BEFORE THE
FLORIDA PUBLIC SERVICE COMMISSION

DOCKET NO. 030623-EI

In the Matter of:

COMPLAINTS BY OCEAN PROPERTIES, LTD., J.C. PENNEY CORP., TARGET STORES, INC., AND DILLARD'S DEPARTMENT STORES, INC. AGAINST FLORIDA POWER & LIGHT COMPANY CONCERNING THERMAL DEMAND METER ERROR.
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VOLUME 2

Pages 217 through 430

PROCEEDINGS:	HEARING
BEFORE:	COMMISSIONER J. TERRY DEASON COMMISSIONER RUDOLPH "RUDY" BRADLEY COMMISSIONER CHARLES M. DAVIDSON
DATE:	Thursday, November 4, 2004
TIME:	Commenced at 9:35 a.m. Concluded at 4:45 p.m.
PLACE:	Betty Easley Conference Center Room 148 4075 Esplanade Way Tallahassee, Florida
REPORTED BY:	TRICIA DEMARTE, RPR Official FPSC Reporter (850) 413-6736
APPEARANCES:	(As heretofore noted.)

I N D E X

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(Transcript follows in sequence from Volume 1.)

GEORGE BROWN

continues his testimony under oath from Volume 1:

CONTINUED CROSS EXAMINATION

BY MR. HOFFMAN:

Q Okay. So you reached your conclusion in 2002 that these meters supposedly were overregistering when FPL last calibrated the meters, and this occurred right after the meter test; correct?

A That's what this is saying, yes.

Q Well, this is your deposition testimony.

A Yes, that's correct.

Q Is that correct?

A That is correct. After I had talked with some experts in the field, they assured me there was no other way.

Q Okay. And you reached this conclusion well before -- many months before you took the first deposition of an FPL meter tester regarding FPL's meter testing and calibration procedures; correct?

A Yes, that is correct.

Q And it was perhaps a year or so before Mr. Smith educated you on meter design components and the intricacies of how thermal demand meters work; correct?

A That was well before I had any discussions with

Mr. Smith. I had discussions with other experts.

Q So the answer to my question is yes?

A Yes.

Q So you essentially came out early, if you will, with a position of multiyear and ten-year refunds with FPL and seeked (phonetic) to negotiate off of that position; correct?

A That -- say that again, please.

Q Yes. You came out to FPL, you communicated to FPL in 2002, before this docket was even opened, a position that would secure you the highest amount of money that these -- your position that these meters had all been miscalibrated, and thereafter, you sought to negotiate this case with FPL; isn't that true?

A What you're saying is true. The difference being the most reasonable thing to consider is that the meters were miscalibrated. If you may or may not recall that my contact with Mr. Bob Armstrong was when the first meters we ever had tested were tested in the field. And Mr. Armstrong was accepted by Florida Power & Light as a metering specialist, that he followed all the various needs to do that testing. His testing matched Florida Power & Light's testing, and he is an engineer, electrical engineer, was also an employee of Landis & Gyr and assured me there was no way other than miscalibration of these meters for them to go high.

MR. HOFFMAN: Mr. Chairman, I'm going to move to

strike that response. My question was whether he communicated early with FPL a position of multiyear refunds and negotiated off of that. His explanation goes beyond that question, is hearsay, and I move to strike it.

COMMISSIONER DEASON: Okay. There's an objection.

MR. HOLLIMON: Well, he asked -- the question was what's the basis of your statement, and he just supplied the basis.

COMMISSIONER DEASON: I'm going to allow the answer. You may proceed, Mr. Hoffman.

MR. HOFFMAN: Thank you, Commissioner.

COMMISSIONER DEASON: Mr. Hoffman, how much more do you have for this witness?

MR. HOFFMAN: I probably have about 45 minutes.

COMMISSIONER DEASON: Well, we need a break then. We'll break for lunch. Let's try to be back here at 1:30, if we can.

(Lunch recess.)

COMMISSIONER DEASON: Call the hearing back to order. Mr. Hoffman, you were inquiring. Oh, and just so that you know, you have used 58 minutes of your allotted time.

MR. HOFFMAN: I think I've curtailed it quite a bit, Commissioner Deason. I think I should be able to finish this up in about 10 minutes.

COMMISSIONER DEASON: Great.

BY MR. HOFFMAN:

Q Mr. Brown, if you could, could you turn to your rebuttal testimony? On Page 8 of your rebuttal, beginning at Line 20 through Page 9, Line 1 of your rebuttal, you state that the before and after billing differential approach should be used for the meters in this docket, and you support -- you cite to a Florida statute. Do you see that passage?

A Say that again, please.

Q Sure. On Page 8 at Line 20 through Page 9, Line 1 of your rebuttal, you state that the before and after billing differential approach should be used for the meters in this docket; is that correct?

A Yes.

Q Okay. And you cite a Florida statute; correct?

A Say that again, the last part.

Q I'm sorry. You cite a Florida statute in support of your position.

A That's correct.

Q Isn't it true that FPL made this before and after methodology available to you on behalf of your clients, and you rejected that offer because FPL's proposal also included a one-year refund?

A Florida Power & Light -- that's correct. We rejected a portion of your offer. That's correct.

Q And you would agree that the customers who are not in

this docket to whom you draw a comparison received a one-year refund from FPL together with the higher of the meter test or the before and after kW demand billing approach; correct?

A The customers that are not in this docket received, that's correct.

Q Okay. I'm going to ask Mr. Menton to assist me here and hand you a document.

MR. HOFFMAN: Commissioner Deason, I'm handing out copies of a letter dated May 6, 2003, from me to Mr. Brown and would ask that that letter be marked for identification.

COMMISSIONER DEASON: Exhibit 9.

MR. HOFFMAN: Thank you.

(Exhibit 9 marked for identification.)

BY MR. HOFFMAN:

Q Do you have that letter in front of you that's been marked as Exhibit 9?

A Yes, I do.

Q Okay. Mr. Brown, do you recall receiving this letter?

A Yes, I do.

Q Is that your signature on Page 2 of this letter?

A Yes, it is.

Q Mr. Brown, if you turn to Page 17 of your rebuttal, beginning with Line 16, and you go through Page 18 of your testimony, that's where you talk about the issue of whether the

refund period for the J.C. Penney's account should include the higher kWh charge under the GSD-1 rate; is that correct?

A Let me read that, if I can.

Q Okay.

A That is correct.

Q Are you aware that this J.C. Penney's account has been on the GSD rate since September of 2003?

A That's correct.

Q And are you aware that they have not sought to contract up to the GSLD-1 rate?

A They have not opted to do that at this time.

MR. HOFFMAN: Commissioner Deason, we have nothing further.

COMMISSIONER DEASON: Staff.

MR. KEATING: No questions.

COMMISSIONER DEASON: Commissioners.

Redirect.

MR. HOLLIMON: Thank you.

REDIRECT EXAMINATION

BY MR. HOLLIMON:

Q Mr. Brown, you were asked some questions about whether there's anything in the PSC rules that authorizes before and after a refund calculation. Do you recall that?

A Yes, sir.

Q Is there anything in the rules that prohibits before

and after?

MR. HOFFMAN: I'm going to object, leading question.

COMMISSIONER DEASON: The question is leading. You may need to rephrase, Mr. Hollimon.

BY MR. HOLLIMON:

Q What do the PSC rules require in terms of how the refund is calculated?

A I don't have the rules right in front of me at the present time. I can't read it for you. But its goal is to make the customer whole or to refund to them what they were overcharged. And as far as I know, there is one rule that's at the end of the section on refunds that does have to do with when something can't be determined exactly, then you can use an estimate back for the whole time period.

Q Mr. Brown, you also were asked some questions about the -- how you calculated your before period and your after period for purposes of determining what the refund percentage should be. Do you recall that?

A Yes, I do.

Q Now, would you explain how you used the information available to you to determine the after number?

A Yes, I can. In the example that Mr. Hoffman gave, I was shown a history of 18 months of billing. I took the 12 months prior to the billing, which would have been from December to November, whatever it may be, I took the next 12

months after that period and then there were six additional months. I took the months that were from, I believe, January through June and averaged the Januaries of '03 and '02 up through June of averaging those months so that they were comparative exactly of the month for month, not a 6-month period or 18-month period compared to a 12-month period.

MR. HOLLIMON: Thank you, Mr. Brown.

COMMISSIONER DEASON: Okay. Thank you, Mr. Brown, for your testimony. You may be excused.

(Witness excused.)

COMMISSIONER DEASON: Exhibits. Let's see, we have prefiled Exhibits, I think, 6 and 7. Are those moved?

MR. HOLLIMON: Yes, move 6 and 7.

COMMISSIONER DEASON: Without objection --

MR. HOFFMAN: Commissioner, with respect --

COMMISSIONER DEASON: You made objections earlier and those rulings stand. I'm going to admit 6 and 7. And that leaves Exhibits 8 and 9.

(Exhibits 6 and 7 admitted into the record.)

MR. HOFFMAN: Commissioner, I do have an exhibit that I need to offer in response to their exhibits. They have offered as part of composite Exhibit 6 the deposition transcripts. It's Exhibit 2 to Mr. Brown's direct testimony. They have offered excerpts from the depositions of Mr. Herbster, Mr. Faircloth, and Mr. Teachman, and we don't

object to that, but we do have the right under Rule 1.330(a)(4) to introduce other parts of those depositions, and we wish to offer those as exhibits as well.

COMMISSIONER DEASON: Do you have copies of that?

MR. HOFFMAN: Yes, sir.

COMMISSIONER DEASON: Okay. Please distribute that. Mr. Hoffman, let's identify these. Is there any particular order?

MR. HOFFMAN: Any order is fine, Commissioner.

COMMISSIONER DEASON: Okay. Well, then we'll begin with Faircloth; that will be Exhibit 10. Herbster will be 11 and Teachman, 12.

(Exhibits 10, 11, and 12 marked for identification.)

MR. HOFFMAN: And we would move, Commissioners, Exhibits 8 through 12.

COMMISSIONER DEASON: Okay. There's a motion to admit Exhibits 8 through 12. Any objection?

MR. HOLLIMON: No objections.

COMMISSIONER DEASON: Very well. Hearing no objection, show then that Exhibits 8 through 12 are admitted.

(Exhibits 8 through 12 admitted into the record.)

MR. HOFFMAN: Thank you, Commissioner.

COMMISSIONER DEASON: Okay. I think we have one other witness from the Customers at this point, Bill Smith.

MR. MOYLE: I'm going to be handling Mr. Smith.

BILL SMITH

was called as a witness on behalf of Ocean Properties, Ltd., J.C. Penney Corp., Dillard's Department Stores, Inc., and Target Stores, Inc., and, having been duly sworn, testified as follows:

DIRECT EXAMINATION

BY MR. MOYLE:

Q Please state your name and address for the record.

A My name is Bill Smith. My address is 33 South Easter Island Circle, Englewood, Florida 34223.

Q Have you caused direct testimony to be filed in this docket?

A Yes, I have.

Q And have you caused exhibits to be filed along with your direct testimony, Exhibits A through O?

A Yes, sir, I have.

Q If I asked you the questions as set forth in your prefiled testimony today, would your answers to those questions be the same?

A Yes, sir.

MR. MOYLE: I would ask that Mr. Smith's direct testimony be inserted into the record.

COMMISSIONER DEASON: Without objection? Hearing none, show that testimony inserted.

MR. MOYLE: Okay. And I would also ask that

Mr. Smith's exhibits be placed into the record.

COMMISSIONER DEASON: Let's identify that.

MR. MOYLE: I'm sorry. Identify A through O maybe as a composite exhibit.

COMMISSIONER DEASON: Okay. And this is attached to the prefiled direct testimony?

MR. MOYLE: Yes, sir.

COMMISSIONER DEASON: Okay. That will be composite Exhibit 13.

(Exhibit 13 marked for identification.)

MR. MOYLE: And I would ask that that composite Exhibit 13 been placed into the record.

COMMISSIONER DEASON: We'll wait until after cross-examination and allow you to move it at that time.

MR. MOYLE: Okay.

TESTIMONY OF BILL SMITH

Please state you name and address for the record.

Bill Smith

33 South Easter Island Circle

Englewood FL 34223

What is the purpose of your testimony?

To discuss the type of thermal demand meters at dispute in this case, the TMT Form 6-S Duncan Landis & Gyr meter, my role in helping design the meter, my work history with the manufacturer of the meters in dispute in this docket, my knowledge of the mechanics of how these thermal demand meters work, and what I believe caused these meters to overregister demand when tested by FPL. I will also discuss the impact that the sun has on thermal demand meters, the proper way these meters should be calibrated, and, how, in my experience, the percentage of error for meters that over-register is calculated.

Please indicate your educational and professional background.

I graduated from North Vernon Indiana High School in 1947. I then served my country in the United States Navy for nine years where I was an Electronics Technician (ET) and a Nuclear Technician. In 1956, I was accepted into Purdue University where I majored in electrical engineering. I graduated from Purdue with a degree in electrical engineering in January of 1961. In 1958, I went to work for Duncan Landis & Gyr. This is the company that made the meters that are in dispute in this docket. I worked there for around 13 years, until 1972. In 1973 I went to work with Anchor Electric. Anchor manufactured meter mounting device. In 1985, I worked with the Astra Corporation, a company that made and sold metering transformer. Shortly thereafter, I worked for the Utility Test Equipment Company (UTEC). UTEC designs, manufactures and distributes meter test equipment. I later returned to Anchor where I finished my career and retired in 1996.

Have you been involved with meters and meter testing equipment pretty much your whole professional career?

Yes.

What were your duties and responsibilities when you worked with Duncan Landis & Gyr?

As an electrical engineer, I had a host of duties that involved the meters and test equipment that the Company manufactured. With respect to thermal demand meters, like the ones involved in this docket, my responsibilities included working on the design of the meters and ensuring that quality control was maintained. I also tested meters, including the thermal demand meters, against a standard meter. Finally, I oversaw the testing of meters, including thermal demand meters.

Did you gain familiarity with the internal workings of thermal demand meters?

Yes. As I mentioned, part of my job included designing the meters. The Company was always seeking ways to improve the thermal demand meter, and part of my responsibilities was to assist with designing improvements to the meter.

Are you aware that the meters in this case all overregistered demand?

Yes I am. I have reviewed the testing reports for the meters. The testing reflects that the meters have overregistered demand. Mr. Brown's testimony details the particulars of the amount by which each meter overregistered.

One of the issues in this case relates to proving the point in time in which the meters in dispute first started over-registering demand. In your experience in designing and working with thermal demand meters, are you aware of factors that could cause the TMT Form 6-S Duncan Landis & Gyr meter to gradually overregister demand?

The thermal demand meter is a relatively simple measurement tool with few critical parts. I am not aware and do not believe it likely, based upon my knowledge and experience, for the TMT Form 6-S Duncan Landis & Gyr meter to gradually overregister demand. It is my

impression, based upon a review of depositions taken in this case; that FPL acknowledges that the TMT Form 6-S Duncan Landis & Gyr meter does not have mechanical components that would cause the meter to run fast.

Why do you say this?

In the deposition of Keith Herbster, who has worked for FPL for nearly 31 years, with between 15 to 18 of those years being involved with meters, he was asked questions about what mechanically might cause a KWD or kilowatt demand meter to run fast. He answered, correctly in my view, that other than adjustments, there was nothing he is aware of that would cause the kilowatt demand meter to overregister or run fast. See excerpt of deposition testimony of Keith Herbster, pages 86-87 (attached hereto as Exhibit A). Also, Brian Faircloth, who states he has tested around 8,000 thermal demand meters, more than anyone at FPL since he has worked in the meter testing center, states "No" in response to the question, "Are you aware of anything that could make these 1V meters gradually or suddenly read high in the field?" See excerpt of the deposition testimony of Brian Faircloth at page 64 (attached hereto as Exhibit B). Jim Teachman, another FPL employee responsible for meter testing, also could not identify anything that would cause a thermal demand meter to gradually overregister demand. See excerpt of deposition testimony of Jim Teachman at page 96 (attached hereto as Exhibit C).

What is the likely cause of a thermal demand meter to overregister?

I believe that the most likely reason a thermal demand would overregister or read high is due to error in calibrating the meter prior to placing it into service.

Why?

Again, the structure of the meter is pretty basic. It really does not have mechanical parts that are likely to cause the meter to over-register gradually over time. However, the process of calibrating a meter, which involves human manipulation, can result in calibration errors that can cause the meter to either over-register or under-register if miscalibrated.

Explain how you could properly calibrate a meter with today's technology:

This testing example will apply to a gang thermal board that has been set up to test and calibrate a TMT form 6S, two stator, transformer rated meter. A single-phase source is used for potential voltage in parallel and for current in series. A reference standard of known accuracy is used for comparison to meters being tested ("meters under test"). Preferably the standard would be an electronic auto-ranging meter of the same form and programmed with the appropriate thermal response curve as the meters to be tested.

INSPECTION

1. Inspect the meter for any visible damage that may cause a hazard or unsafe condition if tested.

2. Inspect the meter for any sign of tampering.

3. If possible correct the problem. If there are no safety concerns continue.

ZERO CHECK and Adjustment

4. Remove the original equipment manufacturer (OEM) canopy. Check the black maximum pointer for proper friction while moving it up-scale away from zero. Replace the OEM canopy with a test cover.

5. Place the meter under test in a test socket with the test canopy (test cover) securely in place.

6. Apply potential voltage only (voltage to match the meter form and type 120V, 240V, 277V, etc.) for a minimum of 2 hours. The black maximum needle should not be in contact with the red instantaneous needle at any time during this test, nor should any current be applied.

7. At the end of two-hours record the zero reading. (AS FOUND) If adjustment is necessary, insert a flat slot screwdriver through the test cover hole corresponding to the zero adjustment on the left side of the meter when facing the meter. If adjusting is necessary, adjust

the zero to within the blade edge width of the indicating red needle on the zero scale point. If adjusting upscale, move the red pointer slightly past the zero then back to zero. This will allow for any backlash, which may occur. If adjusting downscale move the red pointer to as close to zero as possible.

FULL-SCALE CALIBRATION

8. If the potential voltage has not been interrupted for at least 2-hours, the full-scale calibration procedure can begin. Otherwise the meter should be preheated again for a minimum of 1 hour.

9. Amperage should be selected that will correspond to at least 75% registration of full-scale reading of the meter under test. (This is so, because the manufacturer has originally calibrated and warranted the accuracy of this meter at 75% of full scale.) In a single-phase series test this will correspond to ¾ of the amperage needed to reach the desired test point on the full-scale.

10. The selected amperage is applied to the circuit that contains the meters under test as well as the reference standard of known accuracy. The black maximum pointer is moved back to a position that will make contact with the red pointer while testing.

11. The applied amperage and voltage should be monitored closely to maintain their values within 2% of desired test point. This condition should be maintained for 1 hour.

12. At the end of 1 hour, the reference standard is read as closely as possible to two decimals and recorded. Each meter in the test circuit is read to as closely as possible to two decimals and recorded (AS Found). The percentage of error is calculated by dividing the meter under test reading by the standard reading. Any meters under test that register above or below the reading of the reference standard should be adjusted to as close as possible to 100% accurate.

13. If it is necessary to adjust any meters in the thermal gang board, the test load must be maintained throughout the following procedures. Any adjustment to the full-scale should be

done through the hole in the test cover located on the right side of the meter as one faces the meter. This prevents cool air from rushing into the meter that would otherwise occur if the canopy were removed for adjustment that would affect the temperature differences in the thermal elements. A flat-slot screwdriver is inserted in the full-scale adjustment screw. If the meter is to be adjusted upward on the scale, the screw is turned clockwise to the desired point. If adjusting downscale, the adjustment screw is adjusted counterclockwise past the calibration point then slowly back to the calibration point. The black maximum pointer should be in contact with the red indicating pointer. This allows for any backlash, which could occur. If an adjustment has been made, and it is desired to check accuracy of adjustment, reset the red and black needles slightly down scale, this places the black needle back in contact with the red needle. The meter should be maintained at test voltage and current for an additional 45 minutes. At the end of 45-minutes if the meter does not read accurately readjust the meter again and repeat the 45-minute check again.

What are the steps at which an error could occur?

1. To begin with, the known accuracy of the board standard must be confirmed with a transfer standard from the National Institute of Standards and Technology (NIST).

2. The standard must be in the same circuit as the meters under test. This can be accomplished most conveniently by using an electronic auto ranging meter programmed to replicate the thermal response curve. Otherwise it is most likely a correction factor must be applied between the thermal board standard and the meters under test.

3. The zeroing of the meter is important to the accuracy of the full-scale test if the full-scale test is performed in the lower half of full-scale. A thermal demand meter's zero accuracy can influence the lower portion of the scale more so than the upper half of full scale because any deviation in accuracy at zero will decline as the meter is tested higher on the full-scale.

4. Maintaining proper test voltage and current is somewhat critical if the standard is of the thermal type. If the response curve of the standard is not exactly that of the meters under test, the standard could read above or below the meters under test. It should be noted that FPL's thermal board standards do not utilize the black maximum pointer. This can have two effects. First, without the black maximum in contact with the red instantaneous needle there is less resistance in movement of the red pointer that may result in a standard registration slightly higher than the indication that would occur if the black maximum indicator were in contact with the red pointer. Second, on the other hand if the voltage and current are not maintained closely and they are allowed to drift low over the test period it is possible the maximum point of the standard may not be the maximum point reached by the meters under test. That could result in the standard indicating a reading lower than obtained during the test period. That is why the preferred method of testing would be with an electronic auto-ranging meter of known accuracy. It would always read accurately to the maximum level of energy recorded over the test period.

5. Reading the standard board meter and the meters under test can influence the relative reported accuracy of the test results. The thermal standard utilized by FPL has a resolution of 100 increments. Therefore if read to the nearest increment without interpolation the test result would be skewed one way or the other. To aid in making this point I have reviewed a 56 page report on test results of all ~3,900 1V thermal demand meters completed in early 2003. In that report the standard reading was read at even increment in all 3,900 tests except for 49 tests, which read at ½ increment readings. It is highly unlikely that the standard meters maximum indicating needle pointed to an exact increment in 99% of the tests. The same would be true for reading the meters under test. To yield an accurate assessment of the meters being tested, their maximum indicated reading must be interpolated as closely as possible. Otherwise their accuracy will be skewed one way or the other.

