the lowest cost solution? Okay.

A. Yes.

Q. And your number 3 listed in your summary of key results talked about some of the reasons that we will see differences in these spatial values. You list a number of things, supply lo- -- changes in supply, changes in demand locations, etcetera.

And one of my questions was to ask you, is there a way we could kind of delineate those factors. But I think heard you say before that that's not really possible. If we wanted to see how much is the change in supply or the supply is now and figure out what impact did that have, we are not able to do that with these results currently?

A. With the current results, that's correct. So in principle, and we have done analyses along these lines, we could say what if we have the equivalent 2016 supply, which is the last time prior to this that we updated it, and in 2021, and the same thing we would do in terms of changing demand.

I think the key is, it's possible to do that, but it has to be sort of done one thing at a time to understand the implications of, say, a supply change versus a demand change versus a transportation cost change versus a plant location type change.

So in principle, it's possible to use the tool to do that. It's a bit challenging to think about whether we should use, like, a change over six years from 2015 to 2021 to accomplish that. That would only tell you in these six years, this is what happened.

Q. Okay. So on the next page, page 4, you are talking about how the large model is 3108 counties. The smaller model, I think, had about 100 or so different -- a few hundred multi-county regions is how you describe it in your paper.

A. Yeah. And actually if you have a copy of the R.B. 97-09, again, that Figure 6 provides a rough idea of the way in which the multi-county regions were aggregated.

Q. And so when you have a sentence that says, "the smaller model also allows more direct comparison with prior analyses," are you talking about the '98 run, or are you talking about what you just mentioned, which was 2016? What is the prior one you are talking about?

A. More like 2016. So when we began developing the database for this, one of the things we do is run a series of different model checks to make sure that we have at least reasonably consistent data, and then one of the things that we also typically do is go back and look at --

once we have generated initial price surface, we go back and look at a previous year's price surface, in this case, the last one prior to that was 2016, and say, is there something crazy going on here that would suggest that there is an issue with the model data.

Q. Okay.

A. So we typically do that kind of check as an informal visual thing, just to highlight whether or not we should go back and look at any particular aspects of the data inputs for the model.

Q. And you did this in this case?

A. Yes. For both the spring and the fall months.

Q. Okay. And if I heard correctly from some previous questions, one of the reasons you do both the large and the small versions of the model is, one, it's -- as according to your paper, it's quicker to do the smaller version, but also, you can see your product flows on the map because you have less lines, let's say. So visually you get an idea of what's going on?

A. Yeah. So, for example, I didn't even ask -- Dr. Stephenson is the one who does the mapping for these. I didn't even ask him to do the map for the fluid milk distribution routing because it would basically be this massive, ugly, spiderweb of orange lines, and it wouldn't help us to -- and the sizes of the flows are also indicated by the thickness of the lines. And so you would have a lot of lines that were a mess, and then they would also be very similar in size because of the smaller

amounts of milk going to individual counties.

Q. Okay. And so when you did the different model types, is it just the large model run results that you gave to National Milk?

A. So, yeah. So we did both of those, and the assessment is that they generate very similar outcomes. When we have the 3,108 model, we actually have more data points in a sense to work with, and so that was -- that was what we did and reported only the mapping for the smaller versions of the model to give a -- and, again, the primal part is really to focus on providing an example of what the kind of information that the model provides, not so much to be important for the setting of Class I differentials.

Q. Okay. And so for the way you ran the model, I think it's in here somewhere, but I want to make sure is it clear, that are the results constrained by the capacity of each processing location? I know you talked about how you went through and you talked some in cross and you got help from National Milk on plant locations, for example, on which plants might be closing.

But how did you come up with processing volumes, would be one question? And the second question is, does the model -- is the model constrained by those volumes?

A. So, yes, let me start with the second of the questions.

So the model is constrained in the sense that plants can only process up to the allowable volume, and

this is expressed in terms of a total milk volume, farm milk volume that can go into the plant, not in terms of the products that can come out of it.

So the data for that are, to be honest, incomplete. So we have estimates that primarily were developed by Dr. Stephenson over time of the capacities at most of the larger plant locations. But particularly for smaller plant locations, there's some ice cream maker in Wisconsin, we don't really know what their capacity is. So we allow the ones for which we have information to be constrained, and that's, you know, the largest proportion of the milk and products that would be produced are under those constraint plant locations. Which actually then kind of conditions what the rest of the model is going to do, because that milk will probably go there first, and then only be available to some of those smaller facilities like -- it's not after in the sense of time, but would be made available to those plants that are not constrained.

So since we have some plants that are constrained when we have the data, and we have other plants that are not constrained, but the not constrained plants tend to be the smaller plants.

Q. And so they would kind of be filled second in a way; is that what I'm hearing?

A. It's kind of along those lines. Basically if you have a favored plant location, then you would want to use all the available capacity at that plant location, and then once you can't do that anymore, then you got to think

about, where else do I go with that milk, if you will. But it depends crucially on that constrained plant location being a location that the model thinks is good in this broader system to minimize costs.

Q. And so could you give an estimate of -- of the plants that were accounted for in the data, how many of them do you think had volumes so they were constrained, and percentage-wise maybe how many were -- or maybe by volume, total volume of milk?

A. Yeah. I'd actually have to try and go back and look at that. But I think that we do have the majority of milk going into the different plant types, particularly fluid, cheese, butter, and powder plants were under constraints. For an MPC product, or ice cream product, we have less coverage for those, but they tend not to be the big volume drivers.

Q. Okay. Your model took into account imports and exports --

A. Yes.

Q. -- locations. And exports have certainly changed a lot since 2000.

So I'm curious if you can maybe opine a little bit on how you think that might have influenced the results or had an impact on the results, if at all?

A. Yeah. I guess this falls again in the general category of it's a little bit hard to determine what causes what without doing a little bit more parsing out of the different influences. But I can say that one of the

key differences between this model version and even some of the previous ones in the 2010 era were that we used to have -- because when exports and imports were less important to the U.S., we used to have three import and export nodes, like major ports. I think they were L.A., Houston, and New York. And with the growing amount of export volume going out through different ports, you think about a port like Seattle taking a lot of powder products to Asia, we decided that we would actually use Census Bureau-generated port district data to assign the actual export quantities for the different products to those locations. So it's like an extra demand at that particular demand node. Right?

So why it's difficult to answer your question about what difference did exports make is that the total volume of exports is up, but also so is the total volume of milk supply. And so we can try and, like, take out the milk equivalent of those exports and see what difference it makes, but without doing something like that, it's kind of difficult to parse out exactly what that difference made. But we did want to account for that to recognize that that is a part of this broader system that determines those price relatives.

Q. Okay. Which would probably make sense if we're exporting close to 20% of our milk to account for that demand, right?

A. Yes, that's why we did it.

Q. Okay. I wanted to turn to page 8. This is your

table of product categories. And I just want to make sure we're clear on the record what two column headings mean.

A. Okay.

Q. So the first column is the product, and then the next two columns indicate whether it's a final product or it's an intermediate product. And so I just want you to -- so the fourth and fifth column, if you could just make clear for the record what those two columns mean.

A. Okay. So if it's okay, I'll say the final product in this model is things that went to final demand. We can think about that being consumers, but we can also think about it being foodservice or institutional buyers.

An intermediate product in the terminology that we're using here is a dairy product that is used by another dairy manufacturing process but came from a dairy plant, and I have got examples there of the different products.

So the IP allowed to make this product is basically saying, for fluid, that that can be a combination of cream and skim based on the idea that when most milk hits a processing plant, it's often separated into those two different entities and then brought back together in the correct proportions to make the different fat milk that's sold at retail. Right?

So something like ice cream, we actually have a separate product category for ice cream mix that can be produced at particular plants. That is the input into ice cream manufacturer.

Nonfat dry milk, the IP allowed to make this product, in our terminology, skim milk and cream are considered these intermediate products. So to make nonfat, we would dehydrate the skim milk, and the -- I guess that's the fifth of the columns, says product allowed as IP in, basically we're saying that you can use nonfat dry milk in the manufacture of fluid milk. And actually I should note that that's really only in California to meet their higher composition standards. But it can be used to make yogurt, it can be used to make American cheese, other cheese, casein, and ice cream mix.

So does that give you enough examples of what the definitions are?

Q. It does. Thank you.

A. Okay.

Q. I want to turn to page 11. 2.8, Processing and Transportation Costs. You mentioned how Dr. Stephenson was -- you know, you all kind of separated assignments when it comes to data, and I think you said that processing costs came from Dr. Stephenson.