6. It has been pointed out that some of the meter test technicians at FPL physically tap the thermal board standard meter at the end of the one-hour test period. The standard should be of a known accuracy and should not require any external manipulation to acquire an accurate reading. According to Mr. George Brown who has witness a number of tests at FPL's meter test center, that tapping of the reference standard has always resulted in the standard reading slightly higher. A higher standard reading skews the accuracy of the meters under test as well as the standard reference meter.

7. The utilization of a test cover is critical for accuracy and efficiency when a meter must be adjusted. However, if the cover is removed and cool air rushes into the meter the hot coil or element could be influenced greater than the cold element. If the hot element cools slightly and begins to drop slightly and at the same time a technician is attempting to adjust the meter upward or downward, he will be chasing a moving target. It would be impossible to adjust the meter accurately.

8. If the above were to occur and the meter is not allowed to continue at rated load for 45-minutes it is unlikely a miscalibration would be detected. The meter is designed to respond to 99.9% of any change over a 45-minute period. That is why it is recommended by Landis & Gyr to leave the meters under test at test load for an additional 45-minutes if adjustments are made.

Did you review the written materials that FPL used to train its metermen regarding how to properly calibrate a thermal demand meter?

Yes, I reviewed some sheets that were attached to the thermal meter test board. I also reviewed FPL test plans and procedures.

Do you have any concerns about mistakes being made during testing and calibration of meters at FPL's meter testing center?

Yes, I do, based on my review of some of the depositions and FPL documents. I have not yet been granted access to the FPL test meter board or the individual meters, but hope to have the opportunity to review them before or during the hearing.

What concerned you?

I was concerned about a number of things:

Brian Faircloth, who has tested many thermal demand meters at FPL, when asked about the Landis & Gyr manual, which spells out recommended procedures for calibrating meters, testified that he had never seen the manual before. (Exhibit B, page 30, lines 22-25). He testified in his deposition he does not follow FPL's procedure as posted on the meter board and that he taps the cover of the standard and has instructed others to do the same. (Exhibit B, page 48, line 8 through page 50, line 10.)

Furthermore, with Mr. Faircloth's testimony, he says every meter he tests goes out of his shop at 100% (Exhibit B, page 25 line 22 thru page 26 page line14), that he calibrates every meter to 100% (Exhibit B, pages 53 and 71); however, test records provided by FPL to the PSC in response to questions posed by PSC staff and as supporting their allegation that 1V meters gradually go high and low over time, shows that a JC Penny meter number 1V-5879D last tested in 1999 by Mr. Faircloth, was tested as found at 2.28 and was left at 2.28. (FPL answer to staff request for data 8-18-2003, attached hereto as Exhibit D). I question whether Mr. Faircloth does calibrate EVERY meter.

I also noted that FPL did not use a test cover when calibrating thermal demand meters. The manufacturer indicated accuracy and efficiency is improved by using a meter test cover when calibrating a thermal demand meter. The meter test cover keeps the heat contained within the meter and allows for the meter to be adjusted carefully and precisely. Landis & Gyr states specifically: "The efficiency and accuracy of calibrating thermal demand meters can be improved by the use of test covers that have 3/8 diameter holes located over the zero and full

scale calibration adjusting screws, allowing the meter to be calibrated at zero and the calibration point without removing and replacing the cover.") Using a test cover improves accuracy when calibrating a meter for a couple of reasons. When the cover is removed from the meter, the cooler outside air rushes in and cools the so-called hot element of thermal unit much faster than it does the cold element. This causes a rapid change in the reading of the meter. FPL decided not to use this recommended test cover. Instead, it would have its testers remove the actual canopy cover, allowing the heat to escape from the meter itself, and then hurriedly make a full scale screw adjustment. FPL's test plan states "When necessary to make an adjustment, do so as quickly as possible and put the canopy back on the meter so as not to lose the heat." (maximum 20 seconds)." Not using test covers allows the cool air to affect the meter, and rushing to make an adjustment, time after time, is likely to lead to more mistakes than if a test cover were used. The accuracy of the meters was affected by the failure to use test covers. See Landis & Gyr manual (attached hereto as Exhibit E). I believe that it is somewhat telling, according to FPL documents, that 15% of its V class meters failed outside the range of tolerance. SEE 160 TDM (attached hereto as Exhibit F).

I was also concerned when I learned upon reviewing the deposition of Brian Faircloth, the FPL meterman who tested around 8,000 thermal meters. Mr. Faircloth testified that when adjusting calibration adjustment screws, he would bring the meter directly to the point of adjustment without compensating for backlash. (Exhibit B, pages 103-106.) The proper method, as clearly indicated in the Landis & Gyr manual, is to move the indicating pointer downscale past the calibration point and then adjust the indicating pointer up scale very slowly to the point of calibration with the maximum pointer in contact with the indicating pointer. This helps compensation for any backlash. (See Exhibit F.) This failure to follow the adjustment procedures outlined in the manual is, to me, further cause for concern that these meters were miscalibrated.

I noticed another instance in which the policy for calibration posted by FPL on its meter board, which the metermen were supposed to follow, spelled out a key procedure in a much different way than recommended by the manufacture of the meter. Specifically, FPL's meter test board procedure, step 10, states: "If a meter has been adjusted, the test board should be left energized, with a stable load, for approximately 10 minutes, to check for proper calibration." See Meter Test Center Operations, 9-23-93 (attached hereto as Exhibit G) and undated document entitled Thermal Meter Board Procedures (attached hereto as Exhibit H). The Landis & Gyr manual, at page 5 of the section related to Calibration of Thermal Demand Meters, indicates that if the calibration point is going to be rechecked after the cover has been removed and replaced, the present load on the meter must remain constant for a minimum of 45 minutes after replacing the cover before a reading is taken. This indicates to me that FPL's calibration procedure in this respect was not in keeping with the specifications of the manufacturer's manual for calibrating thermal demand meters. Since FPL only waited "approximately 10 minutes" as compared to the manufacturer's recommended "minimum of 45 minutes" the effects of the cool air on the meter were likely to have more of an impact on the proper calibration of the meter than if FPL metermen had followed the manufacturer's instructions and waited at least 45 minutes.

Given the failure to use a test cover, the need to quickly make adjustments and replace a canopy on a meter within 20 seconds, the failure to follow the procedures for calibrating a meter by waiting only 10 minutes, not 45-minutes when checking for proper calibration, the failure to set the calibration point by moving past the calibration point and then slowly adjusting upward to that point as recommended by the manufacturer, the fact that at least one key FPL meterman had never seen the Landis & Gyr manual, and thus not seen the calibration procedures contained in that manual, all add up to make it likely that the meters in this docket were miscalibrated and thus overregistered demand prior to the date of placing the disputed meters into service. This is

especially so when one considers that there is really nothing that can cause these thermal demand meters to over-register gradually over time.

One final note as to why I believe this case involves meter calibration error. In my experience around meter testing operations, if things are misplaced and not handled properly, it is often reflective of how a meter test shop is run and is likely to reflect a lack of attention to detail. I noted that FPL's internal document 0162-0164 TDM (attached hereto as Exhibit I) indicates that FPL lost or could not locate 60 1-V thermal demand meters that were supposed to be tested. These meters were lost after the entire class of 1-V meters failed testing, so you would expect particular care would be paid to the status and location of these meters.

The factors set forth above, when viewed in a cumulative fashion, suggest that the evidence supports the thermal demand meters in this docket over-registering from the date of installation as compared to going bad gradually over time in the field through some unexplained reason.

Did anything else indicate to you that meters in dispute were miscalibrated?

Well, as noted above, a lot of other things point in that direction. If you review the billing records of the accounts involved, once the thermal demand meter was replaced, all of the accounts experienced a significant decrease in demand compared to the demand levels registered previously. These thermal demand meters are all essentially the same. In one case, the Kings Point account, the customer retained his own billing records. Reviewing these records, and the graph that Mr. Brown prepared, permits one to view the energy demand before the thermal meter was installed, view the demand readings during the entire time a confirmed erroneous thermal demand meter was in use, and then see the significant drop in demand once the thermal demand meter was replaced. This indicates that the demand reading was high or overregistering for the entire time that the thermal meter was being used. Again, I don't believe that FPL will dispute

that this type of evidence suggests you can ascertain the point in time in which a change in metering did occur. (See Kings Point billing, history and chart, attached hereto as Exhibit J).

Why not?

Well in reviewing certain of FPL's own internal documents, they appear to recognize that a customer's before and after demand readings are meaningful in determining the amount of refund that should be provided. For example, in FPL document 0161 TDM that starts with the phrase "1 V meter issues", the following question is asked: "What are the conditions that must be satisfied to provide a refund greater than 1 year?" After a reference to Rule 25-6.103(1), FPL states: "FPL methodology – Compared new electronic demand readings to similar months in the previous years to determine if error could be identified; if not, was there a material/consistent difference in the "new" and "old" demands? If so, offered refunds back over that period. Used higher of meter test results or "new vs. old" readings; used average difference for affected years;" (see Exhibit K attached hereto).

Have you reviewed the billing records of the meters in dispute in this case, including comparing new electronic demand readings to similar months in the previous years?

Yes, I have, for all customers.

What has that reviewed indicated to you?

It reflects that the demand meters were in error for a considerable period of time longer than 12 months and that the meters were likely misreading when installed. It also indicates that if FPL used this approach which I presume they did, that it probably should be applied to the meters in this case, since those meters reflect a difference that is both material and consistent in the new demand meters versus the old thermal demand meters. I would think FPL would want to treat similarly affected customers the same.

There is an issue in this docket concerning what impact the sun can have on the thermal demand meters. Are you aware as to whether or not the sun can have an impact on thermal demand meters?

The thermal demand meter is affected by heat, so yes, it is possible for the sun to have an impact. At Duncan Landis & Gyr, it was recommended that meters installed in states with extreme heat, such as Florida and Arizona, use sun shields to minimize the sun's impacts on thermal demand meters. I know that one particular meter, the Commercial Insulated Door account showed the effect that the sun can have on thermal demand meters. It should also be pointed out that FPL document 66-113 TDM "FACTS ABOUT DEMAND METERS" (attached hereto as Exhibit L) which is a scholarly article on thermal demand meters clearly reflects that the sun can have an impact on thermal demand meters. It states in document 96 TDM as follows: "A sun shield placed over the measuring element (Figure C-28) assures that direct rays of the sun will not produce an ambient temperature difference between the coils." Also, an email from an FPL employee, Jim DeMars states, "If potential is applied to the meter and there is no current flow, thermal meters have demonstrated the ability to register a little demand due to thermal heating from direct sunlight." FPL Doc. 158 TDM (attached hereto as Exhibit M). Thus, based on my experience, coupled with these recognitions that the sun can impact thermal demand meters, I have to say that the sun can cause the thermal demand meter to register a slightly higher demand than would otherwise be the case.

Is this significant in your view?

Well, if I was a customer who had a meter over-registering due the solar influence I could be over billed and a shop test would likely never detect there was any error on my meter.

Do you have concerns about the accuracy of FPL's meter test boards?

Yes, I do. I was involved in testing certain FPL meters in an independent test in Bradenton, Florida. These nine meters had previously been tested at the FPL Meter Test Center,

and had tested high in the neighborhood of +1.83% to +3.83% with an average of +2.7%. (See METERSFORINDEPENDENTTESTING3-29&302004REV.XLS attached hereto as Exhibit N) FPL brought the previously tested meters with them to the independent testing center. FPL also brought with them a traveling standard that was tested against the standard in the independent test board. The two standards matched. When the disputed meters were independently tested, the range of error on the meters tested in the neighborhood of –3.7% to +3.3% with an average of +. 25%. If the two meter test boards were both accurate, you would not see this type of disparity when replicating a test. The meters were sealed following the independent testing, since I understood the parties would return to Miami to test the meters again on FPL's test board to see if the meters again tested high in the neighborhood of +1.83% to +3.83%. If this were the test result, it would suggest a problem with either the FPL test board or the independent test board. If the sealed meters were returned to Miami and tested on the FPL test board, and measured in the neighborhood of –3.7% to +3.3%, consistent with the independent test board results, this could mean the meters may have been tampered with from the point in time they were originally tested in Miami to the point in time they were tested at the independent test board. After all, none of the meters were sealed when they arrived in Bradenton. You will note, in my guideline for proper calibration of a thermal meter, an inspection of the meter is conducted to detect if any tampering may have occurred. I understand that FPL was not willing to retest these meters on its Miami test board and allow the independent standard meter used in the Bradenton test to be compared to the standard meter used at the Miami Testing Center thermal test board.

The most telling information related to accuracy of the thermal standard meter is found in FPL Doc. 149-150 TDM. That document is a report of tests conducted on June 12, 2002 on the meter removed from Commercial Insulated Door of Sarasota. FPL's Jim Teachman attempted to replicate the effect of heat from the sun on that meter to determine if heat could cause a thermal meter to over register. Three meters were involved in the tests: The thermal board standard, the

meter in dispute form Commercial Insulated Door and an electronic meter. According to the report four tests were run in sequence. Oddly enough, the thermal standard and the electronic meter never matched. In fact their degree of difference ranged from 1.1% to 1.84%. I cannot conclude which meter was wrong. Perhaps if permitted to review the thermal test board and standard that will be determined.

I also reviewed the deposition transcript of Mr. Dave Bromley who was asked questions about this testing sequence. He indicates that he is not willing to let the independent standard meter be tested against the FPL standard meter at its thermal meter test board in Miami. When asked if an investigation was conducted into the disparity between the test results in Bradenton and the original test results in Miami, Mr. Bromley said he thought that information was privileged and refused to answer any more questions on the subject. See Deposition of David Bromley, page 68-74 (attached hereto as Exhibit O).

Finally, in reviewing the deposition transcript of Mr. Faircloth, who had worked in the meter test center for over 6 years, since March of 1998, tested around 8,000 thermal demand meters, and presumably would be aware of events affecting the thermal test board meters, I was surprised to read the following at page 95 of his deposition (see Exhibit B):

Q. Do you know when the – How often the standard meters are tested or checked?

A. No.

Q. Have you ever tested a standard meter for accuracy?

A. No.

Q. Do you know if anybody who has tested a standard meter for accuracy?

A. No.

So, given what I have described, I have concerns about the accuracy of the meter test board. I understand that there may be some efforts to review those meter boards, and if allowed

to participate in those reviews, assuming they are permitted, In my opinion may be further developed at hearing.

Does this conclude your testimony?

Yes.

BY MR. MOYLE:

Q Mr. Smith, have you prepared a brief summary of your testimony?

A Yes, sir, I have.

Q Would you please provide it for the benefit of the Commission at this time.

A Hello, Commissioners. My name is Bill Smith. I am testifying today about the meters that are the subject of this docket, the TMT Duncan Landis & Gyr meter, my role in helping design this type meter, my work history with Duncan Landis & Gyr, and what I believe caused these meters to overregister demand and when they started overregistering.

I'm an electrical engineer from Purdue University where I graduated in 1961. I worked for Duncan Landis & Gyr, the manufacturer of these meters in dispute, from 1956 until December 1972. I continued to work in the fields of meters and meter testing equipment my entire professional life until I retired in 1995. **While at Duncan Landis & Gyr, my duties and** responsibilities included working on meter designs and working in the area of quality control. I was involved in designing improvements to meters, including working with others on the design of thermal demand meters like the ones in this docket.

Based upon my educational training in electrical engineering, my familiarity with meters, including thermal demand meters, my review of depositions and other filings made

in this case, I believe it likely that the meters in this docket overregistered demand when first installed at the customer's place of business and did not gradually begin overregistering demand.

The thermal demand meter, compared to other meters, is a relatively simple instrument tool -- measurement tool with few critical parts. I was not aware of thermal demand meters gradually overregistering demand when I worked in quality assurance at the meter manufacturer, Duncan Landis & Gyr.

Furthermore, FPL refused to allow me to inspect the meters that are in this docket. I believe it more likely that given FPL's practice of testing the meters prior to installing them that mistakes were made when testing or calibrating the meters. I became more convinced that the errors occurred prior to installing the meters when I reviewed depositions of FPL meter testers. One FPL meter tester who tested and calibrated many meters had never seen the Landis & Gyr manual which spells out procedures for how to test and calibrate the thermal demand meters that are in this docket.

FPL never used a meter test cover which the manufacturer specifically recommends be used to improve meter accuracy and efficiency. Instead, FPL instructed its meter testers to make adjustments quickly so as to not lose the heat which helps make the meters accurate. Rushing to make adjustments is likely to result in error on occasion. Another

FPL meter tester failed to compensate for backlash when calibrating meters, contrary to the calibrating procedures outlined in the manufacturer's manual.

FPL's written directions provided to meter testers indicated that the meter test board should be left energized for approximately ten minutes to check for proper calibration after a meter has been adjusted when the manufacturer stated that in rechecking a calibration the load on the meter must remain constant for a minimum of 45 minutes before taking a reading. FPL's procedure of waiting ten minutes might have saved time, but it affected accuracy and was inconsistent with the recommended practice of the manufacturer.

I relate these things since it makes me believe it much more likely that errors occurred in the meters' test shop rather than in the field with the meters somehow gradually overregistering demand. I also reviewed customer billing records to see how the customers' accounts changed once the faulty meters were removed. I've reviewed the records of one account that provided a review of the account before a thermal meter was installed, a review of the account while the thermal meter was in place, and a review of the overregistering thermal demand meter was replaced. The data from this one particular account showed a level of demand that increased when the thermal demand meter was installed, remained steady, then decreased when the thermal demand meter was removed.

My review of this data leads me to the conclusion that the meters in dispute may have been overregistering for longer than 12 months and I believe overregistering when they were originally installed in the customer's business locations. This concludes my summary.

MR. MOYLE: The witness is available for cross-examination.

COMMISSIONER DEASON: Mr. Hoffman.

MR. HOFFMAN: Thank you, Commissioner.

CROSS EXAMINATION

BY MR. HOFFMAN:

Q Good afternoon, Mr. Smith.

A Good afternoon, sir.

Q The meter testers that you were referring to in the summary of your testimony, isn't it true that those meter testers did not conduct the tests in the early 1990s on the meters at issue in this docket?

A I'm not sure when they worked at FPL. Is that what you're talking about?

Q Yes.

A I do not recall that.

Q So you don't know one way or the other whether --

A That's correct, sir.

Q Okay. Let me -- just as a point of clarification, Mr. Smith, on Page 1 of your testimony on Line 18, you talk

about going to work for Duncan Landis & Gyr in 1958. Now, just as a point of clarification, Landis & Gyr did not purchase Duncan until 1976; correct?

A That's correct.

Q Okay. And during your time at Duncan, you worked on test equipment; correct?

A That is correct.

Q And you also designed and built test equipment --

A Yes, sir.

Q -- and repaired test equipment?

A Yes, sir.

Q And the positions that you held after you left Duncan that you outline on Page 1 of your testimony did not involve thermal demand meters or testing or calibration of thermal demand meters; true?

A That's true. But I believe there's a clarification in the previous question. I did more than just test equipment and test equipment design while I was employed with Duncan Electric.

Q And since your retirement in 1996; is that right?

A '95.

Q '95. Okay. You have not been involved in any work on thermal demand meter issues until you were retained by Mr. Brown's consulting firm to testify in this case; correct?

A That is correct, sir.

Q Okay. Now, the TMT model, which is the type of thermal demand meter involved in this docket, was first manufactured by Duncan in 1974 after you left the company; true?

A The thermal demand may be true, yes, sir.

Q I'm sorry?

A That may be true. The design was certainly started long before that.

Q Okay. But the TMT model, which is the type of model of thermal demand meter at issue in this docket, was first manufactured by Duncan in '74 after you left the company.

A I do not argue with that sir, no.

Q **Okay. As I understand it, Mr. Smith**, the only meter testing that you did when you were at Duncan was for quality control of the test equipment, like a test rack; correct?

A That is basically correct.

Q It was not for calibration?

A I was not hired as a meter calibrator and did not perform as a meter calibrator.

Q Okay. On Page 2, Mr. Smith, of your testimony, you state that you do not believe it's likely for the TMT model thermal demand meter to gradually overregister demand. Do you see that?

A Yes, sir.

Q Okay. You do agree, do you not, that these types of

meters can overregister demand due to imperfections in all of the components?

A Things are possible but not probable. So if you're asking me, is it possible? Yes. Is it probable? No.

Q And the very fact that there are adjustment screws on the meters is because the meters can underregister or overregister; correct?

A The adjustment screws are put on the meter during the design stage basically to offset variations that occur in the design from meter to meter, and therefore, they can be corrected to 100 percent accuracy with these screws.

Q Okay. But isn't it true that these adjustment screws on the meters are there because these meters, in fact, can underregister or overregister?

A In the original design stage, yes, sir.

Q Okay. And you cannot say with certainty that a TMT meter would not gradually overregister demand; correct?

A That is correct.

Q As I understand your testimony, you believe that overregistration is more likely to occur from a step function as opposed to a gradual occurrence; is that correct?

A That is correct.

Q And that step function could involve any number of the components that are in a TMT meter; correct?

A That is correct, sir.

Q Now, when you were at Duncan, Mr. Smith, in your experience there, it was not unusual to run into problems or issues with the quality or the capability of the materials that were used in building the meter; correct?

A That is correct, sir, if you're talking about doing testing on the materials to make sure that they were satisfactory for manufacturing.

Q And the practice would then be to make design adjustments to address those issues with the materials or the components; correct?

A That is correct.

Q But that did not mean that the components were not subject to corrosion or breakdown once the meters were placed into service; true?

A Testing did indicate whether they would hold up for many years of service under adverse conditions, yes, it did.

Q So the components of the meters were still subject to corrosion or breakdown once they were placed into service.

A Yes.

Q Now, you have a number of exhibits to your testimony. You've attached a Landis & Gyr manual and a Sangamo manual. Those contain a number of pages, do they not, instructing how to repair and replace various parts or components of the meter, don't they?

A Yes, they do.

Q And you would agree, would you not, that the TMT meter has a built-in permanent sun shield?

A Yes, it does.

Q And isn't it true that there are a lot of design-related reasons that can cause a meter to overregister such as the wrong number of turns on the tertiary coil?

A Yes. But these should be discovered at calibration time of meter qualification.

Q And a meter can overregister due to the wrong number of turns on the toroidal coil?

A That is correct. Again, it should be caught at testing.

Q And a meter can overregister because the magnetics are different than they should have been, the housings are not correct; is that true?

A That's true.

Q But again, that's why the adjustment screws are on the meter?

A Again, I would refer you to my original statement. The basic reason for adjustment screws are to take out inconsistencies of manufacture.

Q But these adjustment screws are there to compensate for problems that may arise from time to time with the tertiary coil, with the magnetics, with the housings and so forth; correct?

A Only at time of manufacture.

Q Not when they're out in the field?

A No, sir.

Q Okay. Why are the adjustment screws on the meter once the meters have been placed into service?

A Basically because the utility wanted them there. They did not necessarily trust the manufacturers to test equipment to do things correctly, so they wanted some control.

Q Do you have your deposition with you, Mr. Smith?

A Yes, I do.

Q Would you turn to Page 67 of your deposition. Do you have that in front of you, sir?

A Yes. Excuse me. I'm looking at the wrong page. 67.

Q Page 67.

A Way in the back. I have it, sir.

Q Okay. If you would just follow with me, Mr. Smith. I'm going to start at Line 8 and read into the record the deposition testimony that you provided through Line 17.

"Question: What are some of the design reasons that would cause a meter to run fast?

Answer: Wrong number of turns on the tertiary coil, wrong number of turns on the toroidal coil.

Question: What else?

Answer: Magnetics being different than it should have been, but that's why they put adjustments on there so all

of -- can be compensated out."

Are you sticking with that testimony this afternoon?

A Yes, sir.

MR. HOFFMAN: I'm cutting a few out, Commissioner.

BY MR. HOFFMAN:

Q Mr. Smith, the condition of not enough friction on a maximum pointer, just by way of example, that black pointer needle --

A Yes, sir.

Q -- these can cause a meter to overregister or underregister; correct?

A Since this allows the -- yes. Let me explain.

Q Sure.

A Since this meter -- this hand could swing on a shaft without enough friction. Obviously, it could go to the right or to the left, up scale, down scale. It would have nothing to do with the meter operation.

Q Is it your testimony, Mr. Smith, that in connection with this issue of backlash friction, that backlash friction is very minor and that the effect of perhaps not removing backlash on an overregistering meter is very small and cannot be quantified?

A I do not know the quantification, that is correct, sir.

Q Was my statement correct?

A Yes, it is.

Q Mr. Smith, isn't it true you have no direct evidence that any of the meters in this docket overregistered demand due to the affects of the sun?

A Yes, sir.

MR. HOFFMAN: No further questions. Thank you, Mr. Smith.

COMMISSIONER DEASON: Staff.

MR. KEATING: No questions.

COMMISSIONER DEASON: Commissioners.

Redirect.

MR. MOYLE: Just briefly.

REDIRECT EXAMINATION

BY MR. MOYLE:

Q Mr. Smith, based on your years of experience and your involvement with thermal demand meters, do you believe it's more likely than not that these meters were bad from the date of installation as compared to gradually going bad over time?

A That I do believe, sir. Yes.

Q And with respect to some of the causes that Mr. Hoffman asked you about, you know, maybe this could have happened, if you had been able to inspect the meters do you think you would have been able to ascertain whether any of those causes, some of those causes that Mr. Hoffman asked you about had actually existed?

MR. HOFFMAN: I'm sorry, Commissioner. I'm going to raise the same objection that was raised previously with this issue of the ability to inspect. The Customers filed a motion to inspect the meters; it was denied. They sought reconsideration and that was denied. So I don't think it's relevant.

MR. MOYLE: Maybe I can just make a proffer.

COMMISSIONER DEASON: I think the record is clear. You can move forward with your redirect.

MR. MOYLE: I just want it to be clear from his perspective that if he could have looked at that, that would have made, you know, a difference. He could have ruled some of those things out. If Mr. Hoffman is representing that he'll agree to that for the purposes of a record, I'm fine.

COMMISSIONER DEASON: You have proffered your opinion as to what would have happened had that happened but that didn't happen. So let's move forward. Okay? You've made your proffer. **It's in the record.**

MR. MOYLE: Okay. I have nothing further.

COMMISSIONER DEASON: Okay. Exhibits.

MR. MOYLE: We have --

COMMISSIONER DEASON: Exhibit 13.

MR. MOYLE: -- Exhibits A through O which you've marked as composite Exhibit, I believe, 13.

COMMISSIONER DEASON: That is correct. You move

that.

MR. MOYLE: We would like to move those in.

COMMISSIONER DEASON: Without objection? Hearing no objection, show that composite Exhibit 13 is admitted.

(Exhibit 13 admitted into the record.)

COMMISSIONER DEASON: Thank you, Mr. Smith, for your testimony. You may be excused.

(Witness excused.)

COMMISSIONER DEASON: Staff witness is scheduled next, I believe.

MR. KEATING: I believe that's correct. Staff would call Mr. Sid Matlock.

SIDNEY W. MATLOCK

was called as a witness on behalf of the Staff of the Florida Public Service Commission and, having been duly sworn, testified as follows:

DIRECT EXAMINATION

BY MR. KEATING:

Q Mr. Matlock, you have been sworn in already today; is that correct?

A Yes.

Q Would you please state your name for the record.

A My name is Sidney W. Matlock.

Q And are you the same Sidney W. Matlock who prepared prefiled direct testimony in this docket?

A Yes, sir.

Q And, Mr. Matlock, did you prepare Exhibits SWM-1 and SWM-2 to your prefiled testimony?

A Yes, sir, I did.

Q Do you have any changes or corrections to make to your prefiled testimony or exhibits at this time?

A Yes, sir. I have prepared a page of corrections reflecting changes. As filed, my testimony addressed one meter that is not being addressed in this docket. All but two of the corrections to my testimony and exhibits are made to reflect the correct list of meters.

MR. KEATING: And, Commissioners, that list of corrections was provided to the parties and to the court reporter prior to the hearing. We'd ask that that be marked for identification.

COMMISSIONER DEASON: It will be identified as Exhibit 14.

(Exhibit 14 marked for identification.)

BY MR. KEATING:

Q Mr. Matlock, other than noting the corrections you've just identified, if I asked you the same questions included in your prefiled testimony, would your answers be the same?

A Yes, sir.

MR. KEATING: Commissioner, staff asks that Mr. Matlock's prefiled testimony be moved into the record as

though read.

COMMISSIONER DEASON: Without objection, it shall be so inserted.

MR. KEATING: And staff also asks that his Exhibits SWM-1 and SWM-2 be marked for identification.

COMMISSIONER DEASON: Exhibit 15.

(Exhibit 15 marked for identification.)

DIRECT TESTIMONY OF SIDNEY W. MATLOCK

Q. Please state your name and business address.

A. My name is Sidney W. Matlock. My business address is 2540 Shumard Oak Boulevard, Tallahassee, Florida, 32399.

Q. By whom are you employed and in what capacity?

A. I am employed by the Florida Public Service Commission as a Regulatory Analyst in the Division of Economic Regulation.

Q. Please give a brief description of your educational background and professional experience.

A. I graduated from the Florida State University in August of 1975 with a B.S. degree in economics. I was employed by the Florida Department of Commerce (later the Department of Labor and Employment Security) from February of 1976 to February of 1985. I have been employed by the Florida Public Service Commission since February of 1985. In August of 1992, I obtained a B.S. degree in statistics from Florida State University.

Q. What are your present responsibilities with the Commission?

A. My responsibilities include analysis of utility regulatory filings in the Fuel Cost Recovery docket and other dockets and activities relating to electric distribution reliability and electric meter accuracy.

Q. What is the purpose of your testimony?

A. The purpose of my testimony is to explain the Commission's rules governing meter testing, meter accuracy, refunds for inaccurate meters, and refund periods. I also recommend a method for identifying inaccurate thermal demand meters and calculating related refunds. The relevant rules are set forth in Chapter 25-6, Florida Administrative Code, and are cited and discussed in detail below.

Q. Generally, what do these rules require?

A. These rules require that investor-owned electric utilities subject to our jurisdiction make accurate readings of actual customer usage so that fair and reasonable billings can be made. These rules require that investor-owned electric utilities maintain metering equipment in such a way that meters giving erroneous readings can be detected, and when detected, that those meters be adjusted to make accurate readings or be replaced. These rules also require that customer bills based on the readings of inaccurate metering equipment be adjusted fairly and reasonably.

Q. What meters are the subject of your testimony?

A. The meters I am addressing are the type TMT, form 6S thermal demand meters (referred to by Florida Power & Light Company, FPL, as "1V" meters) for which the Commission received complaints on or before July 16, 2003, the date this docket was opened, and for which the respective customers protested the Commission's proposed agency action addressing these complaints. FPL tested a total of ~~19~~ 18 1V thermal meters that were the subject of these complaints. Of these, ~~13~~ 12 were found to have inaccurate demand (demand is measured in kilowatts, kW) readings that were high, and one was found to have an inaccurate kilowatt-hour (kWh) registration that was high (Meter Number 1V7166D). The ~~14~~ 13 meters that were found to be inaccurate are identified in Exhibit SWM-1

Q. **What are the rule requirements for meter testing?**

A. **Rule 25-6.052(3)(a) requires that a meter test consist** of a comparison of the accuracy of the equipment being tested with the accuracy of a standard.

Q. What is a "standard"?

A. **A "standard meter," or a "basic reference standard," is a meter that has been certified** to be accurate to within certain limits by the National Institute of Standards and Technology.

Q. **What are the error limits for the laboratory standards used to test the accuracy of the** meters in this docket?

A. Rule 25-6.054 establishes error limits for laboratory standards and applies those limits to standard meters used to test the kWh components of meters like the ones in this docket. (The 1V meters measure kilowatt-hours as well as kilowatts.) The rule requires that standard meters must be accurate to within plus or minus .05 percent at 1.00 power factor and within plus or minus .10 percent at .50 power factor.

Q. **Generally, what accuracy tests are required to be performed on the 1V thermal meters** that are the subject of this docket?

A. Prior to 1997, each of these meters was required to be tested when it was installed and once every eight years thereafter. In 1997, the rules were changed to allow the utilities to test these meters through an annual random sampling program. Under this program, samples of each type of meter are randomly selected and tested. Inferences regarding each meter type's accuracy are made based on the results of the tests. A specific meter may or may not be included in an annual sample. In addition, FPL is required to test any of its meters whenever a customer requests a meter test or any time the utility suspects that there is a problem with a meter's accuracy.

Q. **What are the Commission's rules governing the accuracy of the 1V thermal meters in** this docket?

A. Rule 25-6.052(1) requires that the average percent registration of watt-hour meters be between 98 percent and 102 percent and that the meter not "creep," or that the disk not turn when no watt-hours are measured. Rule 25-6.052(2)(a) requires that lagged demand meters, which include thermal demand meters, must be accurate to within four percent of full-scale value when tested at any point between 25 percent and 100 percent of full-scale value.

Q. **Please explain the differences between measuring accuracy tolerances for kWh meters** and demand meters.

A. While expressed in the rules in terms of percentages, the accuracy requirements for

watt-hour meters and those for thermal demand meters are not directly comparable. In Rule 25-6.052(1), concerning watt-hour meter accuracy, accuracy requirements are stated in terms of percentage registration. That is, if a certain number of kWh are actually flowing through a meter being tested, but that meter registers a different number of kWh, the two kWh values are used to calculate the percentage registration, or percent error.

For example, if a watt-hour meter is tested and registers 105 kWh, but the actual number of kWh is known to be 100 kWh, the two numbers, 105 kWh and 100 kWh, are divided and the result is multiplied by 100 to calculate the percent registration, which is 105 percent (or positive 5 percent error). A kWh meter does not have a maximum number of kWh that it can measure.

In Rule 25-6.052(2)(a) concerning demand meter accuracy, error limits for lagged demand meters are stated in terms of percent of full-scale error. The "full-scale value" of a lagged demand meter is the maximum kW demand value that the meter can measure. If a demand meter with a full-scale value of 200 kW is tested and registers 105 kW, but the actual number of kilowatts flowing through the meter is known to be 100 kW, the full-scale error is calculated using the difference between 105 kW (measured number) and 100 kW (known number), and dividing by the full-scale value of 200 kW. Here, the full-scale error is 5 kW divided by 200 kW, or positive two and one-half percent (2 ½%).

The four-percent accuracy criterion in Rule 25-6.052(2)(a) for lagged demand meters is a constant percent for all such meters, regardless of their full-scale values. For a particular meter, the "full-scale value" is a constant number of kilowatts. Four percent of a constant number of kilowatts is also a constant number of kilowatts. So, accuracy rules for watt-hour meters are stated in percent terms and accuracy rules for lagged demand meters are actually stated in terms of kilowatts.

All of the 1V thermal meters in this docket have demand full-scale values of either 840

kW or 1,680 kW. As such, the rules require that the kilowatt measurements of the meters with full-scale values of 840 kW be accurate to within 33.6 kW, or four percent of 840 kW, and that the kilowatt measurements of the meters with full-scale values of 1,680 kW be accurate to within 67.2 kW, or four percent of 1,680 kW.

Q. Why is the percent of full-scale value at which a meter is tested important here?

A. When the ~~14~~ 13 meters in this docket were first tested by FPL, only four meters were shown to be in error by more than four percent of their full-scale values. Three of the meters with errors greater than four percent of their full-scale values were tested at 80% of full scale in the initial tests. The other was tested at ~~61.4%~~ 40.0%. The remaining ~~10~~ 9 were tested at 40% and 61.4%. Mr. George Brown of Southeast Utility Services, Inc. (SUSI), acting on behalf of the customers in this docket, insisted that the meters with errors less than four percent of their full-scale values be retested at higher test points. FPL agreed to retest the meters with positive errors at 80% of their full-scale values. In the retests, seven additional meters showed errors greater than 4% of their full-scale values.

In the accuracy tests performed on the meters in this docket, the magnitudes of the full-scale errors were somewhat proportional, although not exactly proportional, to the points at which the meters were tested. For these full-scale errors to be higher at higher test points, the errors expressed in kilowatts are also somewhat proportional to the test-point kilowatts.

The following is an illustration using the test results for Meter 1V5216D, as shown in Exhibit SWM-2. This meter had a full-scale value of 840 kW. It was tested at 40% of its full-scale value, and the error was 20.5 kW (or 2.44 percent of 840 kW). When tested at 80%, its error was 40.66 kW (or 4.84 percent of 840 kW). The test-point kilowatts for the two tests were 336 kW and 672 kW, respectively.

These test results lead me to conclude that the selection of the test point is critically important. The magnitude of the test point appears to directly affect whether the meter is

determined to be within the accuracy limits established by the Commission rules. In turn, the determination whether a meter is registering within prescribed tolerances directly affects whether a customer refund is due.

Q. **What test point would you** recommend?

A. Ideally, I would recommend that a test point be selected for each meter based on the peak kW usage experienced on that meter in the preceding 12 months. The selection of a usage-based test point is consistent with the intent of the Commission rules that a customer's consumption be measured, and the customer billed, only for actual usage. Further, I believe the Commission may select a reasonable test point on a case-by-case basis pursuant to Rule 25-6.052(2)(a) which states:

> The performance of a mechanical or lagged demand meter or register shall be acceptable when the meter does not creep or registration does not exceed four percent in terms of full-scale value, when tested at any point between 25 percent and 100 percent of full-scale value .

(Emphasis added).

Q. **Is it possible to estimate meter error for the 1V thermal meters in this docket** without having to physically retest them at each customer's 12 month historic peak load point?

A. Yes. It appears that, based on the actual test data we have, the relationship of kW error to the test point for the 1V thermal meters in this docket is relatively linear. Therefore, it is possible to reasonably approximate test results that would occur measuring the accuracy of each meter at each meter's historic peak load level. I have calculated approximate results for the ~~nine~~ eight meters that were tested at two different points. I have summarized the approximations in Exhibit SWM-2.

Column (l) of this exhibit shows that only ~~three~~ two meters are calculated to have errors in excess of 4% of full scale at their peak monthly demand reading. These interpolated results

point out the importance of test-point selection for determining whether a meter is in compliance with the Commission rules, as the selection can affect whether a meter is accurate according to the rules.

Q. **For the meters in this docket, are the test points of 80% of the** full-scale values, selected by the parties, adequate for determining whether a meter is in error?

A. Eighty percent of full-scale value is the test point at which FPL agreed with SUSI to test the meters. Testing at 80% of full-scale value generally resulted in greater errors as a percent of full-scale values. That is, as the number of test-point kilowatts increased, so did the errors expressed in kilowatts, and thus so did the errors expressed as a percentage of their full-scale values. Consequently, testing at 80% of full-scale value tended to show more meters registering beyond the Commission's error limits, thereby qualifying more customers for refunds.

Based on the customers' billing data provided by SUSI, none of the customers' typical monthly maximum demand readings exceeded 75% in the last twelve months that demand was measured using a thermal meter. Of the ~~14~~ 13 meters, only one meter registered a demand level of 80% in its last twelve months of service, and none registered more that 80% in any month. None of the errors appear to be understated in the range at which the customers' demand readings were made. For this reason, the selection of an 80% test point appears to be to each customer's advantage for determining whether a meter is in compliance with Rule 25-6.052(2)(a).

Q. What are the Commission's rule requirements regarding refunds for demand meters found to exhibit unacceptable error?

A. The Commission's rules provide a method for determining refunds to customers for whom kWh have been erroneously measured by more than two percent. The rules do not provide a specific method for determining refunds to customers for whom kilowatts (demand)

have been erroneously measured by more than four percent of full-scale value.

Rule 25-6.103(1), subtitled "Fast Meters," states that whenever a meter is found to have an error in excess of the plus tolerance allowed in Rule 25-6.052, the utility shall refund to the customer the amount billed in error as determined by Rule 25-6.058. However, Rule 25-6.058 does not clearly provide an appropriate method for determining the amount billed in error for the demand meters in question in this case. Rule 25-6.058(3) states that for a polyphase meter used to measure a varying load, the average error shall be determined in one of the following ways:

(a) The weighted algebraic average of its error at light load (approximately 10 percent rated test amperes) given a weight of one, its error at heavy load (approximately 100 percent rated test amperes) and 100 percent power factor given a weight of four, and at heavy load (approximately 100 percent rated test amperes) and 50 percent lagging power factor given a weight of two; or

(b) A single point, when calculating the error of a totally solid state meter, and the single point is an accurate representation of the error over the load range of the meter.

While thermal demand meters are polyphase meters, neither (a) nor (b) above are relevant to determining average error for demand meters. Part (b) is not applicable to this case because the thermal demand meters in question are not solid state meters. Part (a) is relevant to calculating average error in energy (kWh) readings from watt-hour meters, but not demand (kW) readings from demand meters. Part (a) calls for measuring the error at light load (approximately 10 percent of rated test amperes). Because customers with demand meters are billed at the maximum demand for the billing period, a test at light load would not be relevant in calculating average error in demand readings. Further, the accuracy specifications for these meters are only applicable for readings between 25 percent and 100 percent full-scale. Finally, Rule 25-6.052, which provides test procedures for measuring the accuracy of both

energy and demand readings on meters, refers to Rule 25-6.058 to calculate error in energy readings from watt-hour meters, but it does not make a similar reference for demand readings from lagged demand meters.

Q. **What method do you propose for determining the percent error to be used in** calculating customer refunds or back bills?

A. I believe that a fair and reasonable methodology would be:

Step 1: Calculate the average billing demand from the complete billing cycles contained in the refund/back bill period.

Step 2: Retest the meter at this average billing demand, noting the correct (true) reading from the reference (standard) meter.

Step 3: Determine the number of kilowatts in error by subtracting the reading of the standard (or reference) meter from the value calculated in Step 2. A positive number means that the customer's meter is reading high. A negative number means that the customer's meter is reading low.

Step 4: Divide the value calculated in Step 3 by the correct (true) value from the reference meter as noted in Step 2 and multiply by 100. This gives the percentage error of the meter being tested.

Q. How would the percentage calculated in Step 4 above be used in calculating refunds or back bills?

A. The percentage calculated in Step 4 would be converted to a "correction factor" that would be applied to the billing demands for each month during the refund period to determine the corrected billing demand. The correction factor is determined by the following formula:

Correction Factor = 1/(1 plus the percentage error determined in Step 4/100)

For example, if the error calculated in Step 4 is 10%, then

Correction Factor = 1/(1.10), or approximately 0.909.

The customer's adjusted kW demand would be determined by the following formula:

Adjusted kW demand = Original kW demand*Correction Factor

Q. Why do you not calculate a percentage error based on the full-scale reading of the meter?

A. For purposes of making refunds, the calculation of a percentage error based on the full-scale reading would not be fair to the customer. For illustration, assume that the customer's meter is tested at the customer's average billing demand level and reads 55 kW, when the reference (standard) meter reads 50 kW. This yields an error of plus 5 kW. The percentage error as calculated in Step 4 would be 10%. However, assuming a full-scale value of 100 kW, the percentage error based on full-scale would be only 5%. Calculating a refund based on an error of 5% would not make the customer whole.

Q. Do you support this method in light of the wording of Rule 25-6.103(3)?

A. Yes. Rule 25-6.103(3) says that "when a meter is found to be in error in excess of the prescribed limits, the amount of the refund or charge ... shall be that percentage of error as determined by the test." As demonstrated above, if the refund is determined by applying the full-scale percent error rather than the test-point percent error, the refund could understate the amount by which the customer was overcharged during the refund period.

Q. Do you support using the greater percentage for calculating back bills for meters that are inaccurate and low?

A. Yes. The test-point percent error would also be fair and reasonable for purposes of calculating back bills.

Q. Over what period should any refunds be made for the meters in this docket?

A. Rule 25-6.103(1) does address refund periods. This rule does not provide a means for making refunds for periods greater than 12 months unless a meter's inaccuracy can be traced to a specific cause and a specific time.

Q. Would you summarize your recommendation to implement the rules in this case?

A. I would recommend that the Commission determine which customers are due refunds by retesting the meters at the customers' historic 12-month peak demand as the test point. Customers for whom demand-meter error exceeded four percent of full scale value would qualify for refunds. I would recommend calculating refunds by testing those customers' meters at the average billing demands from the complete billing cycles contained in the refund period, and applying the test-point percent errors to the bills for the refund period. For the one customer who has been overcharged due to high kWh measurements, I would recommend basing the refund on the method contained in Rule 25-6.058.

Q. Does that conclude your testimony?

A. Yes.

BY MR. KEATING:

Q Mr. Matlock, have you prepared a summary of your testimony?

A Yes.

Q If you would.