And you mention --

A. Yes.

Q. -- that these costs are based on previous cost of processing studies updated to reflect 2021 cost structures.

There's been a few studies of his on costs put into this hearing record, so I'm trying to figure out which one you are talking about.

A. So the input for processing costs in this model derived from sort of a long series of our looking at the evolution of processing costs over time. And essentially, what we did was look at the 2016 processing costs that we had, and Mark provided an adjustment factor that he thought was relevant to bring that to 2021.

And I imagine that he used information available from at least the first of the costs of processing studies that he had done, but I don't know specifically how he arrived at what that adjustment factor should be.

Q. Okay. Thanks.

And then down when you are talking about transportation costs, and you used a standalone transportation cost simulation program. I was wondering if you could expand on that.

And in my mind, what I think I hear you saying, which is something that Dairy Programs can do itself sometimes when we do modeling, we figure some other things out externally, and then input those results into the model, so I -- that's what I'm interpreting that as what you did, but I would like you to kind of expand on how that was done.

A. Yeah, you have the basic idea. We used a separate model to provide the transportation cost inputs for this model.

And I think I mentioned earlier that there's been an evolution of a model. It started out as an extension-based tool to help haulers understand the full

cost of moving milk from a farm to a processing plant, and that has been refined to be a little bit broader structure to allow the assessment of the different costs that I mentioned.

And I think I mentioned previously that the way in which this tool was used was -- again, this is something that my good friend Dr. Stephenson is responsible for -- was to run a large number of different possible routes with that standalone transportation costing tool, and then to understand what the statistical relationship was between the distance of those routes -- and these are the actual road mileage type routes, somewhat similar to how we have done this in the model here -- and then to establish a statistical relationship that is typically a non-linear relationship that would look at all of those different cost points relative to the distance and establish what sort of a mean value would be at a distance of X number of miles.

So does that provide enough information to help you understand how we use this approach?

Q. It does.

And I had another question kind of later on. I think you mentioned you used updated fuel cost data to reflect 2021 diesel prices. Are those factors in this model or that just gives you the relationship and then your USDSS model puts in diesel prices separately, for example?

A. Yeah. So let me try and clarify that, because I

think it's an important point.

The initial transportation cost model is used to generate what we call a cost matrix that has a cost to go from any origin of the 3,108 to any destination of the 3,108, which relates to that function of distance. Okay? We then -- and that actually includes the operating costs that would include wages and tires and fuel in that initial estimate.

But then in order to better reflect regional differences in fuel costs and wages, we adjust that by a factor that shows how the average -- or how a wage or a fuel cost in a particular location is related to the national average.

So if it's 95 -- if diesel is 95% of the national average cost, that 95% is used to reduce the diesel cost at the starting location where that pattern exists. And it could be, you know, 5% more in which case you would multiply it by 1.05.

So we start with a base of the transportation cost from the model -- sorry, I'm using my professor hand -- and --

Q. I appreciate this lecture, so this is good.

A. Okay. And so we then adjust that in the -- in the actual model simulations with the USDSS model to account for the regional differences in wages and in fuel costs.

Q. Okay. And so I think I remember you stating you used DOE data for fuel costs?

A. Right. And so that would actually, excuse me,

come in where the average -- that would be the thing that describes what the average national price would have been in October for diesel, and then we have a regional adjustment based on the DOE data.

Q. Right. Okay.

So the data you did -- you use for kind of like your beginning index, I'll call it that, is for May of 2021?

A. May and October for preceding months, yeah. So the base, if you will, that you are going to adjust up or down is that May and October value.

Q. Okay. And then the wage data, what -- you used wage data from BLS. I'm assuming that was specific to trucking?

A. Yeah. I don't remember the specific BLS category, but it was designed to be specific to trucking labor.

Q. It's a little bit different as Mr. English talked about, and before -- when we did reform, it was informal, and we kind of knew these things or could work with the people. This is our only opportunity to ask these questions.

A. I appreciate that.

Q. Okay. I want to turn to the Figure 5, which is on page 13.

A. Yes.

Q. And I think in that figure what you said, because this is using the smaller run, less locations, so kind of plant locations might be grouped together in a larger

triangle to represent a few plants that are there.