A Under the Commission rules, there's a multistep process for determining whether a refund is due to a customer and what amount is due to a customer whose meter is overregistering the customer's actual usage.

First, he must test the meter against a standard to determine whether the meter is overregistering beyond the error limits allowed for that type of meter. If so, the customer is eligible for a refund. For the meters in this case, the Commission's rules establish a plus or minus 4 percent error limit. Second, you must determine a percentage of error to use for purposes of calculating the proper refund amount. Third, you must determine the period of time for which the refund should be calculated. And finally, based on the results of the second and third steps, you must calculate the refund due, including interest. My testimony addresses the first and second steps in this process.

As I stated, the first step is to determine whether a meter is overregistering beyond acceptable limits. I recommend that this be accomplished by testing each meter against a standard while applying a level of demand to the meter that

reflects the peak kilowatt usage experienced on that meter in its last 12 months of service. The percentage of error would then be calculated by dividing the difference between the readings on the standard meter and the tested meter by the full-scale reading on the meter. You may hear this referred to as the full-scale error. Meters that exceed the 4 percent error limit would then be eligible for a refund. I believe that this is consistent with the Commission's rules and is a fair method of determining the maximum error that would have likely been experienced by the customer.

The second step, as I previously mentioned, is to determine the appropriate percentage of error to use for purposes of calculating a refund. I recommend that this be accomplished by testing each eligible meter against a standard while applying a level of demand to the meter that reflects the average billing demand from the last 12 months of service. The percentage of error would then be calculated by dividing the difference between the readings on the standard meter and the tested meter by the reading on the standard meter. You may hear this referred to as the test point error.

The test point error would then be converted to a correction factor that would be applied to the billing demands for each month during the refund period. The Commission's rules are unclear when it comes to determining a percentage of error for purposes of calculating a refund due to erroneous

demand readings. However, I believe that the method I recommend is consistent with the Commission's rules and is a fair method of determining the meter error that would have likely been experienced by the customer during the refund period. That concludes my summary.

MR. KEATING: Staff tenders Mr. Matlock for cross.

COMMISSIONER DEASON: Okay. Which party wishes to go first on this cross-examination?

MR. HOFFMAN: I'd prefer to go last.

COMMISSIONER DEASON: Okay. Mr. Moyle.

MR. MOYLE: Flip a coin.

COMMISSIONER DEASON: You want to flip a coin?

MR. MOYLE: Flip a coin, or odds or evens, scissor, rock, paper. I'll go ahead and go.

COMMISSIONER DEASON: Okay.

CROSS EXAMINATION

BY MR. MOYLE:

Q Mr. Matlock, you had made a comment about the rules being unclear. Do you believe that the rules related to these meters could be amended, changed, or updated to make them more clear?

A Yes, sir, I do.

Q Would that be something that you would recommend as somebody who's been with this Commission and familiar with meters and meter testing, meter procedures, things like that?

A I don't know that it would be necessary. I don't know that I would do that. And I don't know that it's necessary because that refund calculation is not something that -- the way that I would do it is not something that our rules prevent you from doing. And I think it is consistent with similar calculations that are carried out for kilowatt hour meters. And I don't know that it would be necessary to do that to address these refunds.

Q Okay. You had made the comment about the rules don't prevent you from doing that. You've been in the room today, have you not, and heard testimony about the before and after approach that was used by FPL with respect to customers not in this docket?

A Yes, sir, I have heard that discussed.

Q Are you aware of anything in the rules that would prohibit the use of this before and after approach for a way of determining meter error?

A I don't -- there's not anything in the rules that say to do it or not to do it. The rules have a method of measuring meter error. And that's all that I have testified about.

Q Okay. And I looked at your testimony and I don't have, you know, a tremendous amount with you, but on Line 20 of Page 1, you indicated, the purpose of my testimony is to explain the Commission's rules governing meter testing, meter accuracy, refunds for inaccurate meters, and refund periods.

And, you know, we've heard testimony about what FPL did with these meters and whatnot, and I was just trying to make sure that from your perspective, being familiar with these rules, that there was nothing in the rules that precluded FPL from doing what they did with the before and after approach. And you would agree with me, there is nothing to prevent them from doing that; correct?

A I agree that there is nothing to prevent that. We first heard of that in an agreement that was made between the customers and the utility. And that was a -- it was a negotiation.

Q Who was that agreement with? What customers? Do you know? Or was it just a way -- FPL came to you and said, here's how we propose to do it?

A It was the customers who were represented by Mr. Brown.

Q The before and after approach?

A Yes, sir. It was in May of 2003.

Q Okay. And just so we're clear, Mr. Hoffman just used an exhibit. I think it was marked as Exhibit Number 9.

MR. MOYLE: Can I approach the witness, and ask him if this is what he's referencing with respect to the agreement?

COMMISSIONER DEASON: Yes.

THE WITNESS: Yes, sir. This is what I'm referencing.

BY MR. MOYLE:

Q Were you a party to that discussion and that agreement that's referenced in that document? Were you involved in those discussions?

A I don't believe I would be considered a party, and I'm not -- I wasn't involved in the discussions. I just found out that this agreement had been reached.

Q I was going to ask you some questions about it if you were in the room, but you weren't in the room; is that correct?

A I wasn't in the room when the agreement was made.

Q Okay. Isn't it your understanding that FPL and Mr. Brown on behalf of his customers agreed to test the meters at 80 percent?

A Yes, that was my understanding.

Q Okay. And you're not aware of anything that has resulted in that agreement not being in place as we sit here today, are you? And that's still a deal as far as you're concerned?

A Yes, as far as I know that 80 percent test point is still what is being used.

Q Okay. And with respect to your understanding about what they agreed to, is it your understanding that there was an agreement to use a before and after approach as well between Mr. Brown and his customers and Florida Power & Light? And I can hand you the document if you need it.

A As I recall, that method of calculating a percent error to use was included in that agreement.

Q Okay. And then just if you know anything about this, there's a sentence in the agreement that states as follows in paragraph five, "Best efforts will be made by all parties to settle all refunds in an expeditious manner; however, in the event of a disputed claim that is not resolved by the parties, no refund or credit shall be made pending final disposition of the claim." Do you have any information with respect to why that sentence was inserted in this document?

A No, sir, I don't.

Q I asked you the leadoff question about are the rules candidates for change and I think you indicated yes. Some of your testimony centers around 25-6.052(2)(a); correct? And this is the rule which requires meters to be accurate within 4 percent of full-scale when tested at any point between 25 percent to 100 percent of full-scale; correct?

A Yes, sir, that's correct. The wording of that rule refers to error of registration of the demand meter.

Q Right.

A And it says that it does not -- it said that it should not -- or the performance of the meter is acceptable if that error of registration does not exceed 4 percent in terms of full-scale value. That's the actual exact wording of that.

Q Okay. And that's 25-6.052; correct?

A (a).

Q Okay. Now, if I was reading your testimony properly or correctly, the percentage of error changes depending on what test point is selected; correct?

A Yes, sir, that's true for -- that's generally true for these meters that are in this docket. The error of registration increases measuring that error in kilowatts, and as a result, that same error divided by the full-scale value of the meter also increases.

Q So am I correct, is it true that you could have -- let's say you tested the meter at 25 percent of full-scale, that you could have an error reading that would be less than 4 percent, but if you moved up scale and tested it at 75 percent of full-scale value, that the error reading could increase and be over 4 percent; correct?

A Yes, sir, that is possible as it relates to these meters.

Q And that's sort of the basis for your suggestion and say, hey, it's pretty critical as to where you test the meters, what point on the scale; correct?

A Yes, sir.

Q Now, with respect to the rule that says that you can test any point between 25 to 100 percent of full-scale, isn't it true that customers when they're out there and they're using electricity, that they're not going to be precisely at

25 percent or 30 percent? I mean, they're going to vary with respect to their usage; correct? Isn't that partially why you're making a recommendation of using their actual usage for the test point?

A Yes, sir, that's correct.

Q And you're not advocating or urging or even believe, do you, any sort of interpretation that would basically allow for the following: If you test the meter, say, at 25 percent of full-scale and it's less than the 4 percent error point, that you're done, that that's it? As long as it tested once at, say, anywhere between 25 and 100 percent, you know, the meter is good to go. That doesn't seem like a logical interpretation of that rule, does it, to you?

A I don't know that the rule as it's stated would preclude that. It's not the way I would do it if a customer's load was greater than 25 percent if I were determining whether or not the meter was accurate for his use.

Q I understand. I'm just trying to understand what you believe the rule says with respect to the ability to test between 25 and 100 percent. I mean, obviously it's probably in FPL's financial interest to test at a low point on the scale for the reasons we just discussed, and conversely, it's in the customer's interest to try to have it tested at a high point on the scale. You'd agree with that; correct?

MR. HOFFMAN: I'm going to object to that question.

It's predicated on facts that are not in evidence.

COMMISSIONER DEASON: Mr. Moyle, just rephrase your question.

MR. MOYLE: Okay.

BY MR. MOYLE:

Q Would you agree that if FPL tested at 25 percent of full-scale for all the meters, that they would have less meters found to be in error as if they tested at 80 percent of full-scale for meters based on your experience and testimony?

A I don't think that that would -- I don't agree that that would be to the utility's advantage to do that.

Q Right. But my question was, if they tested at 25 percent as compared to 80 percent, you would agree that fewer meters would be found to be over 4 percent error; correct? We just talked about the proportional relationship.

A Well, if all meters were like -- no, sir, I don't agree. If all meters were like these meters, there would be fewer found to be in error.

Q If you tested at a higher point in the scale, there would be fewer found to be in error?

A No, if you tested at a lower point. Now, it's outside my testimony, but we've heard that not all meters are like these meters.

Q Okay. But this proceeding --

A I also --

Q I'm sorry.

A I also don't agree that it's to a utility's advantage o have inaccuracy among the meters that it uses.

Q And I'm just asking you from a financial standpoint. You know, I don't think it's the right thing; you don't think it's the right thing. But just from a standpoint of impact, dollars and cents bottom line, if -- and I'm not suggesting that FPL is motivated by that, but if somebody were, wouldn't it benefit them to test at a lower point on the scale as compared to a higher point on the scale with respect to these thermal meters?

A Well, I don't agree that it would benefit them because they would not know whether a meter was inaccurate on the high side or the low side at one end of the scale until the meter was tested. So I think it would be to their advantage to do the right thing. It would be to their advantage to know what people are consuming and know that they're paying for what they're consuming rather than to have inaccurate meters in use.

Q And you agree that these rules should be interpreted to treat customers fairly; correct? That's sort of an overlying tenent of these rules?

A Yes, sir.

COMMISSIONER DEASON: Mr. Moyle, I'm going to ask you to wrap it up. It's already been 15 minutes.

MR. MOYLE: Okay. I'm sorry.

BY MR. MOYLE:

Q Just a couple more questions, and again this is on this interpretation issue. There's a rule that allows a customer to seek independent tests; correct?

A Yes, sir.

Q And that independent test, there's nothing in that rule that says a customer has to test at a particular point on the scale; correct? It just says you can go take an independent test and test the meter.

A I don't believe the test points are mentioned in that rule.

Q Okay. Would that suggest to you that the better interpretation of this rule is that the meter needs to test so that it is less than 4 percent error at any point along the scale, so that if you tested at 25 percent, it has to be less than 4 percent; if you tested at 50 percent, it has to be less than 4 percent; if you tested at 80 percent, it has to be less than 4 percent; you know, at any point it has to be less than 4 percent because you have customers whose loads will vary? Doesn't that seem like the most logical interpretation of that rule to you?

A If that were the way the rule --

COMMISSIONER DEASON: Could you answer yes or no, please.

THE WITNESS: Yes, I believe that would be a clearer

statement. Yes, sir.

MR. MOYLE: Thank you. I have nothing further.

COMMISSIONER DEASON: Mr. Hoffman.

CROSS EXAMINATION

BY MR. HOFFMAN:

Q If you'd look at that rule, Mr. Matlock, 25-6.052(2)(a), does that rule state that the performance shall be acceptable when the error does not exceed 4 percent when tested at any point between 25 and 100 percent or when tested at all points between 25 and 100 percent of full-scale value?

MR. KEATING: Mr. Matlock, I'd like to interrupt and ask if you have a copy of the rules in front of you to look at.

THE WITNESS: Yes, sir.

MR. KEATING: Okay.

THE WITNESS: The rule says when tested at any point.

BY MR. HOFFMAN:

Q Okay. So the rule simply does not say that there is to be tests at all points for performance purposes between 25 percent and 100 percent of full-scale value; correct?

A That's correct.

Q And the rule does not require more than one test if you test a meter and the error of registration does not exceed 4 percent if you've tested at any point between 25 percent and 100 percent of full-scale value; correct?

A That is correct for that rule, for Rule

25-6.052(2)(a). There is another rule that I haven't -- this rule wasn't highly discussed in my testimony, but it was mentioned. The rule is 25-6.056(4)(b), which states that a meter is to be tested -- meters are to be tested when they are suspected by the utility of being inaccurate or damaged. So if a meter is tested once, in 25-6.052(2)(a), if there was evidence that that meter's result was not reflective of the accuracy of that meter, another test would need to be performed.

Q Okay. But in the typical situation where that event is not present, if, for example, you test a thermal demand meter at any point between 25 percent and 100 percent of full-scale and the meter overregisters 2 percent, is there a requirement under that rule to do a second test?

A No, sir.

Q You talked with Mr. Moyle a little bit about this issue of the level of registration as you move up or down the scale. Do you recall those questions?

A Yes, sir.

Q Okay. I think he asked you a question about if you test at 25 percent of full-scale and have a 3 percent error, then there was a question about if you move it up to 75 percent of the scale. Do you recall that?

A Yes.

Q And your testimony, as I understand it, is under that

scenario assuming that there was a 3 percent error at 25 percent, the test at 75 percent could produce an error greater than 3 percent or less than 3 percent; correct?

A Yes, sir, that's correct.

MR. MOYLE: Which is it? Greater or less than? I'm sorry.

COMMISSIONER DEASON: No, he's saying it could be either one and the witness agreed.

BY MR. HOFFMAN:

Q Finally, Mr. Matlock, along sort of the same line. You had some questions about whether it would be in someone's financial interest, and I know there's no evidence of that in this proceeding, but if you assume just for purposes of theory, and I know that you don't accept this, that the level of error did increase as you moved up the scale, and if you had more underregistering meters than overregistering meters, what would be the financial impact under that scenario?

A If you had more underregistering meters as you moved up the scale?

Q Yes, sir. If you had more underregistering meters than overregistering meters and you accepted for purposes of this question that the error increases as you move up the scale.

A It would depend on what the levels of usage were for the various customers then.

MR. HOFFMAN: Thank you, Mr. Matlock. No further questions.

COMMISSIONER DEASON: Commissioners.

Redirect.

MR. KEATING: Just a couple.

REDIRECT EXAMINATION

BY MR. KEATING:

Q Mr. Matlock, do you still have what was handed out as Exhibit 9, the May 6th, 2003 agreement between FPL and George Brown?

A Yes, sir.

Q Do you know whether this Commission, given that this ase has proceeded to hearing, can or should hold the parties o this agreement?

MR. MOYLE: Object to the extent it calls for a legal onclusion.

THE WITNESS: I don't know --

COMMISSIONER DEASON: Wait. I'm sorry. Well, he said he didn't know.

MR. MOYLE: I just want the objection to the extent t calls for a legal conclusion.

COMMISSIONER DEASON: I understand. Objecting, legal onclusion.

MR. KEATING: I believe Mr. Matlock was asked some questions about this document before and whether certain

terms -- whether he understood that certain terms still apply. I want to ask him whether he knows if they should apply -- I'm sorry, whether we can apply them.

MR. MOYLE: And my objection is just to the extent that it calls for a legal conclusion about whether it's a binding agreement. He's free to answer with respect to what his understanding is.

COMMISSIONER DEASON: With that understanding, you may answer the question.

THE WITNESS: I don't know that we were ever in a position to enforce this agreement should the agreement break down. We were told that certain things have been negotiated. And I don't think that it would -- I don't know if it was up to us to apply anything other than our rules in having these disputes resolved in light of this agreement.

COMMISSIONER DEASON: Let me ask this question. Is there anything in this agreement that is inherently inconsistent with our rules?

THE WITNESS: No, sir, I don't think that there was. We found out about it shortly after this date or maybe on that date, and I don't think it was operating outside the rules to get things resolved. It was just there were some things in it that our rules didn't cover or that our rules didn't sanction. And it was a way to reach a conclusion if the agreement held up.

BY MR. KEATING:

Q Just one more question. Mr. Matlock, is there anything that you are aware of in the Commission's rules that would suggest the use of either a percentage of error determined by a meter test or a percentage of error based on a comparison of meter readings before and after meter replacement? Is there anything in the rules that leads you to believe that one of those two methods is preferred under the Commission's rules?

A Well, I think the rules are -- I think the rules would use a test result, and that's as far as the rules would go. The other way of calculating a percent revision to a customer's bill is -- when it's used is greater than what the test result gives you. So I don't know of anything.

MR. KEATING: Thank you.

COMMISSIONER DEASON: Okay. Exhibits.

MR. KEATING: Staff would move Exhibits 14 and 15.

COMMISSIONER DEASON: Without objection, show that Exhibits 14 and 15 are admitted.

(Exhibits 14 and 15 admitted into the record.)

COMMISSIONER DEASON: Thank you, Mr. Matlock. You maybe excused.

(Witness excused.)

COMMISSIONER DEASON: Mr. Hoffman, you may call your next witness.

MR. HOFFMAN: We call Ed Malemezian.

EDWARD C. MALEMEZIAN

was called as a witness on behalf of Florida Power & Light Company and, having been duly sworn, testified as follows:

DIRECT EXAMINATION

BY MR. HOFFMAN:

Q Would you please state your name and business address.

A My name is Ed Malemezian, 8009 Southwest Yachtsmans Drive in Stuart, Florida.

Q And by whom are you employed?

A Ed Malemezian Consulting.

Q And your position?

A I am the president and principal.

Q Mr. Malemezian, have you prepared and caused to be filed 39 pages of prefiled rebuttal testimony in this proceeding?

A Yes, I have.

Q Do you have any changes to your prefiled rebuttal testimony?

A Yes, I do.

Q Could you outline that change?

A Yes. I have one change on Page 27, Line 2, where I talk about FPSC Rule 25-6.052(2)(a). I'd like to add (4) to that sentence. And that is the only change I have.

Q With that change, if I asked you the questions contained in your prefiled rebuttal testimony, would your answers be the same?

A They would.

MR. HOFFMAN: Commissioner Deason, I would ask that Mr. Malemezian's prefiled rebuttal testimony be inserted into the record as though read.

MR. HOLLIMON: I have an objection.

COMMISSIONER DEASON: Without objection, it shall be inserted.

MR. HOLLIMON: I'm sorry. I have an objection.

COMMISSIONER DEASON: Oh, you have an objection. I thought you said you hadn't. I guess that was just wishful thinking. Okay. State your objection.

MR. HOLLIMON: My objection is to the opinion testimony provided by this witness with regard to issues that fall under the engineering field of material science, and specifically Page 12, Line 3 through Page 17, Line 2, and Page 18, Lines 6 through 11. This witness admits in his testimony that he's not an expert in material science and yet he's rendered multiple opinions with regard to that particular engineering discipline.

COMMISSIONER DEASON: What was the second part of your -- Page 18, what lines?

MR. HOLLIMON: Line 6 through 11.

COMMISSIONER DEASON: 6 through 11.

MR. HOFFMAN: What was the first one, Mr. Hollimon?

MR. HOLLIMON: It was Page 12, Line 3 through Page 17, Line 2.

COMMISSIONER DEASON: Okay. There's been an objection. Do you care to respond to the objection?

MR. HOFFMAN: Yes, sir. As he outlines in his testimony, Mr. Malemezian has an electrical engineering degree. He began his career with FPL in 1971 and has served in a number of capacities involving metering. He has served as the meter superintendent for Southern Division Meters and has approximately 26 years in every aspect of meter operations, meter testing, meter processes, meter procedures, and the workings of the components of these thermal demand meters.

His testimony, Commissioners Deason, goes straight to and directly to the impacts on the characteristics of the components of these meters which he has worked with for roughly 26 years. He has spoken over those 26 years many times with the manufacturer about these components. He has observed and experienced on numerous occasions problems with these components. And the fact of the matter is one does not have to be a metallurgist to be qualified to render an opinion as to whether the characteristics of these components of these meters, that he has probably more experience than anyone in this state with, whether they can change over the course of

time. So we think that he is perhaps the most qualified person that we could possibly produce to address the issue of whether the characteristics of the many components in this meter can change.

COMMISSIONER DEASON: I'm going to overrule the objection, testimony found on Page 13, Lines 14 through 18, allow this witness to testify on this subject, and any further question about this just falls to the weight that the Commission would give to this testimony. So that objection is overruled. The testimony is inserted into the record in its entirety as corrected.

There are no exhibits attached to his testimony; is that --

MR. HOFFMAN: No, sir, there is not.

BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

FLORIDA POWER & LIGHT COMPANY

REBUTTAL TESTIMONY OF EDWARD C. MALEMEZIAN, P.E.

DOCKET NO. 030623-EI

AUGUST 16, 2004

Q. Please state your name and business address.

A. My name is Edward C. Malemezian. My business address is Ed Malemezian Consulting, Inc., 8009 SW Yachtsmans Drive, Stuart, Florida 34997-4823.

Q. By whom are you employed and in what capacity?

A. I am employed by Ed Malemezian Consulting, Inc. ("EMCI") as President and Principal.

Q. Please describe your education and professional experience.

A. I graduated from the University of Florida in 1970 with a Bachelor of Science in Electrical Engineering degree. I have been a registered Professional Engineer in the State of Florida since 1976. In January 1971, I began my career at Florida Power & Light Company ("FPL") in Miami, Florida, as a Relay Trainee, installing and maintaining protective relay equipment in FPL substations and Power Plants. This work continued through 1972 as a Relay Engineer. From 1973 through 1977, I rotated through several FPL service centers as a T&D supervisor, where I managed field operations, maintenance,

and construction activities associated with FPL's substation, overhead, underground, and transmission facilities. This included the direct supervision of Bargaining Unit employees and related operations, engineering, and management functions.

In 1978, I was promoted to Meter Superintendent of Southern Division Meters in Miami, Florida, where I managed the daily operations of all Dade County Field Metering, Meter Test Shop, T&D Radio System, Connect and Disconnect Services, and the FPL System Standards Laboratory. In that position, I was responsible for the correct metering on 1 million customers. I directed the activities of ten supervisors and 140 Bargaining Unit employees, with an annual operating budget of $2 million. Among other responsibilities, I was directly involved in the operation of the Southern Division Meter Test Shop and FPL System Standards Laboratory, which eventually evolved into FPL's present Meter Technology Center ("MTC"). In 1981, I rotated through several training positions as a Distribution Engineer, Service Planner, and Service Planning Supervisor in order to better experience FPL's distribution engineering and customer interface activities. From 1982 through 1997, I worked with a number of titles: System Operations Engineer, Construction Services Staff Engineer, Distribution Engineering Staff Engineer, and Distribution Engineering Principal Engineer, as part of the General Office staff, in support of FPL's Power System operations. In these positions, I was responsible for various Meter Engineering activities at FPL. These included

establishment of policies, procedures, and selection of equipment to ensure the correct metering on 3.7 million customers. I was the chief architect and project manager in the implementation of FPL's present, very efficient in-service, meter sample test program, and was responsible for its administration for a number of years. I also was a key participant in numerous multi-million dollar projects: Smart Meters, Power Quality Monitoring, MV-90 Load Profile Data Collection System, FPL's 1,000 MW 800,000 point On Call System, FPL's 500 MW CI Load Control System, FPL's 40,000 point residential AMR System, and others.

In 1998, I joined EDMpro.com, an unregulated business of FPL Energy Services, as Data Collection Manager. I managed the competitive metering activities of this Energy Data Management business, achieving success in working with utilities to obtain load profile data access for EDMpro.com clients.

In mid-2001, upon FPL's decision to close EDMpro.com, I retired from FPL and established EMCI. EMCI provides Metering Consulting Services to utilities, utility suppliers, and related companies, delivering solutions to clients that utilize my in-depth knowledge of all the important aspects of the metering industry: field, shop, engineering, project management, and competitive services. EMCI calls upon 33 years of utility experience, including approximately 26 years in metering, and a similar number of years

participating in regional, national, and international professional, trade, and standards organizations to provide practical insight into the issues and practices used throughout the industry. I have delivered dozens of presentations at metering conferences, been interviewed or published numerous times in trade magazines, been quoted many dozens of times in industry reports, and even appeared on Public Television in a report on Smart Meters.

Q. Please describe your professional memberships and affiliations.

A. My professional memberships and affiliations include: Institute of Electrical and Electronics Engineers (34 years), Florida Engineering Society (33 years), National Society of Professional Engineers (34 years), Registered Professional Engineer in the state of Florida (28 years), Southeastern Metermen's Association (9 years), National Fire Protection Association (1 year), Southeastern Electric Exchange Meter Committee (15 years), Edison Electric Institute working committees (6 years), American National Standards Institute ("ANSI") C12 metering standard committees (12 years), Automated Meter Reading Association (2 years), International Utilities Revenue Protection Association (2 years), and International Electrotechnical Commission Technical Committee 57 Working Group 14 (3 months).

Q. Are you familiar with ANSI Standards for Electric Meters?

A. Yes. I first gained familiarity with these ANSI standards in 1978 as part of my responsibilities as Meter Superintendent of Southern Division Meters. This family of standards serves as the "bible" of requirements for metering in the United States. I continued using these standards on a regular basis throughout my entire metering career at FPL and as a consultant today. In 1992, I became a working member of the ANSI committees assigned to review and revise ANSI C12.1, ANSI C12.10, ANSI C12.16, and ANSI C12.20, all of which deal with electric meters. I brought significant working knowledge on utility practices and on meter testing, particularly those with electronic components, to the ANSI committees. My suggestions for additional tests and improvements to existing tests have been adopted and included in these standards. I continue as an active participant in this standards work, as I feel it allows me to further contribute to the industry, while at the same time, allowing me to keep current on significant events affecting metering and meter testing. My knowledge and commitment to these efforts have been rewarded by the ANSI committee members electing me as one of a select few on the Editorial Committee responsible for final review of each of these standards just prior to publication.

Q. Are you familiar with the provisions in the Florida Administrative Code ("FAC") and the Florida Public Service Commission ("FPSC") rulemaking in the mid-1990s concerning electric metering?

A. Yes. I am very familiar with the FAC and the mid-1990s FPSC rulemaking as it applies to electric metering. During my metering career at FPL, FAC rules have been extremely important in determining policies and procedures regarding metering. An intimate working knowledge of the FAC rules on metering was required in the performance of many of my duties.

Around 1995, FPL assembled a team comprised of members from each Investor Owned Utility ("IOU") involved in electric metering in the state of Florida. This team was gathered to review and possibly seek revisions to the FAC rules as they pertained to electric meter testing. The IOU team's objective was to bring the FAC meter rules up to date, in order to better take advantage of the capabilities of modern meters, to the benefit of both the utilities and utility customers. Close cooperation between the IOU team, the FPSC staff, and other interested parties was required to ultimately secure approval for revised FAC Rules 25-6.022 and 25-6.052 through 25-6.058 in mid-1997. In my role as project manager for the IOU team, I gained even more intimate familiarity with these rules. Regular discussions with the PSC staff in that process allowed me to gain much greater insights into what the rules mean and why they were promulgated.

Q. How familiar are you with the Florida Power & Light Co. Test Procedures and Test Plans for Metering Devices document dated April 3, 1997?

A. I am extremely familiar with the document as I was its author. This test plan and procedure document was required to comply with FAC Rules 25-6.052 and 25-6.056, both as amended on 5/19/97. I wrote this test document from late 1996 through April 1997, again, gaining intimate familiarity with its content and intent. The document called upon my many years of knowledge and experience with FAC rules for metering, ANSI standards, FPL practices and procedures, FPL's previously approved plans for meter testing, and industry practices. This test plan was approved by the FPSC staff in late summer 1997. This document remains in effect today without any updates or modifications.

Q. Have you previously filed testimony in this docket?

A. No, I have not.

Q. What is the purpose of your testimony?

A. The purpose of my testimony is to respond to certain assertions made in the direct testimonies of Mr. George Clinton Brown of Southeastern Utility Services, Inc. and Mr. Bill Smith. Both testimonies include statements that are in error or only selectively tell part of the story concerning FPL's thermal meters. The inaccurate or misleading statements that I will address include the following: (1) that all meters in this docket tested outside the accuracy tolerances established by the FPSC, (2) their statements on the internal construction and stability of thermal demand registers, (3) that improper

calibration can be the only cause of meter over-registration, (4) that statements attributed to FPL's meter testers concerning failure mechanisms are inappropriate and misleading, (5) that FPL's thermal meter testing and calibration processes do not comply with manufacturer's recommendations, (6) their statements on the effects of heat from the sun on thermal meter registration, (7) that the thermal demand meter is a simple measurement tool that will not gradually over-register demand, (8) Mr. Smith's suggested calibration process, (9) the effect of meter reading errors, (10) tapping on the reference standard, (11) the time required for stabilization after meter covers are removed, (12) their comments on sun shields, and (13) that independent meter tests point toward problems with FPL's thermal test boards.

In addition, my testimony will discuss the method proposed in the direct testimony of Mr. Sidney W. Matlock of the FPSC for determining the percent error to be used in calculating customer refunds or backbills.

Q. Is Mr. Brown correct in concluding on page 4, lines 7-10 of his direct testimony that all the thermal demand meters in this docket tested outside the accuracy tolerances established by the FPSC?

A. No, he is not. First of all, the table shown on page 3 of Mr. Brown's direct testimony does not properly list all of the meters at issue in this docket. The discrepancies between Mr. Brown's table and the fourteen meters actually

included in this docket are discussed on pages 3 and 4 of Mr. Bromley's rebuttal testimony.

Document No. DB-4, submitted as part Mr. Bromley's direct testimony, provides test results for the fourteen meters that should be included in this docket.

Additionally, I would point out that only four of the fourteen meters were found to have demand errors greater than four percent of full scale. This conclusion is affirmed on page 5, lines 6-7 of Mr. Matlock's direct testimony. Ten of the fourteen meters tested within the demand accuracy tolerances established by the FPSC. These initial tests on all fourteen meters were conducted at load points that represented either 40% of full scale for meters on high scale or 80% of full scale for meters on low scale. FPSC Rule 25-6.052 (2)(a), FPL's approved Test Procedures and Test Plans for Metering Devices, dated April 3, 1997, Paragraph III D.3.c, and ANSI C12.1-2001, Paragraph 5.2.1.1, all state that "the performance of a mechanical or lagged meter or register shall be acceptable when the error of registration does not exceed four percent in terms of full-scale value, when tested at any point between 25 percent and 100 per cent of full-scale value." Therefore, all the initial tests on these fourteen meters were conducted in accordance with accepted practices and complied with the appropriate rules for meter testing by FPL.

Eight of the high scale meters were tested a second time at a load that represented 80% of full scale, and only then, did they test just outside the established limits. These second tests at 80 per cent of full scale were performed as a customer accommodation, but were not required by FPSC rules. I'll also note that the average percent of full scale associated with these customers' actual historical usage in the twelve months prior to the 1V meter change out is approximately 60 percent, as calculated from the prior demand data provided in Exhibit 5 of Mr. Brown's direct testimony.

Q. On page 5, line 7 of his direct testimony, Mr. Brown contends that thermal "... meters are pretty straightforward in their design and operation ...", yet he goes on for over a page on how thermal meters operate. Is Mr. Brown correct in his assertions that thermal meters are straightforward devices?

A. The fact that it took Mr. Brown over a full page to describe the operation of thermal meters is indicative that they are pretty complex devices, dependant on the correct operation of a number of components working in harmony in order to function properly. Mr. Brown's descriptions of thermal meter operation are, for the most part, correct. He is, however, grossly in error on page 5, line 16 when he states that "... when current is flowing through the meter, one of the bi-metal coils is heated through a resistive ...." In actuality, a representative amount of load current flows through the resistive heaters of

both bi-metal coils, generating differential heat in the two bi-metal coils, which is a direct function of the amount of real power being delivered to the customer. This is a fundamental concept in the operation of thermal meters and reinforces Mr. Brown's own admission that he is not knowledgeable in this area.

Q. On page 2, line 23 of his direct testimony, Mr. Smith contends that "... the thermal demand meter is a relatively simple measurement tool with few critical parts." Is Mr. Smith correct in his assertions that the thermal meter is really a very simple device with few critical parts?

A. No. He is not correct. In comparing the thermal demand meter against its chief competitor of the 1970s and 1980s, the mechanical demand meter, we agree that the thermal meter was a simpler device. This relative simplicity was one of the primary reasons FPL chose it over the mechanical demand meter. Fewer moving parts contributed to the stability and reduced maintenance required of the thermal meter. But to characterize the thermal meter as a simple device with few critical parts is a gross misrepresentation of the facts. One merely needs to review Duncan / Landis & Gyr's Bulletin 841, attached as Exhibit E to Mr. Smith's direct testimony, to see how complicated the thermal meter really is. This bulletin begins with 13 pages of pictures, theory of operation, calibration instructions, repair and maintenance instructions, followed by 6 pages of specifications and application guidelines, followed by two pages of troubleshooting instructions, ending with 12 pages

of application diagrams. These are not the instructions for a simple device. As with any metering device, each one of the components that go into the thermal meter are critical to its proper operation. Changes in the characteristics of any one of these components will affect demand registration. Considered in that light, every one of the components can be considered critical. Mr. Smith is clearly in error with his statement that there are "few critical parts" in the thermal meter.

Review of Figures 2, 3, 5 and 6 and reading the first seven pages of text in Landis & Gyr Bulletin 841 reveals the critical nature of most all components in the thermal meter. Instructions are given in painstaking detail for proper procedures to use for calibration and repair of the thermal meter. If the parts were not critical, then such care would not be required by the manufacturer. Among the components that are deemed absolutely critical to the proper operation of the thermal meter are: the zero calibration spring, the full scale calibration spring, the front bi-metal coil, the rear bi-metal coil, the front heater elements, the rear heater elements, the integrity and thermal characteristics of the front heater housing, the integrity and thermal characteristics of the rear heater housing, the front bearing, the rear bearing, the balance and positioning of the red pusher pointer assembly, the balance and positioning of the black maximum pointer, the condition of the grease in the damping assembly, the condition of the electrical connections in the range changing switch, and the condition of the three dozen or so soldered

connections in the potential and current circuits of the meter. Many of the components are mechanical in nature and subject to some wear and tear and malfunction. If that were not the case, then Landis & Gyr would not have found it necessary to include so many pages in Bulletin 841 on how to replace them.

Q. Are both Mr. Brown and Mr. Smith correct in their assertion that only improper calibration can cause thermal demand meters to over register?

A. No. They are clearly incorrect in this assertion. Both Mr. Brown, on page 6, lines 4-21 of his direct testimony and Mr. Smith, on page 3, lines 19-25 of his direct testimony, have overlooked a number of fundamentals in trying to support and promote their positions. As discussed in the previous answer, thermal meters contain a number of components critical to the stability of the meter. I am not an expert in materials science, but as an engineer, I know that all mechanical components are constructed of materials that can change characteristics over time. I also know that regular and continued temperature cycling, such as that which occurs under the cover of meters, accentuate changes in the characteristics of materials.

When one looks at the effects of the characteristics of the zero calibration spring and the full scale calibration spring, one can appreciate how a slight change in the spring constant of either spring can cause changes in the calibration of the meter. These changes could occur in either direction, over-

registration or under-registration, depending on the direction of the change and to which spring it applied.

Similarly, the balance and match in characteristics of the two bi-metal coils are critical to the continued stability of the calibration of the meter. Mr. Brown states on page 6, lines 9-10 of his direct testimony that "the bi-metal coils are subjected to an aging process prior to assembly into a meter, and therefore are stable indefinitely." This statement is an open admission that the bi-metals change characteristics over time. Aging is simply a method that attempts to cycle the material in such a manner that delivers most of this change before the component is manufactured into a finished product. Aging is always a trade off in balancing the time (and expense) up front against stability in the future. If this were a perfect world and materials always behaved perfectly, then the claim of "stable indefinitely" might have some merit. However, all is not perfect, so it is reasonable to conclude that the bi-metal coils change characteristics over time. As in the case with the springs, the changes in the bi-metal coils could result in the meter over-registering or under-registering, depending on the direction of the change and which bi-metal coil was affected most.

Similarly, the balance and electrical match in characteristics of the resistive heater elements are critical to the continued stability of the calibration of the

meter. Changes in their characteristics will result in over-registration or under-registration conditions.

Similarly, the physical integrity and match in thermal characteristics of the heater housings are critical to the continued stability of the calibration of the meter. Changes in their characteristics will result in over-registration or under-registration conditions.

Changes in the front and rear bearings due to corrosion or foreign objects could affect registration. Generally these conditions result in under-registration, but it is possible that if the corrosion or trash were in place during calibration, but subsequently cleared out, then the meter would later over-register.

Changes in the balance and positioning of the two pointers could affect registration. Generally these conditions result in under-registration, but it is possible that if pointer problems were in effect during calibration, but subsequently cleared out, then the meter would later over-register.

Changes in the condition and viscosity of the silicone grease in the dampening assembly could affect registration. Changes in the characteristics of the silicone grease could result in under-registration or over-registration, depending on whether the grease increases viscosity (hardens) or decreases in

viscosity (thins and runs out). Both of these conditions have been observed and experienced at FPL in the past, and confirmed to affect registration in the directions noted.

Changes in the conductivity of the electrical connections in the range changing switch and in the three dozen or so soldered connections in the potential and current circuits of the meter can affect registration. Changes in the conductivity of these connections could result in under-registration or over-registration, depending on whether increased resistance was introduced to the retarding, front thermal element or the driving, rear thermal element.

Depending on the nature of the changes experienced above, it is impossible to predict which of them might have occurred and whether they occurred suddenly at a discrete point or points in time or gradually over the time the meter was in service.

Last, as a parting observation on the topics discussed above, since we are not operating in a perfect world, it is clearly reasonable to expect that materials will change over time. We recognize that fact and Landis & Gyr recognizes that fact. The claims of Messrs. Brown and Smith have no factual basis and are clearly in error. If Landis & Gyr could have made a meter with perfectly made parts, and one with parts that never changed characteristics, they could have and would have left off all the adjustment screws. These adjustment

mechanisms are there to allow the meter to be brought back within calibration limits after the parts within the meter have changed characteristics over time.

Q. What other indications are there that both Messrs. Brown and Smith are incorrect in their assertion that thermal demand meters cannot gradually over-register and therefore, the only plausible explanation (for over-registration) is improper calibration?

A. The fact of the matter is that six of the fourteen meters in this docket were never calibrated by FPL. Therefore, their assertions have no basis. These meters were purchased new by FPL from Landis & Gyr in 1989 through 1992. Landis & Gyr 100% tested these meters before they left the factory. They were calibrated to have zero error just before they were boxed by Landis & Gyr for shipment. These meters, upon receipt by FPL, were all tested per the then new meter acceptance procedures at that time. These new meters were as-found tested by FPL and found to have zero error. Therefore, there was no need for FPL to remove meter covers and recalibrate any of these six new meters. As a result, the as-left tests were also recorded as zero error. These would be noted as 0 / 0 on the meter test reports. For the meters to be improperly calibrated and tested, both Landis & Gyr and FPL would have had to make identical mistakes, in both the direction and amount, in their demand meter testing processes. This is an extremely unlikely event and not at all reasonable to assume to have occurred.

Subsequent to the initial tests on these six meters (performed when they were new in the 1990s), FPL never tested these meters again until they appeared at FPL's Meter Technology Center in August 2002, as part of the 1V meter retirement project. As-found testing performed in August 2002 indicated that these six meters all had changed registration in-service from the zero error condition when they were initially placed in service. One could assume that the only reasonable explanation for these changes in registration is that one or more of the materials discussed previously changed characteristics in a manner that caused the meters to either gradually or suddenly over-register some time after they were placed in service and before they were removed for testing in 2002. However, one thing is known for certain, FPL did not improperly calibrate these meters.

Q. What is the relevance of Mr. Brown's assertion on page 7, lines 1-5 of his direct testimony, and repeated by Mr. Smith on page 3, lines 1-17 of his direct testimony, that FPL meter testers were questioned and were "... unaware of any mechanism that can cause these thermal meters to gradually over-register demand" ?

A. Their assertion is an attempt to mislead the Commission into believing that the only explanation for over-registration is improperly calibrated meters. Mr. Herbster, Mr. Faircloth, and Mr. Teachman are all involved in testing meters, not repairing meters. FPL does not repair these meters. Since the meter testers never have cause to repair these thermal meters, they never have reason

to open them up and take them apart in order to investigate why they are in error. Without the need to fix them, they would not be expected to know the answer to this question, as posed to them at their depositions. When meters were determined to be too far out of tolerance to be adjusted, the meter testers simply place red Property Disposal Report (PDR) stickers on the meters to signify that they should be disposed.

Q. Both Mr. Brown, on page 8, lines 11-17 of his direct testimony, and Mr. Smith, on page 9, line 6 through page 11, line 16 of his direct testimony, contend that "FPL's stated calibration procedures do not comply with the manufacturer's recommendations for calibration." Are Mr. Brown and Mr. Smith correct in their assertions that FPL does not test thermal meters in accordance with manufacturer's recommendations regarding the use of test covers?

A. No, they are incorrect in their assertions. Their first assertion states that a test cover is required for calibration testing by the manufacturer, as referenced in Landis & Gyr Bulletin 841, Technical Manual on the TMS and TMT thermal demand meters. However, page 5 of Bulletin 841, actually states that "…. Thermal demand meters should always be tested with the covers in place. When the cover is removed from the meter, the cooler outside air rushes in and ….. For this reason, any calibration of the meter must be done quickly, after the cover has been removed, preferably within 20 seconds …. The efficiency and accuracy of calibrating thermal demand meters can be

improved by the use of test covers that have 3/8" diameter holes ...." In reading the preceding excerpt from Landis & Gyr Bulletin 841, it is clear that two methods for calibrating meters are acceptable to the manufacturer: one which involves quickly removing the cover and one which involves the use of special test covers. FPL has elected to use the first method, namely quickly removing the meter cover, making the required calibration adjustment, replacing the cover, then waiting an appropriate time to recheck the adjusted registration. Messrs. Brown and Smith contend that the method employing test covers is the only acceptable method recommended by the manufacturer. Landis & Gyr Bulletin 841 positively contradicts their contention. Further, FPL believes its method is more efficient and far superior to that of using test covers for many reasons. First of all, FPL meter testers are very skilled and adept at quickly removing meter covers, performing the adjustment on the appropriate calibration screw, and then quickly replacing the cover. In their depositions, both meter testers Faircloth and Herbster said that they were able to perform calibration adjustments in 15 seconds or less total elapsed time for the cover being off the meter. Note that Messrs. Faircloth and Herbster's stated 10 to 15 second time frame for the covers being off was well under the 20 seconds suggested by Landis & Gyr as the (maximum) preferred time.

Second, the use of test covers is not without its own set of problems. Test covers have (at least) two 3/8 inch diameter holes drilled in the front of each cover. These holes are always open, allowing cooling air to constantly enter

the front of the meter. This cooling air is present for the entire three hour or so testing cycle, as contrasted with a 10 to 15 second cooling period created in the FPL process. I contend that the FPL process is a closer representation of real world conditions than the process using test covers. In fact, during the early 1980s, I recall Landis & Gyr experienced calibration problems created by the use of test covers. Something changed in the placement of holes in their factory test covers or nameplates that affected the position through which the cooler air, streaming in through the test cover holes, hit the meter and its thermal elements. This resulted in a miscalibration of the meter by Landis & Gyr. FPL and all other utilities performing acceptance tests found that many, if not all, of these new meters required recalibration before they could be placed in service. Landis & Gyr eventually tracked down the problem to test covers, and made appropriate modifications to fix things in approximately 1983.