A. Absolutely. Yes.

Q. I did have a question. If we noticed -- well, let me -- I just want to get your feel on how kind of accurate you think those plant locations are, if, for example, based on looking of these things -- you know, our own knowledge, and not my knowledge, but the people sitting behind me's knowledge, working out in our Federal Order offices see a dot, let's say in the part of South Dakota where they're not quite sure there's a plant there, but no dot maybe in North Dakota where we think there is a plant there, I mean, I think you talked earlier about the plant list was probably the hardest part of this whole -- putting together the plant list is probably the hardest part to put together for the model.

A. It is. It's the place where the least amount of publicly available information exists. I think is -- that makes it the bigger challenge.

Q. Okay. So one question is, is kind of these differences in where maybe a plant is or isn't, because this is a smaller model, is that like a mapping problem based on the fact that you just used the smaller runs to do this, not necessarily all the plant locations that you did in the larger run?

A. So this has been a question that we have been getting -- well, at least I have been getting since the time I started working on this model in 2000, and they actually got it before in 1997. It has to do with exactly

what you are talking about, the aggregation of plants that are at other specific locations to the locations that are available in the model.

And so I can't remember the specific instance, but it was -- there was a conversation they were having, and somebody said, "You don't have my plant on there. My plant's over here, it's not over here." I said, "Yes, we know, because that actual triangle location is accounting for all the processing capacity, whether it's right there or not. It's like, in the multi-county region, this is the location that we chose to aggregate where that plant location -- or plant capacity was available."

Q. And that multi-county region is kind of going back to the study from 1998 and the circles, right? So that region could be a large circle where that dot represents or a small circle?

A. Yes. And as I noted, and in locations where there was a good deal of milk supply in a dense area, like the Central Valley of California, it's pretty much county by county. In other regions where at least at that time there was less milk supply, you had less dense coverage, and you were aggregating more plant capacity at a given location. So I can understand how the specific flows here would make it look like it's not representing the plants that you are aware of.

Q. So we had one question, if we can compare Figure 5 to Figure 4. So Figure 4 is on page 7.

A. Yep. Thank you.

Q. And Figure 5 is on page 13.

And I want to point to the area in North Carolina on the coast where there's on Figure 5, there's a triangle there. So that would represent some fluid plant in that area?

A. Let me look at the Figure 5.

Okay. I don't know the reason why there isn't a blue dot where there is a dot in Figure 5. So, again, these maps were, again, generated by Dr. Stephenson.

Q. Maybe I'll get the privilege to ask him that question.

A. Perhaps you will.

Q. Okay. I want to make sure it's clear for the record, because we just had the question come up. I think what I heard from you in regards to -- earlier, I think this was questioning for you from Mr. English -- or Mr. Rosenbaum, while if there's a kind of a plant there in your map that's not really there, or a plant -- a plant missing that is there, in the big picture that doesn't really change your results?

So, for example, maybe the missing plant in North Carolina or something, that doesn't -- in the big picture -- doesn't in the big picture kind of change the results out of the model?

A. Actually, I think the Figure 5 is actually showing that the supply plant is there. It's just omitted in the general graphic that's talking about the dairy process -- and actually, I think maybe one of the reasons that that

may be omitted is we didn't have a capacity for that plant, and therefore it didn't show up in the capacity graphs that are shown in Figure 4. I don't know. I'd have to actually better understand that.

But -- so the plant is definitely there for the purposes of processing something in the analysis that we did. What seems funny is that it doesn't show up as listed in Figure 4.

Q. Okay. Okay. I'm on page 14, into 15. So here you are talking about milk assembly -- well, that's the figure, Figure 6. I don't want to talk about 6.

But I did want to move to the second -- page 15 in that top paragraph. The second sentence from the bottom of that paragraph says, "The model results are not sensitive to changes of plus or minus 5%, and demand values are estimated transportation costs."

So I just wanted to make sure it's clear, what you are saying is if -- if there's only a small change, the model's not going to pick that up or won't change its results if there wasn't the change greater than 5% in one of those variables?

A. Yeah, that's the correct interpretation. And perhaps a little bit of background on that is helpful to have.

I mentioned in the starting statement that I made that this has actually been peer-reviewed research that's been published. And one of the things that the reviewers required us to do was that kind of analysis to assess the

sensitivity of our results to those kinds of changes.

And so I mentioned earlier that we can tweak those things to evaluate their impacts. And in general, what we find is it takes a really large change, like the shifts in population that we have seen and the locations of milk supply and the transportation costs being markedly different, for us to see a markedly different result from the model.

Q. On page 17 you have Figure 8, milk production by region. And you list the four regions, but I don't think they are defined anywhere of what encompasses those regions.

So could you elaborate on that a little bit?

A. Yeah. So, again, we talked about the division of labor between Dr. Stephenson and myself, and I mentioned that he was the one who was responsible for pulling together the milk supply data.

I hope you will have the opportunity to rigorously question him about Figure 8.

Q. Well, hopefully the person calling him on the stand might know that we were going to ask him these questions, so thank you.

This is -- I don't -- I'm trying not to go back and forth. I want to go to page 21 where you show the pie charts of the changes in the transportation costs as a percentage of the total from 2011 to 2021.

So, for example, fuel costs represented 35% of transportation costs in 2011, while they only represented

25% in 2021.

We were wondering if you have kind of what are the -- what are those values for those two years?

A. I agree that the breakout is perhaps relevant to show the shifts among costs, but actually figuring out what the total costs would be is also important.

And I will again ask you to refer to my esteemed colleague, Dr. Mark Stephenson, to provide additional details because he did that component of it.

Q. Okay. I will wait. And I wrote Mark on my sticky, so we're going to come back to that.

And I assume then that he also did the Figure 13?

A. Yes, he did.

Q. This is why we're going to get done by 5:00.

A. Excellent.

Q. I did have a question. So your results that you gave to National Milk, they are in Exhibit 300 that we have discussed, include the base differential of a $1.60.

A. That's correct.

Q. The proposed results that are kind of -- from National Milk's proposal results in Column S on Exhibit 300 include a 2.20 base differential.

A. That's my understanding, but I have not had any direct input at how that was calculated.

Q. But assuming that's their -- that's what's in that -- assuming that the 2.20 is what they put in their base differential, then is it right to say that $0.60 -- part of the $0.60 difference between what the model came

up with versus what they proposed could be attributed to the different base differential that you -- that each party assumed?

A. Again, I -- I don't know enough about how that process was done to say you are just adding $0.60. I actually don't think that was what was done. But I don't know exactly how that set of values was assigned and the role that the 2.20 played in that.

Q. I'll look forward to asking National Milk about that.

A. I think you will have an opportunity.

Q. Okay. On the bottom of 23 you talk about Kriging, K-R-I-G-I-N-G, is employed. And I think what I think you are saying is, right, we get all these values at certain locations, and you put it in this -- use this method to kind of make a one continuous map. Even though there might not be milk or a plant in a lot of locations, you still assign a value in that?

A. Yeah, that's -- that's exactly the idea. It is an algebraic algorithm that allows you to extrapolate values based on -- if you think about -- say you have got a series of marginal values at Class III plants, but you don't have one in every county that you can use to say that would be the value in that county.

This is an algorithm that allows you to take those existing values, use different weighting schemes, and assign the value to every county. And it's fairly commonly used in this kind of spatial mapping type work.

I guess one other thing I'll add is, that in contrast to some of the previous work that we have done, there are different ways to implement this algorithm. And the way we initially were implementing it when we started this process, we'd say if a -- if -- it's the linear distance between two points, so if you are going to cross, like, Lake Erie, you would say you can just take the value and go right across there, and we realized that that was not appropriate.

And so it's been modified to reflect the fact that it actually has to respect the borders that are part of that mapping system so that you are not coming up with funny values for things that look to be closer than they are, because the straight line distance is not the same as what you have to have happen by moving the product.

Q. And when you say that's what you did initially, is that what was done back in the '90s or what -- what that's the initial period?

A. Well, initially in the '90s, but also in the early iterations of this model in the 2000 era we were using that without recognizing the importance of accounting for that geography.

Q. Okay. We're looking at Figure 15 on page 24 with all these pretty lines, pretty wavy lines. And this might be a Mark thing --

A. It is a Mark thing.

Q. Okay.

A. Can I say that to everything and then we'll be

done really quickly or --

MR. ENGLISH: No.

THE WITNESS: I guess I'm under oath. Sorry.