FPL disagrees with Landis & Gyr's statement that the use of test covers improves the efficiency of the testing and calibration of thermal demand meters. Perhaps it makes sense for Landis & Gyr, with 100% brand new meters, all of the same manufacturer and type, but it does not for FPL. The use of test covers presents a logistical nightmare in a production test facility like FPL's Meter Technology Center. Through the years, FPL has purchased thermal demand meters from Duncan / Landis & Gyr, Westinghouse / ABB, Sangamo / Schlumberger, and General Electric. Throughout time, each

manufacturer made several models of thermal meters, as in the case of the Landis & Gyr model TH, which was replaced with the TR which was replaced with the TMT. Further, each came in one version for single phase and a different one for polyphase. Sometimes self-contained and transformer rated meters were different in sizes, too. The bottom line impact of all these different models of thermal meters would be a requirement to have many different sizes and types of test covers in order to fit all the variation in meter covers and placement of calibration screws. This translates to many test covers to store, time to select the correct test cover, and many "removed" covers to store and eventually get back on the right meter.

Finally, the testing efficiencies asserted for using test covers totally disappear unless the majority of meters passing through the shop require calibration. If you are going to incorporate test covers in your thermal testing process, then you probably need to use them on every meter going through the shop. It takes time and effort to do this. Meters that are new need to be tested but rarely need calibration. Meters that become the subject of a complaint test, witness test, sample test, and those to be disposed of, all receive as-found tests only, without any calibration on their first pass through the shop. Test covers are not practical or efficient for meters that do not require calibration.

Q. Continuing on with Messrs. Brown and Smith's contention that FPL fails to follow manufacturer's recommended procedures for calibration, can

you comment on their assertion that 45 minutes are required for stabilization after adjustments are made?

A. The situation described by Messrs. Brown and Smith is one where a meter has been tested (for the appropriate 45 minutes or more) and found to be in need of adjustment. The FPL process would be to remove the cover, make the adjustment, and then replace the cover, as described in the previous answer, all in 10 to 15 seconds. At this point the meter should be very close to zero error, and certainly within the 2 percent error accuracy tolerance as established by FPL's approved test procedures for adjusted meters. Further testing is not required by FPL's approved test procedures, FPSC rules or by Landis & Gyr's recommendations. Page 5 of L&G Bulletin 841 states "…. After calibration adjustments …if other tests are to be made, the cover should be replaced as soon as possible. If it is desired to recheck a calibration point after the cover has been removed and replaced, the present load on the meter must remain constant for a minimum of 45 minutes after replacing the cover …" I don't see any requirement by the manufacturer that a reading must be taken. Further, Landis & Gyr Bulletin 841 takes a very conservative approach, one which reflects that Landis & Gyr does not know how long meter testers might actually have the cover off of the meter. As a manufacturer, Landis & Gyr is providing instructions that reflect all reasonable possibilities. Their stated 45 minutes reflects the worst case situation. FPL has elected to take this additional read after a minimum of 10 minutes for stabilization as a reasonable practice to help verify the accuracy of

the original adjustment. A period of ten minutes was established by FPL as being more than adequate for this verification check, for a number of reasons: first, the meter has just gone through a full 45 minute test and adjustment, if necessary, to zero error; second, after 10 minutes, the response characteristic of a thermal meter causes the red indicating pointer to reach 80% of the value it would ultimately attain (reference L&G Bulletin 841, Figure 4) versus 99.9% after 45 minutes; third, FPL meter testers are looking for movement of the red pointer away from the desired calibration point, versus an absolute determination in how far the pointer might be off; and fourth, 10 minutes has been determined by FPL to be a sufficient amount of time to wait in order to look for movement – in other words, if it has not moved after ten minutes, it is not going to move any noticeable amount more by waiting another 35 minutes.

Q. Continuing on with Messrs. Brown and Smith's contention that FPL fails to follow manufacturer's recommended procedures for calibration, can you comment on their assertion that adjustments are made without backlash compensation?

A. Backlash compensation describes the situation where the black maximum pointer exerts a very small frictional force on the red indicating pointer as the red pointer drives the black pointer upscale. With proper viscosity of grease and without obvious drag of the black pointer on the scaleplate, the backlash is almost negligible. If, upon testing, the meter is found to under-register,

Messrs. Faircloth and Herbster, two of the meter testers at FPL, indicated in their depositions that they adjust the full-scale adjustment screw in the direction that moves the red indicating pointer upscale. In this configuration, the black maximum pointer is pushed upscale by the red pointer, providing the appropriate amount of backlash. Therefore the backlash compensation assertions made by Messrs. Brown and Smith are not applicable to this situation. If, upon testing, the meter is found to over-register, then Messrs. Faircloth and Herbster, two of the meter testers at FPL, indicated in their depositions that they adjust the full-scale adjusting screw in the direction that moves the red indicating pointer downscale. In this configuration, the black maximum pointer would not provide the small amount of backlash compensation to the red indicating pointer. While not a desirable practice, if it were to occur, the effect of this action would result in the possibility of the demand slightly under-registering in normal operation in the future. If any backlash were present in normal operation, it would tend to retard the movement of the combined red and black pointers. Last, as Mr. Bromley explains in his rebuttal testimony, six meters were new and, when tested, did not require any calibrating adjustments by FPL.

Q. Continuing on with Messrs. Brown and Smith's contention that FPL fails to follow manufacturer's recommended procedures for meter testing and calibration, can you comment on their assertion that some of FPL's meter testing is performed at less than 50% of Full Scale?

A. FPL's meter testing conforms to all applicable codes and standards for demand testing. FPSC Rule 25-6.052 (2)(a), FPL's approved Test Procedures and Test Plans for Metering Devices, dated April 3, 1997, Paragraph III D.3.c, and ANSI C12.1-2001, Paragraph 5.2.1.1, all state that "the performance of a mechanical or lagged meter or register shall be acceptable when the error of registration does not exceed four percent in terms of full-scale value, when tested at any point between 25 percent and 100 per cent of full-scale value." These codes and standards have contained acceptable test points as being between 25 percent and 100 percent of full scale for a long, long time, at least 40 years by my quick research. If Mr. Brown or Mr. Smith have a problem with these test points, I suggest they approach the appropriate regulatory or standards bodies to petition that these rules or standards be changed. To my knowledge, neither Mr. Brown nor Mr. Smith has made such an attempt.

Landis & Gyr Bulletin 841, on page 6, states that "....the calibration test point can be made at any point from 50% of full scale to 100% of full scale." The use of the word "can" indicates some latitude in interpreting Landis & Gyr's preferred range for a calibration test point. It might be different had L&G used the word "must" or even "should", but they did not use either of those

more emphatic terms. In any case, the language in the Landis & Gyr Bulletin 841 certainly does not take precedence over FPSC Rule 25-6.052 (2)(a)(4) which authorizes a calibration test point range of 25 percent to 100 percent of full scale.

Q. On page 9, line 14 through page 10, line 15 of his direct testimony, Mr. Brown describes the effect of heat, including heat from solar radiation, on thermal demand registration. Does heat from solar radiation affect thermal demand registration, and if it does, does it cause under-registration or over-registration?

A. Mr. Brown presents confusing and somewhat conflicting information on the effect of heat from solar radiation on thermal demand registration. The effects of heating from solar radiation on demand registration are really very straightforward and simple to understand. As has been explained in several documents attached as Exhibits to previous FPL witnesses deposed by SUSI, and on page 5 of Mr. Brown's direct testimony, the thermal meter works on the principal of differential heat applied to the front (retarding or "cool") thermal element and the rear (driving or "hot") thermal element. The bi-metal coils in each of the two elements are wound in opposite directions in order to cancel out the effect of ambient, background temperatures. This technique works extremely well when the temperature contained under the meter cover is consistent and not rapidly changing. For this background cancellation to work properly, it is imperative that the temperature gradient inside the meter,

from the front to back, be reasonably close to zero. Direct, bright solar radiation striking the front of the meter could heat the front of the meter more than the rear of the meter, setting up a potentially significant temperature gradient from front to rear. Since the front, retarding thermal element is now exposed to higher "ambient" temperatures than the rear, driving thermal element, the red thermal indicating hand is driven downscale by the ambient temperature differential set up by the uneven heating. The amount of under-registration would be proportional to the intensity of the heating and inversely proportional to the length of time it is applied. After some period of time, the temperature under the cover would stabilize and the gradient from front to back would be reduced. Once the external heating is removed, the red indicating pointer returns to exactly the point it should be due to the electrical load measured by the thermal demand meter. In the course of investigating this phenomena, as triggered by Mr. Brown's inquiries, approximately 150 meters were tested by FPL to evaluate this external heating effect and found to behave exactly in the manner described above, whereby the external heating caused either no demand mis-registration or some demand under-registration. Demand registration on the meters returned to their starting point after the external heating was removed and the meters were allowed to return to ambient temperature. Only one meter was ever found that over-registered after the external heating was removed.

Q. Having concluded that heating from solar radiation might cause under-registration in demand indication, should the Commission be concerned about its impact on demand billing?

A. No, not at all. Demand billing would not be affected by these instances of under-registration. Demand billing reflects the maximum demand experienced by the customer during a given month. A single 30 minute period is all that is required to set this demand. For external heating to be a factor in the positioning of the black maximum pointer, the under-registration due to heating from solar radiation would need to occur at the time of peak demand. For instance, if the maximum external heating caused under-registration occurred at 4:00 PM, but the customer's electrical load peaked at 6:00 PM, it would be totally moot as to where the red indicating pointer was at 4:00 PM. If one believes that the maximum external heating caused under-registration were to occur simultaneously with the time of electrical peak load, then to be a factor, the customer would have to experience the external heating masked peak for each of the thirty days in the month. All you would need would be a single cloudy day for the red and black pointers to measure the customer's true peak load. Therefore, heating from solar radiation should have little to no impact on demand billing.

Q. On page 4, line 8 through page 6, line 13 of his direct testimony, Mr. Smith describes his suggested calibration procedures for thermal demand meters. Are Mr. Smith's suggested calibration procedures correct?

A. For the most part, Mr. Smith's suggested calibration procedures are consistent with manufacturer recommendations and with FPL's own procedures. There are, however, several notable exceptions worthy of discussion. In Mr. Smith's step 4, page 4, lines 14-16, I would not check the black pointer for friction until after I had performed my as-found tests. Moving the pointer up and down the scale could obliterate any problem in friction or grease that might have been present. Further, as discussed earlier, I would not use test covers. This comment continues in his step 5.

In step 7, page 4, lines 23-25, I would not adjust the zero calibration until after I had completed my as-found test for the full scale calibration test.

In step 9, page 5, lines 9-13, I would not test at 75% of full scale. As noted earlier in my testimony, the FPSC rules allow FPL to test demand at any point from 25% to 100% of full scale. For customer request tests or FPSC complaints, I would test demand at the customer's actual historical average percent of full scale, as determined by the customer's previous demand history. The rationale and process for selecting this test point is described in pages 13-15 of Mr. Bromley's direct testimony and on page 6, lines 5-15 of Mr. Matlock's direct testimony.

In step 2, page 5, lines 19-23, I cannot see how it is possible to read a reference standard with 100 whole number marks out to two digits past the decimal point (I believe that this is what Mr. Smith is suggesting). Mr. Smith is also in error in his formula for percentage error. His formula provides the absolute percent registration of the point under test. First, he is calculating percent registration versus a percent error, even though he calls it percent error. Second, the prescribed method for expressing percent error of demand meters is stated in terms of full scale. This method has been in the rules and standards for at least 40 years. If Mr. Smith has a suggestion to make to the appropriate rulemaking and standards bodies, again, he is free to do so. In the meantime, FPL must follow the rules, as approved by the FPSC for calculation of percent error.

Q. **On page 7, line 14-24 of his direct testimony, Mr. Smith describes the effect that reading errors on the thermal reference standard have on the resulting accuracy calculations. What point is he trying to make in asserting that this reference standard has ".... A resolution of 100 increments. Therefore if read to the nearest increment without interpolation the results would be skewed ...."?**

A. It is true that the thermal demand test board reference standard has 100 tick marks on its scale. These marks are very close together, making interpolation very difficult, at best. Therefore, FPL meter testers have stated in their

depositions that they generally round their readings off to a whole number, without interpolation. Mr. Smith's analysis of the data from the 3,900 1V meters tested bears this out. Unfortunately this is the best that can be done with the equipment at hand. A similar situation exists in the ability to accurately read the demand pointer position of the meters under test. These too, have crowded scale plates, with 70 or so increments on them. In summary, it is very difficult or impossible to read the test board reference standard and meters under test any closer than is presently being done by FPL. Also, it is my understanding that each one of the readings for the reference standard and for the meter under test, for all the meters in this proceeding, were agreed to by Mr. Brown and FPL. Accordingly, this should not be an issue for this proceeding.

Q. On page 8, lines 1-7 of his direct testimony, Mr. Smith describes his perceived problem that tapping the reference standard is improper. Is Mr. Smith correct that tapping is bad?

A. No. Tapping on meters, both reference standards, meters under test, and regular meter reading, is a long standing process that has been practiced by folks needing to accurately read meters. This practice of tapping on meters is universal in that it is generally used in all industries where meters and gauges are required to be read. Meter tester Brian Faircloth stated on page 56, line 8 through page 58, line 18 of his deposition, that he was taught about tapping while receiving training on the thermal test board from his predecessor at the

thermal test board. Landis & Gyr Bulletin 841, on page 4, says to "…. Tap meter lightly while making this adjustment…." Even though taken out of context, this statement demonstrates that tapping the meter cover, while not required, is an accepted practice.

Q. On page 14, lines 4-13 of his direct testimony, Mr. Smith describes the need for sun shields on thermal demand meters. Has Mr. Smith uncovered a problem that FPL was deficient in not installing (external) sun shields on its thermal demand meters?

A. No, absolutely not. Shielding the two thermal elements is very important. Heating from solar radiation can have an effect on the registration of thermal demand meters. As discussed in an earlier answer, external heating can cause temporary under-registration in these meters. However, I am confused over Mr. Smith's revelation of this issue as relevant to the 14 meters in this docket. In the distant past (30 to 40 years ago), certain meters were especially sensitive to the effect of heating from solar radiation. The Landis & Gyr TR thermal is an example of this type of meter. The TR had it thermal elements located above the disc, just under the top surface of the meter cover. The original TR meters were supplied with painted covers in order to block or shield solar radiation from beaming down on top of the two thermal elements. Later TR meters were shipped with clear covers and a clip-on metal sun shield just inside the cover, blocking perhaps 50% of the top surface of the meter.

When the polyphase TMT was introduced by Landis & Gyr in 1974 to replace the TR, it was provided with an internal, non-removable metal sun shield that can readily be seen by looking into the top front of the meter. The metal sun shield is clearly visible inside the TMT, fully covering the top of the two thermal elements. The 14 meters at issue in this docket all are equipped with this factory installed sun shield. For this reason, I am confused by Mr. Smith bringing up sun shields as an issue with TMT demand meters, since these meters already have them. Perhaps Mr. Smith is confusing the TR with the TMT. In reading his background material from page 1 of his direct testimony, I see that Mr. Smith left Duncan / Landis & Gyr in 1972, two years before the TMT was introduced. I would therefore expect he is more familiar with the TR than the TMT.

Q. Mr. Brown, on page 8, lines 19-24 of his direct testimony, and Mr. Smith, on page 15, lines 1-20 of his direct testimony, describe concerns with differences in test results conducted by independent meter tester versus tests conducted by FPL. Please comment.

A. FPL takes great pains to ensure meters are accurately tested. Not having been a participant in any of the independent testing puts me at a serious disadvantage in explaining why differences in test results occurred. However, there are two comments I can make. First, FPL's test was conducted in a controlled environment compared to the uncontrolled conditions in Mr. Brown's carport. Additionally, FPL test results determined an over-

registration error that was greater than the error determined by the independent test, so I'm not sure what issue Mr. Brown is raising.

Q. On page 16, lines 6-24 of his direct testimony, Mr. Smith describes concerns with the procedures used in the calibration of FPL's thermal demand meter test boards. Are any of Mr. Smith's concerns warranted?

A. No. FPL takes appropriate measures to ensure these thermal test boards are calibrated accurately. The FAC rules, FPL's approved Test Procedures and Test Plans for Metering Devices, dated April 3, 1997, and ANSI C12.1 are all silent on the requirement for calibrating demand test boards. Therefore, FPL utilizes the manufacturer's recommendations as a minimum set of requirements for calibration of the test boards. The two thermal boards are both Catalog Number 1132 by Eastern Specialty Company. Eastern Specialty Bulletin No. 134, page 7, section 18, provides guidance on the method to be employed in testing the calibration of the thermal board's reference standard. Through the years, FPL has performed these calibration tests on a yearly basis, a practice that remains in effect today.

As a follow-up to Messrs. Brown and Smith's concerns on the calibration accuracy FPL's thermal test boards, FPL conducted a test using product transfer standards ("PTS") to verify the calibration accuracy of the two thermal test boards. This test involved taking two production (regular) demand meters into the standards laboratory to determine their accuracy with

a high degree of certainty. The PTS meters were then taken to the thermal boards, loaded up with 10 other demand meters, where they were all tested as demand meters. The registration of the PTS meters were compared against the reference standard and conclusions were then drawn on the accuracy of the thermal reference standard. The results of those tests are as follows:

	Standard Reference Meter	PTS #1	PTS #2
Test Board 3:	1.21	1.22	1.22
Test Board 4:	1.21	1.20	1.20

As a result of these PTS tests, FPL concluded that the reference standard meters in both thermal test boards were reading within acceptable accuracy limits.

Q. On page 9, lines 4-17 of his direct testimony, Mr. Matlock describes a proposed method for determining the percent error to be used in calculating customer refunds or backbills. Is Mr. Matlock's proposed method consistent with FPSC rules?

A. For the most part, Mr. Matlock's proposed method is consistent with FPSC rules. There is, however, one exception worthy of discussion. Rule 25-6.103(3) states that "... when a meter is found to be in error in excess of the prescribed limits, the figure to be used for calculating the amount of the refund or charge ... shall be that percentage of error as determined by the test." In the case of the demand meters, the "test" requirement of Rule 25-6.103(3) is provided by Rule 25-6.052(2), which states that the error of

registration is defined in terms of full scale value. Determination of demand error expressed in terms of full scale value has been in the rules and ANSI standards for at least 40 years. Therefore, the literal interpretation of Rules 25-6.103(3) and 25-6.052(2) require calculation of percentage of error in terms of full scale value and not in terms of "... the correct (true) value ..." as proposed by Mr. Matlock on page 9, Step 4 of his direct testimony. As Mr. Matlock states on page 7, line 21 through page 9, line 3 of his direct testimony, Rule 25-6.058 does not specifically provide a method to determine the amount billed in error for demand meters. However, at the time Rule 25-6.058 was last amended on 5/19/97, the associated rulemaking process provided a ready opportunity to include method(s) for billing calculations associated with demand errors, had they been felt necessary. Since no such effort was made in amending Rule 25-6.058, one can conclude that the parties involved in the 1997 rulemaking considered the provisions of Rule 25-6.052(2) to be the appropriate method used for determination of the amount billed in error on demand meters. Rule 25-6.052(2) requires calculation of percentage of error in terms of full scale value.

Q. Also included in Mr. Matlock's proposed method, discussed on page 9, lines 6-10 of his direct testimony, are provisions to "... calculate the average billing demand from the complete billing cycles contained in the refund/back bill period ... (and) ... to retest the meter at this average billing demand ..." Is Mr. Matlock's proposed demand test point

consistent with FPL's modified process for customer requested meter tests discussed on page 13, line 13 through page 15, line 13 of Mr. Bromley's direct testimony?

A. Yes, it is consistent with the customer request test process FPL modified in late 2003. FPL's process uses the "... customer's percentage of full scale reading as determined by the average of the customer's actual previous 24 months percentage of full scale readings." The only point of difference between the FPL process and Mr. Matlock's proposed method is in determination of the number of months of historical data to be used: FPL's method uses the 24 months prior to the meter change, Mr. Matlock's method uses the actual months in the refund / backbill period. Both methods are similar and intended to select a demand test point reflective of the customer's actual average demand usage prior to the meter change. In addition, FPL's process states that no meter will be tested at less than 40 percent of full scale value, while Mr. Matlock is silent on this issue.

Calculations and data presented in Exhibit SWM-2 of Mr. Matlock's direct testimony, however, use the customer's maximum billing demand during the refund period (12 months) versus the average billing demand during the refund period. FPL believes that the customer's average demand is more reflective of the customer's actual average usage than is the customer's maximum demand. Using the average demand smoothes out the effects of highs and lows, and therefore is more reflective of a customer's typical usage

than would be provided by using the maximum value for the demand test point.

Q. Does that conclude your rebuttal testimony?

A. Yes, it does.

COMMISSIONER DEASON: Is there a summary?

MR. HOFFMAN: Yes, sir.

BY MR. HOFFMAN:

Q Have you prepared a summary of your rebuttal testimony?

A Yes, I have.

Q Could you please provide that to the Commission?

A Yes, I will. The purpose of my testimony is to respond to certain assertions made in the direct testimonies of Mr. George Brown of Southeastern Utility Services and Mr. Bill Smith. In addition, my testimony will discuss the method proposed in the direct testimony of Mr. Sidney Matlock of the FPSC in determining the percent error to be used in calculating customer refunds or backbills. I will try to highlight certain parts of my testimony.

George Brown testifies that at the time the meters began to overregister can be established as the time FPL last calibrated the meters. He testifies there is virtually no physical mechanism that can result in these meters gradually overregistering demand. I disagree. Thermal demand meters are devices with numerous components. **Each one of these components** that go into the thermal meter is critical to its proper operation. Changes in the characteristics of any one of these components will affect demand registration. Many of the components are mechanical in nature and subject to some wear,

tear, or malfunction. If that were not the case, then Landis & Gyr would not have found it necessary to include so many pages in Bulletin 841 on how to repair or how to replace them.

As an engineer, I know that all mechanical components are constructed of materials, and that regular and continued temperature cycling such as that which occurs under the cover of meters accentuate changes in the characteristics of these materials. It is impossible to predict which changes occurred and when they did. If Landis & Gyr could have made a meter with perfectly made parts and with parts that never change characteristics, they could have and they would have left off the adjustment screws. These calibration mechanisms are there to allow the meter to be brought back within calibration limits after the parts have changed.

My testimony discusses the fact that six, six of the 14 meters in this docket were never calibrated by FPL. This fact eliminates Mr. Brown's theory that miscalibration is the cause of overregistration. FPL's thermal meter and calibration processes comply with manufacturer's recommendations. Let me address three of the issues.

Landis & Gyr Bulletin 841 provides two methods for calibrating meters. The practice employed by FPL involves quickly removing the cover and the other involves the use of a special test cover. Landis & Gyr takes a very conservative approach in suggesting 45 minutes be required for stabilization

after adjustments are made. Ten minutes was established by FPL as being more than adequate for this verification test. FPSC rules and FPL's Commission-approved test procedures authorize testing at any point between 25 and 100 percent of full-scale value. The suggestion in Landis & Gyr's Bulletin 841 certainly do not take precedence over FPSC rules.

The effects of heating from solar radiation on demand registration are really very straightforward and simple to understand. FPL has investigated this issue and found that this external heating either has no effect or underregistration on the meters.

Turning to Mr. Matlock's testimony, he proposes the use of error at the meter test point to calculate refunds. His proposal is inconsistent with the test requirement provided by Rule 25-6.052(2) which states that the error of registration is defined as a percentage of full-scale value. Mr. Matlock also suggests calculating the customer's billing demand from the billing cycles contained in the refund or backbill period versus FPL's present method which uses the 24 months prior to the meter change. Both methods are similar and both are intended to select a demand test point reflective of the customer's actual demand usage prior to the meter change. That concludes my summary.

MR. HOFFMAN: Thank you, Mr. Malemezian. He's available, Commissioner Deason, for cross.

COMMISSIONER DEASON: Mr. Hollimon.

CROSS EXAMINATION

BY MR. HOLLIMON:

Q Good afternoon, Mr. Malemezian.

A Good afternoon.

Q Mr. Malemezian, you've been here all day, haven't you?

A Yes, I have.

Q Okay. Do you recall some testimony with Mr. Bromley when he was being examined about the meter that brought the whole thermal demand meter issue to the attention of Florida Power & Light?

MR. HOFFMAN: Objection. That's outside the scope of his rebuttal.

MR. HOLLIMON: Well, I think if you give me a chance to follow up --

COMMISSIONER DEASON: I'm sorry. Finish your objection.

MR. HOFFMAN: Commissioner, I think that's clearly within the scope of Mr. Bromley's testimony and it's a question for him, but that's outside the scope of his prefiled rebuttal.

COMMISSIONER DEASON: Your response.

MR. HOLLIMON: I simply was trying to lay the predicate, as I've learned, for a question that I was about to ask him. That's all I was trying to establish.

COMMISSIONER DEASON: I'll give you that latitude. Please proceed.

BY MR. HOLLIMON:

Q So, Mr. Malemezian, you were present when Mr. Bromley testified, were you not, sir?

A Yes, I was.

Q And are you familiar with the meter that he described as the meter that brought the whole thermal demand meter issue to FPL's attention?

A Yes, I am. I'm not sure I would characterize it that way, but, yes, I am. I have some knowledge of that, yes.

Q I believe in your summary you said that with regard to the issue of sunlight, it's very simple and straightforward and simple to understand; is that correct?

A I did say that, yes.

Q And that there was some investigation done by Florida Power & Light and it demonstrated a consistent result; is that correct?

A Yes, they did do that.

Q Now, how do you explain the fact that the meter that Mr. Bromley discussed had the exact opposite result?

A I would characterize that as an anomaly in that one meter. FPL tried very diligently to reproduce that effect. And in testing 150 meters after the fact looking for that specific type of reaction, they clearly didn't find it on a

single other meter.

Q Mr. Malemezian, in your testimony you refer to the ANSI C12 family of standards as the Bible for metering requirements; isn't that correct?

A I do, yes.

Q While you were employed by FPL, did FPL consider these standards to be the Bible?

A I think that's a correct characterization, yes.

Q Does FPL follow the recommendations of the ANSI C12.1 with regard to metering issues?

A Yes, they do where they are appropriate.

Q So sometimes the Bible is not appropriate?

A Sometimes other rules and other requirements take precedence over the ANSI requirements, yes.

Q So are the rules a better technical standard than ANSI?

A Are the rules as in the PSC rules?

Q Correct.

A The --

MR. HOFFMAN: Excuse me. I'm going to object. The question is ambiguous. I just don't know what rules of the Commission Mr. Hollimon is referring to.

COMMISSIONER DEASON: Okay. Could you specify, Mr. Hollimon?

BY MR. HOFFMAN:

Q I'm referring to the rules that you mentioned in your prior response, but in particular, I'm referring to the PSC rules that relate to how you test meters. And the question is whether the ANSI standard is a better technical resource than the PSC rules with regard to meter testing.

A I would contend that the -- I think the answer to the question is yes.

Q Thank you.

A And I would contend that the Florida PSC rules have a requirement that requires Florida Power & Light and all other investor-owned utilities to provide a test plan. And the test plan is the resource and the technical document that describes all of the technical details of meter testing. And so by the fact that the FPSC rules require that that document be prepared and submitted and approved by the Commission and the Commission staff, I would say that the FPSC rules do in fact provide excellent technical guidance.

Q Mr. Malemezian, in your testimony you take issue with the testimony of Mr. Brown and Mr. Smith that thermal demand meters are relatively simple and pretty straightforward in their design operation, do you not?

A I do, yes.

Q Isn't it true, Mr. Malemezian, that in your experience with thermal demand meters while you were employed with FPL was that thermal demand meters are fairly simple

devices?

A Yes. I would characterize thermal demand meters as very simple devices, but being simple devices doesn't mean that there are not complex mechanisms and complex interactions that are dependent on proper operation of parts, components, materials being stable and so forth. Simple devices can have such similar reactions to changes.

Q Do you recall being deposed on September 14th, 2004?

A Yes, I do.

Q Do you have a copy of your deposition?

A Yes, I do.

Q I'm going to read into the record on Page 21, beginning on Line 4, it says, "During the time that you worked for Florida Power & Light, what was your experience with thermal demand meters?"

And your response was, "Florida Power & Light used thermal demand meters as its primary measurement of demand on commercial industrial customers. Florida Power & Light was very happy with the performance of those demand meters and throughout the years got very good results from them. They were fairly simple devices. They were fairly reliable, fairly stable devices. They were certainly much better than any alternatives that were offered in the industry in the early years."

Do you stand by that testimony?

A I do, yes.

Q Now, in your prefiled testimony, you relied upon the Sangamo "Facts About Demand" paper; is that correct?

A I did make some references in reading through that, yes.

Q You relied upon it in forming your testimony, did you not?

A Yes, if that's the definition of being -- of relied upon it. Yes, I've reviewed it.

Q Well, let's turn to Page 212 of your deposition.

A 212?

Q Correct. We're going to refer -- oh, I'm sorry. Actually, it begins on the bottom of Page 211. The last line on Page 211 I'm going to read into the record.

"In response to some of Ms. Smith's questions, you talked about the Sangamo paper and the Jenny paper. Do you recall that?"

Your answer is yes.

"Did you rely upon these documents to formulate your testimony?"

"Answer: Yes, I read them. Yes. And they were input into my testimony. Yes.

Question: So you relied upon them?

Answer: As I relied on lots of information, yes.

Question: You found them authoritative?

Answer: I found that they had useful information in them, yes.

Question: The kind of documents that an expert would rely upon?

Answer: Yes."

Do you stand by that testimony?

A I do.

MR. HOLLIMON: May I approach?

COMMISSIONER DEASON: Yes.

BY MR. HOLLIMON:

Q Can you identify the document that has been handed to you?

A Yes. This is the Sangamo "Facts On Demand" Bulletin that you asked me about in my deposition.

Q Okay. And, Mr. Malemezian, if you'll turn to the page Bates numbered 100 TDM.

A Yes, I'm there.

Q If you'll read the fourth paragraph into the record, please.

A "The excellent field accuracy of thermal meters is, in part, a result of the simplicity of design (only one moving part). Careful selection, matching, and aging of the bimetal coils are other factors of prime importance. Compensation for fluctuations of ambient temperatures (sun shield, enclosure design, deflection adjustment) give stable accuracy in all

installations."

Q And if you'll turn to the next page, it's 101 TDM.

A Yes.

Q Do you see that?

A I do.

Q And under the testing and maintenance, would you read the last sentence in the first paragraph, please.

A "For example" --

Q No. "This sustained."

A Pardon?

Q The second sentence in the first paragraph under testing and maintenance.

A Testing and maintenance, the second sentence. "Thermal meters can be tested," is that the sentence?

Q No. "This sustained accuracy." Do you see that second sentence, first paragraph?

A "This sustained accuracy is the result of the inherent design and the fact that thermal meters have only one moving part."

Q Now, in this document, what is the recommendation in terms of the test point at which these meters should be tested, thermal demand meters?

A I don't recall.

Q If you'll look in the fourth paragraph under testing and maintenance, would you read the third sentence into the

record?

A The fourth paragraph?

Q Yes. The third sentence beginning with, "The meters."

A "The meters to be tested are connected in series with the standard meter and a load of 3/4 scale or higher applied."

Q Now, what's your opinion as to why this authoritative document states that testing should be conducted at 3/4 scale or higher?

A I do not know why they put that comment in there.

Q Okay. If you'll turn to the next page, 102. And if you'll read into the record the second to last paragraph, please.

A "Since the only moving part, the bimetal shaft, moves slowly on polished stainless steel pivots, no lubrication is required on any part of the thermal meter. The bimetal coils will remain stable indefinitely because of the aging processes performed before they are assembled in the meter. The heating elements are precisely matched during manufacture and do not require further attention."

Q Okay. Earlier when we were referring to 3/4 scale, that's the same thing as 75 percent of scale; is that correct?

A

Q If you'll turn to 112 TDM, please. Under the question that's Number 23, do you see that?

A I do.

Q Would you read the second paragraph, please, into the record.

A The thermal meters are available?

Q Yes.

A "Thermal demand meters are available with a dual range feature that is easily changed in the field. This feature provides extra demand measurement capacity and better accuracy by keeping the demand reading in the upper half of the scale as loads increase. Again, recalibration is not necessary on Lincoln meters with a range change."

Q Now, why is it that better accuracy occurs when the demand reading is kept in the upper half of the scale?

A The effects of meter reading errors are less of a percentage of the overall reading of the meter, the error that's introduced by reading of the meter.

Q Now, is that true if you're talking about full-scale error?

A It's true if you're talking of any kind of error. The higher you are in the scale, the less the uncertainty, and the reading is a percentage of the overall reading that you're taking.

Q Now, Mr. Malemezian, the meters that are in this docket were all manufactured in accordance with ANSI standards, were they not?

A My understanding is, yes, they were.

Q Now, are you familiar with a standard ANSI C12.5?

A Yes, I am.

Q And doesn't that standard state that thermal demand meters shall be substantially constructed of good materials in a workmanlike manner with the objective of attaining stability of performance over long periods of time and over wide ranges of operating conditions with a minimum of maintenance?

A It does say that. But remember that the word it uses is they are to be designed with the objective of attaining that stability. Attainment of an objective is not always possible.

Q Mr. Malemezian, you have a significant amount of your testimony that goes to the physical characteristics of the components in thermal demand meters and that they're subject to change over time due to temperature cyclings. Do you recall that?

A Yes, I do.

Q Isn't it true there's a specific engineering discipline that focusses on the physical characteristics of materials and the effects of stress on these characteristics?

A I believe there is, yes.

Q And isn't it true that discipline is known as material science?

A I believe that's correct, yes.

Q And isn't it true you have no training in material

science?

A I have no expert training in that. As an engineer, you take courses in that as part of your undergraduate work, and I did have some of those courses.

Q But you're not an expert -- you don't consider yourself to be an expert in material science, do you?

A No, I do not claim to be an expert.

Q You're a Florida professional engineer, aren't you?

A Yes, I am.

Q As a matter of fact, on the very front of your testimony it says, Ed Malemezian, P.E., doesn't it?

A It does say that, yes.

Q And as a Florida professional engineer, what engineering disciples do you hold yourself out to be competent in?

A Electrical engineering.

Q You don't hold yourself out to be competent in material science, do you, sir?

A Not as an expert, no. I mean, I will say that I don't feel that I need to be an expert in material science in order to render opinions on the changes and characteristics that occur in meters. Having been -- as Mr. Hollimon (sic) pointed out, my background is very extensive, 26 years at Florida Power & Light dissecting many, many meters, following up on problems and issues with those meters, working with

manufacturers, including Landis & Gyr. You get to learn an awful lot about the interaction of those components and the changes in material characteristics that can take place, and I don't feel I have to understand the nitty-gritty details of all of the physics involved there in order to render opinions and discussion on how those changes can affect --

Q We're going to get to that, Mr. Malemezian. Let's just hold on for a second.

The meters in this docket are all 1V thermal meters; is that correct?

A Yes, they are all 1V thermal demand meters.

Q Now, isn't it true that you have no specific experience with investigating 1V thermal demand meters with regard to changes and characteristics of their components?

A That's not true, no. In my years of experience at Florida Power & Light, I was involved with investigations into the changes in accuracy and calibration that ultimately was tracked down to changes in the characteristics of many meters. These investigations probably were the hundreds or the thousands of meters. Included in that batch of meters that I experienced in this 26 years were thermal demand meters and were thermal demand meters of the 1V type, but I cannot associate to you today that a specific issue or problem I can remember back that was specifically attributed to a 1V meter.

Q So the answer to my question is yes? You have no

specific examples of investigations into 1V thermal demand meters?

A The answer to your question is yes, with the explanation that I gave.

Q Okay. Now, isn't it true that you've also never had any discussions with thermal demand meter manufacturers about changes in component characteristics?

A No, that's not true. I believe that through the years at Florida Power & Light there were issues associated with thermal demand meters and that Landis & Gyr, the manufacturer of these meters, was the primary supplier to Florida Power & Light for many years. And through those years there were numerous discussions on why meters behaved and performed the way they did. And changes in characteristics of materials certainly were part of those discussions.

Q But you can't recall any specific discussion you ever had with that regard?

A That's correct.

Q Okay. Mr. Malemezian, have you examined, personally examined the meters that are in this docket?

A Describe to me -- explain to me what you mean by examine.

Q Have you looked at them?

A Have I looked at them? I do not believe I have.

Q Did you ask Florida Power & Light to let you look at

them?

A I do not believe I did, no.

Q So you don't have any idea whether or not any of the component characteristic changes you've testified to have actually occurred?

A I do not. But again, relying on my very extensive experience I don't need to understand the specific mechanisms, the specific characteristics that occurred in these particular 14 meters to understand that these materials are tightly integrated into the chain of accuracy and performance and stability of these meters. I did not feel that I needed to examine them. And further, a casual examination -- preserving the integrity of the meters, which FPL felt was important, that casual observation and looking at them would not have led me to conclude anything specific about these particular meters.

Q Mr. Malemezian, you've also never tested meter components for changes in material characteristics, have you?

A No, I have not personally. However, I have been intimately involved with manufacturers like Landis & Gyr who did do that for Florida Power & Light and been witness and beneficiary of the results of those investigations.

Q And have you ever been informed by Landis & Gyr that the material characteristics in thermal 1V demand meters changed characteristics?

A Again, not specific to a particular 1V thermal demand

meter. However, that discussion has taken place, again, through the years numerous times on general populations of meters of which the 1V is a party to or a member of, and I cannot tell you specifically this discussion was on this 1V meter.

Q Mr. Malemezian, you testify that it's reasonable to expect the physical characteristics of bimetal coils in thermal demand meters to change over time; isn't that correct?

A I did say that, yes.

Q And isn't it true that the choice of materials used to construct a bimetal coil would have a significant bearing on whether or not a material's characteristics will change over time?

A Yes, that is true.

Q And this would also be true for all the other components in thermal demand meters?

A That is true, yes.

Q And let me make sure I understand something. You've never designed a thermal demander meter, have you?

A No, I have not.

Q You've never been through the design process for a demand meter component?

A No, I have not.

Q You've never specified the materials that will be used in the demand meter?

A No, I have not.

Q You've never selected materials for a demand meter?

A No, I have not.

Q You have no idea what the manufacturer's design specifications are for the thermal demand meters in this docket?

A No, I don't. And I don't feel that I need to.

Q Now, I'm going to go back to the bimetal coils for a second. You don't know what type of materials are used in those coils, do you, sir?

A I do not.

Q And you have no idea what the physical properties of those coils are?

A I do not.

Q Isn't it true that it's a standard engineering practice to -- in engineering design to build in what's known as a factor of safety?

A Yes, it is.

Q And isn't it also true that the purpose of the factor of safety is to account for uncertainties in the design process?

A Uncertainties in the design process, uncertainties in the materials that are being used, uncertainty in manufacturing tolerances and capabilities. All of those things are a result -- or are a goal of safety margins that are designed in.

However, again, years of experience has led me to see firsthand that when you get bad materials and materials behaving in a fashion that were not part of your original design objectives, that margins of safeties are not adequate for preventing changes.

Q Now, Mr. Malemezian, you also testify that we're not in a perfect world; isn't that correct?

A I did say that, yes.

Q Now, isn't, in fact, the whole purpose of a factor of safety to compensate for the fact that we're not in a perfect world?

A It is. And the practical reality of it is you can never design a margin of safety to prevent the totally unexpected circumstances from happening. And that's what I refer to as we do not live in the perfect world and such the margins of safety cannot cover all of the situations.

Q You just said that you can't use a factor of safety that would compensate for totally unexpected circumstances; is that correct?

A That is correct.

Q Now, you also testified that it's entirely reasonable to expect that these kind of conditions, the changing in characteristics, will occur in these meters; isn't that correct?

A I did say that, yes.

Q So isn't that exactly the type of change that a factor of safety then is actually perfect to protect for?

A Yes, it is the intention of a factor of safety. However, to design a margin of safety adequate to protect you under all of these circumstances, you couldn't afford -- you would not be able to afford the resulting meter or any kind of device that would be perfectly stable and safe to use.

MR. HOLLIMON: May I approach?

COMMISSIONER DEASON: Yes.

BY MR. HOLLIMON:

Q I'm going to hand you something. Mr. Malemezian, can you identify what I've handed you?

A Yes. This is the "Marks' Standard Handbook For Mechanical Engineers."

Q Now, Mr. Malemezian, is that an authoritative text?

A Yes, I believe it is.

Q Is it the kind of text that an expert would rely upon?

A Yes.

Q I've tabbed a page that's 5-20. Would you turn to that, please.

A Yes. I have it here.

Q And under the column that says, "Design Stresses," I'd like for you to read into the record the second paragraph, please.

A "The design stress is determined by dividing the applicable material property -- yield strength, ultimate strength, fatigue strength -- by a factor of safety. The factor should be selected only after all uncertainties have been thoroughly considered. Among these are the uncertainty with respect to the magnitude and kind of operating load, the reliability of the material from which the component is made, the assumptions involved in the theories used, the environment in which the equipment might operate, the extent to which localized and fabrication stresses might develop, the uncertainty concerning causes of possible failure, and the endangering of human life in case of failure. Factors of safety vary from industry to industry, being the result of accumulated experience with a class of machines or a kind of environment. Many codes, such as the ASME code for power shafting, recommend design stresses found safe in practice."

Q Now, Mr. Malemezian, isn't it true that by choosing materials and incorporating an appropriate factor of safety, it's possible to design a bimetal coil such that the integrity and physical characteristics of the coil could be assured for a long period of time?

A If it were a perfect world, that would be a true statement. Again, my years of operating experience has shown me that materials crop up that get selected, that get built into meters that are unexpected and cause problems later beyond

what a margin of safety would be able to cover you for.

Q Okay. I want you to turn to deposition Page 36, please, Line 8. Let me know when you're there. I'm going to read into the record the question beginning on Line 8.

"Wouldn't it be possible to design a coil by choosing the materials and the factor of safety such that the integrity and physical characteristics of the coil could be assured for a long period of time?"

"Answer: If you define the bounds of what that margin of safety is, I suppose yes."

Do you stand by that testimony?

A Yes.

Q Now, you don't know what materials the bimetal coils for the meters in this docket are constructed of, do you, sir?

A No, I don't. And as I've explained, I don't feel that I need to know that --

Q And you don't know what any of the physical properties of these materials are, do you?

A And again, no. I don't feel that I need to know that to understand that changes do occur.

Q And you don't have any idea what the factor of safety that was used by Landis & Gyr in designing these meters is, do you?

A No, I don't. And again, I don't feel that I need to know that.

Q And just to make sure, you haven't performed any physical testing on any of the meter components that you have identified as being subject to change; is that correct?

A Not personally. But again, I reflect back -- or I remind you of my earlier comments that having been involved with the dissection and investigation of literally hundreds or thousands of meters that have changed characteristics, the change in the characteristics of materials is always very, very high up on the list of causes that the manufacturers have identified to us.

Q And those meters that you're talking about that change characteristics, those were the kilowatt hour registration meters, weren't they?

A The majority of them were, yes. But they are constructed of materials, steels, metals, various components, springs, bearings, greases, all of the same kinds of things that are at play in my testimony on the things that can change thermal demand meters -- change in thermal demand meters.

Q Now, Mr. Malemezian, even if we assume that some physical characteristic of a bimetal coil changed, you don't have any idea what effect that would have on demand registration, do you, sir?

A The effect of a change in the characteristics of a -- no, I do not. The change in the characteristics of the bimetal coil could cause a meter to overregister or underregister

depending on the direction of the change and into -- and which bimetal coil, whether it was a driving element or the retarding element, in the meter.

Q And so for the meters in this docket, you don't know if any changes occurred; correct?

A Repeat the question, please.

Q For the meters in this docket, you don't know if any changes actually occurred to these bimetal coils?

A No, I do not.

Q So you can't possibly know what the effect of any such change that you don't know about would be?

A That's correct.

Q Now, you've also testified the physical characteristics of the calibration and zero adjustment springs are subject to change; is that correct?

A Yes.

Q And what material are these springs made from?

A Again, I don't feel that I need to know that.

Q Okay. You don't know?

A I do not know.

Q And what's the spring constant on some of these springs?

A I do not know.

Q What's the density of the material?

A I do not know.

Q What's the coefficient of expansion?

A I do not know.

Q What's the thermal connectivity?

A I do not know.

Q What's the melting temperature?

A Do not know.

Q What's the modulus of elasticity?

A Do not know.

Q What's the yield stress?

A Do not know.

Q What's the ultimate stress?

A Do not know.

Q Those are all basic properties of metals, are they not?

A They are. But again, my comment is I don't feel that I need to know that to understand that they do change. I've had reports from those experts that do know about those things tell me on other meters, other investigations that those -- all of those things are, in fact, in play and subject to change.

Q Now, Mr. Malemezian, for all the other components of the meters that you've identified as being subject to changing characteristics, if I asked you the same series of questions about what the type of material is and what their material properties are, would your answer be that you don't know what the types and properties of the materials are?