BY MS. TAYLOR:

Q. Well, I'll ask it anyways in case you know, but I'll write it down here to ask him.

Is the difference between lines, like, a 10% change in -- is that -- because this -- yeah, $0.10, sorry, not 10% -- $0.10 change? Because some of these numbers are kind of hard to read.

A. Yeah, this is actually the way that we used to map it was only with the lines and then some colored gradation. What I think is a little bit challenging about this is you actually have the individual county levels being mapped, and on top of it you have this line surface.

And technically, we wouldn't need the line surface to help us interpret that so much except for the fact that there's kind of this very broad range of values that goes again from 1.60, you know, up into the 7s. And I think in putting the lines in there, Mark was trying to help guide the eyes to kind of where the break points were as opposed to just using the colors.

Q. Okay. Okay. Another question for you, and you talked a little bit about this with somebody, about kind of the art that goes into kind of taking the model results and then trying to bring them into the real world, not just what the model spits out.

And you talked about what kind of things might

people look at, factors go into different changes. And one, you talked about competitive relationships that currently exist, which the model does not account for. You also talk about places where geography gets in the way, so maybe that's mountain ranges or a lake.

A. So let me expand on that just a little bit, if I may.

So the geography that we have here is the road network. So if the road is going over a mountain and the milk and products are moving over a mountain, they are going over the mountain or they are not. It's not whether or not there is a mountain range. We don't account for any differential costs on a movement that would be going over a mountain range versus traveling flat across the plains once you got east of there. But we can have geography if it's based on the existing road network.

So when I was thinking about things that were more related to the transportation network, I was kind of thinking about we don't account for traffic congestion in metropolitan areas, for example.

Q. And maybe, back to my mountain example, maybe you don't count for it might cost more to go over that mountain, even though --

A. That's correct.

Q. Uh-huh. And that's something that -- that's kind of the art of people with knowledge of that marketing area might be able to attest to?

A. Yeah. And I should also say there's -- and I grew

up in San Diego, so I'm a little bit familiar with the California geography, but we can also think about how many arteries there really are to move product from a location like the west, and there aren't that many. So that actually might account for greater congestion on those routes, and we didn't account for that in the system that we use, which is sort of like this average costing of routing plus an adjustment for fuel and wages.

Q. Okay. I think in your statement somewhere you define disorderly marketing can result when differentials are greater than transportation costs.

Does that ring a bell?

A. I'm not sure I used the word disorderly marketing. Let me have a look and see.

Q. My notes say it's on page 23, so we'll all flip there.

It's on the bottom of 22 into 23. So the sentence says, "If these values" -- and you are talking about differentials -- "were larger than the cost of transportation, then 'disorderly' marketing conditions could result with excess milk trying to find its way to the higher valued plants."

A. I'm still looking for where you are.

Q. At the bottom of page 22.

A. Sorry, I was on 23.

Q. Yeah, sorry. And then the sentence starts there and goes on to 23.

A. Thank you.

Q. Yep.
A. Okay. So --
Q. The question is, can you comment if you think you see where -- if there are any instances of that in your model results or you feel confident that your results are not overstating transportation costs?
A. So I guess I haven't done a systematic analysis to look at, like, whether a Class I differential for a particular movement was a bigger value than the transportation cost. I think generally what we see in the model results is that we're not really actually talking about the disorderly marketing per se, we're talking about can we evaluate what those transportation costs would be and how they affect what the marginal value of milk would be, for example, at that Class I plant.

But we don't have any kind of more systematic analysis of is the model saying something is too big relative to what the current Class I differential is.
Q. Okay. And then for your -- particularly for the fluid plants that you had in your data, does the model differentiate between ESL plants and traditional HTST plants? And do you -- if it does, do you think it impacted the results in any way considering they have kind of different distribution networks?
A. It does not currently make a distinction between those two milk products. Again, I mentioned earlier, nor does it deal with the differences in distribution for organic milk. But we have actually started talking about

that as more ESL milk has come online, do we need a separate category for that, and the basic challenge is being able to come up with the demand data to support that.

Q. Okay. Not going to ask you questions I don't think you're here to answer. Save that. Let's see.

So you talked a little bit about it, and I know we looked at the results from 1998, but does your -- did your model put out different surfaces for different product categories, the four classes of products, for example?

A. Yes.

Q. And does each one of those kind of have a zero point? I mean, they are all spatial values, so I assume just like the Class I surface you produced, those also have kind of like a zero starting point somewhere.

A. I guess I would have to go back and look at the data. My recollection is we have fewer of those zero points in part because of the way that manufacturing capacity is spread around the country.

Q. And do you -- would you know maybe what the range was in those surfaces?

A. So if we're thinking about whether or not there is a -- dare I say it -- a Class III price surface, the spatial analysis, which suggests that there is, my recollection is that surface largely goes from west to east -- and this is an approximate value, and I'm not remembering it so much from this as from previous work -- that might be like $0.50.

Q. Okay. And does the model solve for all four of those surfaces simultaneously?

A. It's generating a marginal milk value at all locations where plants are processing. We then can actually look at -- for the plants that would be doing products that would be in any of the classes, we can assign a value for that.

And so all of the information is being generated at one time, just as I have talked about everything kind of happens as a part of this broader system. And we don't typically map any of the other surfaces other than Class I. We have, for our own interest, occasionally done that, and then most people do not want to talk to us about a Class III price surface.

MS. TAYLOR: I think Mr. Wilson has a question for you.

CROSS-EXAMINATION

BY MR. WILSON:

Q. First of all, I'm not an economist to any degree, so there are terms that I don't know if you have used them today, but other people have used them in the past, related to shadow pricing.

A. Yes.

Q. That's equivalent to the -- to the marginal spatial price cost that you are talking about, right?

A. So the base marginal values generated in the model would be called by economists shadow prices or shadow values, and the only place where we depart from that is

when we add the $1.60 to get to something that's comparable to the current Class I differential surface.

Q. Are there occasions where that shadow price is, on Class I, a lot different than the other II, III, or IV shadow prices? And if they are, what's your view on what's causing that?

A. So I think you are -- maybe you are talking about a broad set of differences between a Class III and a Class I value?

Q. Correct.

A. Yeah. So I mentioned numerous times that the way this model works is it's looking at all this information simultaneously. So as an example, we might expect that a Class III value would be different than a Class I value, except for that 1.60, in a location where there's a lot of cheese plants and a lot of milk going into cheese plants that are satisfying a demand. And it'd be particularly the case if there isn't a lot of demand for milk to go into a fluid plant. And I'm kind of thinking about in my mind an example of Idaho and Montana, right?

So there you could actually get differences between the need for milk to make cheese, which is big and strong, and saying, I need this right here based on the capacity, and not so much demand for fluid milk, and also a much sparser network of fluid plants in that region that mean you actually have to move that farm milk a lot longer distance to get it to a fluid plant.

Q. So if you had that county in Idaho that maybe had

a fluid plant sitting next to a cheese plant, and one of them was a lot more -- if Class -- if the cheese value shadow price was significantly greater than the fluid value, what's that telling you? What's that -- what's that telling us?

A. Okay. So I can imagine a situation in the real world where that might happen. In the model world, if you have a cheese plant right next to a fluid milk plant, the model only knows about the value differences due to what I mentioned before, like, there's a little bit of different component mix that's going into those different plants, and it only knows about what would the transportation costs be for me to go from one to the other.

So the model won't generate big differences in a Class III value and a Class I value, again, ignoring the 1.60 part, if they are right next to each other, because it's only accounting for those specific differences in the component use and in the transportation that would take you to go kind of this hypothetically across the road from one plant to another.

So the model won't generate something that looks like a big difference between those two values, other than that 1.60 that would come into play. And so the model can't really inform very much about what would happen if we saw that.

Q. So in looking back at some of the maps that you didn't create, we see these assembly points for the fluid. Okay? And so I think of these shadow prices for the fluid

side as milk is trying to get to the Southeast of the United States, that shadow price gets larger and larger, meaning that it's costing more money to get that milk to processing. And so it's an assembly. It's -- it's -- that shadow price is driven from the assembly side of farm to processor -- transportation, not assembly, right?

A. Yeah. So it -- again, I apologize for kind of keep saying this, but we have to think about this as a broader system that includes all the different elements.

I agree with the basic idea that the model is saying milk wants to move to the Southeast, it needs to move longer distances. And that's actually both the longer distances that we're looking at for a farm milk assembly to a plant, as well as the distribution routings that would take place, right?

So the basic idea I think is there. What exactly causes that has a broader set of factors. But the map, actually even for the small model, tends to suggest we have a lot of milk that wants to move through kind of a stair-step to the Southeast, and that's part of what's generating those larger differences between the current Class I differential and the model-generated marginal values at that location. It's just more costly to get the milk into those locations.

MR. WILSON: Thank you, Dr. Nicholson.

THE WITNESS: Thank you.

MS. TAYLOR: That's it from AMS. How about that?

THE COURT: Mr. English?

CROSS-EXAMINATION

BY MR. ENGLISH:

Q. I have one follow-up question.

On page 14, Figure 6, a question that Ms. Taylor asked a couple of different times about North Carolina. Isn't it, sir, that that is likely the Port of Wilmington, North Carolina, and is an export node?

A. Let me look. So I'm looking at Figure 5 --

Q. Yes.

A. And I'm looking at the fact that that is representing a fluid plant, which is not an exportable product in the model. And it's also apparently, at least if my eyes are not deceiving me, distributing milk.

Q. Okay.

A. So I think the omission is on the previous figure where it wasn't represented with the blue dot, it's not the omission for that, and it's not just an export location. Although Wilmington is an export location in the model.

MR. ENGLISH: All right. Thank you, sir.

THE WITNESS: Sure.

THE COURT: Ms. Hancock?

MS. HANCOCK: Thank you, Your Honor. We have no further questions. Appreciate your time.

We would move for admission of Exhibits 302 and 303.

THE COURT: Is there any objection to the admission into evidence of Exhibit 302?

There is none. Exhibit 302 is admitted into evidence.

(Exhibit Number 302 was received into evidence.)

THE COURT: Is there any objection to the admission into evidence of Exhibit 303?

There is none. Exhibit 303 is admitted into evidence.

(Exhibit Number 303 was received into evidence.)

MS. HANCOCK: And may the witness be excused, Your Honor?

THE COURT: Is there anything you would like to add?

THE WITNESS: No. I thank everyone for the opportunity to make this presentation, and I thank you for helping me meet my other obligations.

Thank you very much.

THE COURT: Wonderful. Thank you, Dr. Nicholson. We really appreciate it.

And the witness may be excused.

THE WITNESS: Thank you.

MS. HANCOCK: I would just maybe tell you what I understand or -- I don't know if, Erin, if you want to go?

MS. TAYLOR: Sure. So on my list of people that need to go tomorrow, from National Milk, a Dr. Koontz, and from MIG, Dean Sommer.

THE COURT: I'm sorry, say those again?

MS. TAYLOR: Dr. Koontz, K-O-O-N-T-Z. And then that would be a witness for National Milk. A witness for the Milk Innovation Group would be Dean Sommer, I think -- did I write that down correct?

MR. ENGLISH: You did, but it's really IDFA.

MS. TAYLOR: That would be an IDFA witness. I think Mr. English said his name earlier.

THE COURT: Dean Sommer.

And then I had written down last night Jeffrey Sims?

MS. HANCOCK: Yes. Well, for the -- he didn't have the need to go and be off by tomorrow, but assuming that we get Dr. Koontz on and off, and Mr. Sommer on and off, we would be prepared to put on Jeff Sims, Dr. Eric Erba. I think that Sally Keefe still at some point would like to go on.

MS. TAYLOR: That will take us through tomorrow and part of Friday.

And then Friday I have one in-person dairy farmer that I know from National Milk that's coming, and we have six farmers signed up to virtual testimony in the afternoon.

THE COURT: You know, that is wonderful because you just announced and you said, if you would like to testify, let us know by noon or something, and you filled it up.

MS. TAYLOR: People are listening.

THE COURT: I love it.

All right. Is there anything else before we go off record for the day?

There is none. See you tomorrow morning at 8:00 a.m.

We go off record at 5:02 p.m.

(Whereupon, the proceedings concluded.)

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STATE OF CALIFORNIA)
) ss
COUNTY OF FRESNO)

I, MYRA A. PISH, Certified Shorthand Reporter, do hereby certify that the foregoing pages comprise a full, true and correct transcript of my shorthand notes, and a full, true and correct statement of the proceedings held at the time and place heretofore stated.

DATED: November 29, 2023

FRESNO, CALIFORNIA

MYRA A. PISH, RPR CSR
Certificate No. 11613