A Depending on the questions you ask me, if they are he questions in my testimony, then the answer would be yes, hey would be the same. My answer would be the same.

Q Have you ever personally observed in a Landis & Gyr .hermal demand meter, a 1V meter, any change, a physical :haracteristic of a meter component?

A Yes, I have. The issues associated with the thermal grease. I personally witnessed changes in the viscosity of the grease both in a lessening of viscosity and in increase in viscosity manifesting itself in changes of the performance of :he damping assembly of the meter.

Q Now, is that for a TR meter or a TMT meter?

A The majority of the changes that I saw were in regards to the TR meter, and the grease used in the TMT meter is the same type of grease.

Q Now, Mr. Malemezian, would you agree with me that for all these meters and all the components in these meters that by choosing appropriate materials and by choosing appropriate factors of safety, that it's possible to design these components such that you could expect that the normal operation of the meter would have no effect on the characteristics of these materials?

A Could you repeat the question?

Q Yes. Would you agree with me that if you choose appropriate materials and choose appropriate factors of safety,

that it's possible to design the components in this meter such that under normal operating conditions, the normal operation of the meter would have no effect on the characteristics of the springs -- excuse me, of the components in the meter?

A Yes. I would agree with that statement to the degree that, again, we're in this perfect world and that the margins of safety are adequate to protect the changes in characteristics. But again, my firsthand experience shows me that materials crop in to meters and get built in that are not expected and, therefore, exceed the margin of safety that the designs you're describing would protect you from.

Q Mr. Malemezian, you've testified about changes in conductivity of electrical connections in these meters; is that correct?

A Yes, I did.

Q And in the soldered joints in these meters?

A Yes.

Q Now, isn't it true, Mr. Malemezian, that by simply removing the meter cover, that the condition of these connections and the soldered joints can be quickly and easily checked?

A Yes. The majority of them are readily accessible by removing of the cover. However, as I think Mr. Bromley mentioned, that we, Florida Power & Light intended to preserve the integrity for future testing and retesting. Breaking the

seal and recovering the cover of the meter removes some degree of certainty from the resulting meter. Further, in the checking of the thermal demand meter and the electrical connections, as you described, while the majority of them would be then readily accessible or accessible with the cover removed, there are, in fact, some that are down deep within the bowels of the meter that would require further disassembly to get to and reach.

Q But you could check the majority of these electrical connections that you refer to in your testimony quickly and easily by simply removing the cover?

MR. HOFFMAN: I'm going to object, Commissioner Deason. Again, we're starting to go down the road of examining the meters. That request was made and has been denied. So I would object to the relevancy.

COMMISSIONER DEASON: I'll take that question to mean it's more of a general question concerning these type meters, not the ones that are in question, but how you could go about doing it. I'm going to allow the question.

THE WITNESS: Repeat it, please.

BY MR. HOLLIMON:

Q That a majority of the electric connections and soldered joints inside 1V thermal demand meters can be easily and quickly checked simply by removing the meter cover and performing the test.

A Yes, that is correct. As I expressed, you would have to remove the cover to do those tests.

Q And isn't it also true that by performing this check and this test, that you would not affect the future performance of the meter?

A Unless you -- no, that's not necessarily true. If you selected a meter that applied more current than was appropriate, it could, in fact, affect the further repeatability of the testing.

Q But if you select the right meter and perform the test correctly, it shouldn't affect the future performance of the meter.

A That's a correct statement, yes; again, with the caveat that you had to remove the cover to do that.

Q And also, by removing the meter cover and performing this test, you wouldn't affect the integrity of the meter, would you?

A Define integrity.

Q Well, the ability of the meter to be used in service and to be repeatable when it's tested.

A You would remove a degree of certainty that the meter has not been altered in any fashion by taking the cover off. So the answer was I think the integrity would be compromised.

Q And isn't it standard practice of Florida Power & Light to remove meter covers when they calibrate meters?

A When they calibrate meters, yes. We're talking about testing meters here, not calibrating meters.

Q Mr. Malemezian, in your testimony you talked about a lot of these components that could experience a change in physical conditions or that might, and that these changes might affect the calibration of the meters; is that correct?

A Yes.

Q But for the meters in this docket, you've never actually observed any of these conditions actually considering?

MR. HOFFMAN: Objection, asked and answered.

COMMISSIONER DEASON: I believe it has been asked and answered.

BY MR. HOLLIMON:

Q Isn't it true, Mr. Malemezian, that your testimony is based on the supposition the changes to physical characteristics may occur and not based on any factual evidence that any such changes have actually occurred?

A I don't believe that's true in that my years of experience leads me to believe that these changes occur regularly and are certainly possible and explain why a meter that has been in service over time has, in fact, changed its calibration.

Q Now, I'm talking about the meters that are in this docket, Mr. Malemezian. And I want to know what's the factual evidence that you have that any of these changes have actually

occurred.

A I can cite solely the fact that six of these meters that Florida Power & Light installed in the early '90s were never calibrated by Florida Power & Light. And so if they were -- and the test records indicate that they had zero error when they were installed, and roughly ten years later, they're removed from service and they do, in fact, have calibration errors in them, the only explanation for that is that something within the meter has, in fact, changed.

Q Is it possible that the meter test report is wrong?

A Is it possible? Yes. Is it likely? No.

Q Well, would that provide another explanation for why when retested ten years later you see this miscalibration?

A It could. However, again, on these six meters in particular, I think Mr. Bromley explained that these meters were purchased new from Landis & Gyr. They were tested by Landis & Gyr, calibrated by Landis & Gyr. Landis & Gyr shipped them. They had zero error. Some months later, the meters were received by Florida Power & Light, tested by Florida Power & Light, and found to have zero error, confirming what the manufacturer had sent them out as. And so for Landis & Gyr and Florida Power & Light to have made identical errors in both sign, direction, and magnitude for the testing that they did on these six meters is extremely unlikely.

Q Now, Mr. Malemezian, you have no personal knowledge

about any calibration testing that Landis & Gyr did for the six meters you referred to, do you, sir?

A No firsthand personal knowledge of those six.

Q Mr. Malemezian, are you being compensated by FPL for your testimony today?

A Yes, I am.

Q What's your compensation rate?

A $250 an hour.

Q And as I understand it, your business is a one-man consulting firm; is that correct?

A Yes, it is.

Q And virtually all of your work is with utilities and utility suppliers; is that correct?

A I think that's a fair characterization, yes.

Q So that's where your bread and butter comes from?

A Yes, it is.

Q Now, prior to your engagement by FPL, you were contacted by Mr. Brown about a potential engagement, were you not?

A Yes, I was.

Q For this matter?

A Yes. **Mr. Brown** asked if I would be interested in helping him with this.

Q And as I understand, you declined Mr. Brown because you would not engage in any situation that would put you at

odds with utility customers; is that correct?

A I think that's pretty much what I told him, yes.

Q And you told Mr. Brown you would not accept any engagement against FPL or any other utility; is that correct?

A I believe those were my words, yes.

Q So I guess you don't want to take any actions that would interfere with your bread and butter, do you?

A I'm not sure that's so. I certainly would take actions that I felt were appropriate.

Q I guess you wouldn't want to take any actions -- well, you wouldn't want to accept a representation adverse to FPL; is that right?

A What I explained to Mr. Brown is I would not take on assignments by folks that were going against FPL. However, if in maybe working for FPL that I uncovered or discovered something that was unfavorable to them, my duty would be to disclose and report that kind of activity.

Q And so in this case did you discover anything unfavorable to FPL?

A Not in any of the issues I can think about sitting here right now.

Q But you never looked at the meters, did you?

A Again, I didn't feel I needed to do that to understand what was going on. My years of experience have told me what mechanisms were at play, and I didn't feel that I

needed to nor was it prudent to because of the fact that they were sealed or held for litigation purposes.

MR. HOLLIMON: That's all we have.

COMMISSIONER DEASON: Staff.

MR. KEATING: No questions.

COMMISSIONER DEASON: Commissioners.

Redirect.

MR. HOFFMAN: Thank you, Commissioner.

REDIRECT EXAMINATION

BY MR. HOFFMAN:

Q Mr. Malemezian, Mr. Hollimon asked you a number of questions that dealt with the details of the materials in thermal demand meters. Do you recall those?

A Yes, I do.

Q And I think that you acknowledged more than once that you're not -- you don't view yourself to be an expert in material science; correct?

A That is correct.

Q Well, if you're not an expert in material science, can you explain on what basis you have provided your opinion that the characteristics of the components of these thermal demand meters can change?

A Yes, I think I can. It relates back to my engineering training that sets the tone for creative problem solving and thinking, some basic course work. But then the

bulk of my opinions and testimony revolves around my 26 years involved in metering at Florida Power & Light, all aspects of metering, from superintendent of a field operation of a meter shop similar to Florida Power & Light's meter test center, a standards laboratory, field operations involving related activities to metering, being responsible for meter engineering, having frequent and regular discussions with manufacturers like Landis & Gyr, the other suppliers of metering devices, having been personally involved in investigations of problems and issues having to do with the accuracy of meters, the long-term stability of meters; as I said, literally hundreds and hundreds, if not thousands, of those kinds of investigations over that 26 years. And as I described, many of those investigations lead you right to materials and changes in the characteristics of those materials.

And so I don't feel that I need to understand the nitty-gritty details of all of the constants involved and the strengths involved to realize as an engineer that those materials do change, they are built into these meters, and margins of safety are not adequate to protect against the unexpected. And so it's just years and years of experience being an expert and being very familiar with those workings of meters to render the opinions that I've given here.

Q You were asked by Mr. Hollimon -- thank you,

Mr. Malemezian. You were asked by Mr. Hollimon twice, at least wice about your experience in investigating components of 1V ieters. And when you were asked that the first time, I believe our answer was yes and you provided a response. And then when ie asked you the question again I believe you said not quite. So I think the record is unclear. So I would like to ask you o explain what experience you have, if any, in investigating he components of 1V meters.

A Yes, I can take a stab at that. My experience with V meters, I feel very comfortable in saying that in the years of dissecting and following through with problems on meters, he 1V thermal meter, the TMT that is the type of meter involved in this docket, was a meter that was included in this road umbrella of the hundreds and thousands of investigations hat I was involved in.

The materials that were in those meters were certainly similar to the materials in other meters. But what I can't say and I don't want to go on record as saying is I can remember on a specific date on a specific instance this problem with the 1V thermal meter. I mean, we're going back over 25 or 30 years of experience, and I cannot in good faith relate to you that specific. But I feel that my experience is so broad that it absolutely included 1V thermal meters.

Q Thank you. You also stated in response to a question from Mr. Hollimon that you had not examined the meters at issue

in the docket and that a casual examination would not reveal a change in components. Why is that?

A Well, because the changes that we're looking for that I'm describing are very subtle. Most of the changes in the materials that we're looking for in order to properly test for would require a destructive test. **The bimetals are in** housings. To do a test and see if the characteristics haven't changed, you have to totally disassemble the meter and that would destroy the future capability to test them at some other point perhaps, as Mr. Matlock had indicated in his testimony.

The changes that we're looking for are very, very subtle. They're in the ranges of percent, and they're probably well within the design specifications of those materials.

The second reason or another reason why we have not investigated them, Florida Power & Light does not have the wherewithal to do those very sophisticated types of tests. Further, Landis & Gyr, the supplier of these meters, stopped manufacturing them 12 or 13 years ago. All of the equipment, the test equipment, the fixtures, and even the people and the expertise that had the familiarity to do this testing are no longer there. So it would be very difficult to even find anybody that was capable of doing a test. And other than the curiosity of probably understanding what was going on here, there really isn't a good reason to do the test and to find a specific cause.

If you could find a single cause, probably there's multiple causes here, those only come into importance if you are continuing to buy these meters in the future so that the manufacturer could correct the manufacturing problem, a materials problem and not build that into future meters. That's not the case here. So there is not a lot of reason to do this.

Q Mr. Hollimon asked you a number of questions regarding the utilization of a factor of safety. Do you recall those questions?

A Yes, I do.

Q What effect would the utilization of a factor of safety in the design of a thermal demand meter have on whether the components of the meters can change and cause overregistration over a period of time?

A The higher the factor of safety the less likely those changes are to occur would occur over time. However, as I described, that my experience again has led me to see firsthand that materials get manufactured into meters that are for some reason in excess of the specifications, they somehow find theirselves (phonetic) into the manufacturing process and manifest themselves in problems later. And I've seen numerous examples of that kind of situation at Florida Power & Light. Factors of safety are there, meters are designed, but something unusual happens and all of a sudden you've got a problem, you

know, years down the road.

Q If you could, Mr. Malemezian -- I think this is my last question -- you were handed an exhibit or document, excuse me, by Mr. Hollimon. It was the Sangamo document, the first page says, "Facts About Demand Metering."

A Yes.

Q Do you have that?

A I do.

Q And Mr. Hollimon asked you a question or two from a statement on Page 101 TDM of that document in the last paragraph, the third sentence. And if you could turn to that.

A Yes, I have it.

Q That passage states, "The meters to be tested are connected in series with the standard meter and a load of 3/4 scale or higher applied." And I think that you stated that the 3/4 scale means 75 percent; correct?

A That's correct, yes.

Q Does this document state whether or not this statement is made by Sangamo in connection with a 3.5 or a 7.0 scale?

A It makes no reference to that, no.

Q Okay. And what would a 75 percent test on a 3.5 scale be? 75 percent?

A 75 -- 3.5 or roughly 3.

Q And what would it be if a 75 percent demand was

placed on a 7.0 scale?

A Same calculation, 75 percent of 7 and so you're talking roughly 6.

Q Wouldn't it equate to half of the 75 percent?

A Yes.

MR. HOFFMAN: No further questions.

COMMISSIONER DEASON: Thank you, Mr. Malemezian You may be excused.

(Witness excused.)

MR. HOLLIMON: Commissioner, I have just one redirect on the very last question that was asked.

MR. HOFFMAN: I'm going to object to that.

MR. HOLLIMON: I'm sorry. That's fine.

COMMISSIONER DEASON: No, I think we're concluded. I believe we're down to the last witness; is that correct?

MR. MOYLE: Yes, sir.

COMMISSIONER DEASON: Let me inquire. How much cross-examination do we anticipate?

MR. MENTON: Commissioner Deason, after hearing Mr. Bradley earlier, I've tried very hard to pare it down. So I would say 30 to 45 minutes.

COMMISSIONER DEASON: Do you guys need a break or no? All right. We're going to roll.

Okay. Mr. Moyle, you may call your witness.

Just a second. Before we do, I better need to check

with the court reporter. Are you okay?

THE COURT REPORTER: I'm fine.

COMMISSIONER DEASON: We can break if you'd like. You're okay?

THE COURT REPORTER: I'm okay.

COMMISSIONER DEASON: Okay. We're going to roll.

MR. MOYLE: Mr. Gilmore will be the next witness, and Mr. Hollimon will put him on.

BILL GILMORE

was called as a witness on behalf of Ocean Properties, Ltd., J.C. Penney Corp., Dillard's Department Stores, Inc., and Target Stores, Inc. and, having been duly sworn, testified as follows:

DIRECT EXAMINATION

BY MR. HOLLIMON:

Q Would you please state your name and address.

A My name is Bill Gilmore. My address is 11850 Southwest 81st Road, Miami.

Q Have you prepared and caused to be filed rebuttal testimony plus Exhibits 1 through 4?

A Yes, I have.

Q Do you have any changes to this rebuttal testimony?

A No, I do not.

Q If I asked you the questions in your rebuttal testimony today, would your answers be the same?

A Yes.

MR. HOLLIMON: I'd ask that Mr. Gilmore's testimony be moved into the record.

COMMISSIONER DEASON: Without objection, show the testimony inserted.

MR. HOLLIMON: I'd also ask that the Exhibits 1 through 4 be entered into the record as a composite exhibit.

COMMISSIONER DEASON: We will identify the exhibits as Composite 16, and I'll allow you to move them after cross-examination.

(Exhibit 16 marked for identification.)

REBUTTAL TESTIMONY OF BILL GILMORE

What is your name and business address?

My name is Bill Gilmore and my business address is 7107 36th Avenue East, Bradenton, FL 34208.

Describe your educational and work background.

I am a principal and vice president of Southeastern Utility Services, Inc. I provide technical and statistical support to SUSI, and I also advise clients on the best ways to use their utilities.

I have a Bachelor of Science degree in electrical engineering from Georgia Tech (1973) and Masters of Business Administration with emphasis in Management Science from the University of Florida (1979).

In 1973 I joined Florida Power & Light as an electrical engineer. Later I went to management positions in construction and maintenance, marketing, customer service, and became Manager of District Office Operations in the corporate headquarters. While in that last position, one of my duties was to ensure that all rates and tariffs were administered fairly and accurately.

In 1990, I left FPL to become a senior consultant in the management consulting firm of Qualtec Quality Services, Inc. While at Qualtec, I advised and set up Statistical Process Control systems in many corporations and government organizations, and I instructed in the proper use of statistical tools such as control charts. In 1990, I left FPL to become a senior consultant in the management consulting firm of Qualtec Quality Services, Inc. While at Qualtec, I advised and set up Statistical Process Control systems in many corporations and

government organizations, and I instructed in the proper use of statistical tools such as control charts.

What is the purpose of your testimony?

The purpose of my testimony is to rebut the testimony of FPL witness David Bromley and FPSC Staff witness Sid Matlock.

Are you sponsoring any exhibits included with your testimony?

Yes. Attached are exhibits BG-1, BG-2, BG-3, and BG-4.

Mr. Bromley has testified that the meters in this docket should only receive a 12 month refund. Do you agree with this testimony?

No. FPSC Rule 25-6.103(1) limits refunds to 12 months, "except that if it can be shown that the error was due to some cause, the date of which can be fixed, the overcharges shall be computed back to but not beyond such date based upon available records." FPL has conducted an entirely subjective analysis to determine if refunds should extend beyond 12 months. Based on this analysis, it is not too surprising that FPL has concluded that longer refunds are not appropriate. Mr. Brown has provided testimony indicating that there has been a change in demand registration that occurred following replacement of the 1V thermal demand meters at issue in this docket. Moreover, this change in demand registration extends for the entire period these meters were installed.

Have you conducted any additional analysis regarding proper refund durations in rebuttal to Mr. Bromley's testimony?

Yes. I have prepared a statistical analysis to determine if a statistically significant change in demand registration has occurred following replacement of the meters in this docket.

Describe this analysis.

For each meter in this docket, I have constructed an XmR control chart. A control chart is a standard statistical tool for determining if a change in a process has occurred. To construct a control chart, a population of data is observed. From this population, the mean is determined. Control limits (an Upper Control Limit, or UCL, and a Lower Control Limit, or LCL) around these mean are then determined. These control charts are simply time-series line graphs, with the UCL and LCL being approximately three Standard Deviations above and below the mean. A point outside the lines can be said to have less than a 1% chance of being a part of the previous process.

For this analysis, I have compared before and after meter replacement data (obtained from FPL's billing records), to determine if the after-meter-replacement data indicates that a change has occurred. In other words, when the value for the year after change-out is "out of control", or outside of the control limits, it clearly is different from all previous years indicating that some change has occurred.

The upper and lower control lines are derived statistically, and are used in Industry to determine if/when a process has had a significant change. Control limits in an XmR chart are calculated from the moving range (mR). A range is based on the absolute value of

consecutive differences in observations. The first step in calculating control limits is to estimate the average of the moving range.

- Count the number of time periods, n.
- Calculate the absolute value of the difference of every consecutive value, call this moving range.
- Add the moving ranges and divide by "n" minus one to get the average moving range.

The UCL is the mean of the observations plus 2.66 times the average range. The value 2.66 is chosen so that 99% of the data fall within the control limits.

UCL = Mean of observations + 2.66 * Average of moving range

Similarly, lower control limit is average of observation minus 2.66 times the average range. The Lower Control Limit (LCL) is calculated as:

LCL = Mean of observations – 2.66 * Average of moving range.

What assumptions have you made in this analysis?

I have assumed that there is a relationship between consumption and demand. In other words, I have assumed that demand is a function of consumption, and that as consumption increases, demand increases as well. My analysis is based on the ratio of demand to consumption. I have utilized a parameter that is derived from the ratio of maximum demand to total kwh consumption for a given period. I have then multiplied this ratio by 1000 to create a more user friendly number. For example, in a month where the maximum demand is 540 kW, and the kWhr consumption is 200,000 kWhrs, this parameter would be determined as follows:

Ratio = (540) / (200,000) * 1000 = 2.7

What is the basis for this assumption?

I know that here is a direct relationship between kWhr consumption and demand. In fact, demand is nothing more than the integration of kWhr consumption over a fixed period of time and is expressed in kW. In other words, the demand for any hour of consumption is equal to the kWhr's consumed during that hour (e.g., 450 kWhr consumer over a 1 hour period equals a demand of 450 kW).

This known relationship between consumption and demand is very useful. It can be used to explain changes in demand registration that have occurred due to changes in total consumption that have occurred for any observed period of time. For example, in analyzing the change in demand that has occurred following replacement of a meter, one method is to simply compare the average annual demand that occurred post meter change to the average annual demand that occurred during the life of the meter. FPL used a substantially similar method to calculate the appropriate correction to demand registration for 1V meters that are not in this docket.

However, this methodology does not recognize that increases or reductions in demand may also be related to changes in total kWhr consumption during that period. My analysis corrects for changes in consumption that have occurred during the life of the meter, and, therefore, allows for a true comparison of demand, before and after meter replacement.

What have you done to check this assumption?

Exhibit BG-2 contains the raw data for each meter in this docket. Using this data, I conducted a standard correlation test to determine if there is a statistically significant correlation between demand and consumption. A correlation test was conducted for each meter in the docket - comparing demand and consumption for each month prior to meter replacement. A correlation of greater than 0.70 is considered to be a strong correlation between two sets of data.

What are the results of this correlation analysis?

This analysis indicates that 9 of the 13 meters for which a demand refund is sought exhibited correlations of at least 0.69. Four other meters exhibited lower correlations. For three of these meters, my review of the raw data indicates that there may be meter reading errors that affect the results obtained. Exhibit BG-1 summarizes this information.

In total, this analysis tells me that using the ratio of demand to consumption is valid, and that my assumption about there being a significant relationship between demand and consumption is valid.

What do the control charts indicate?

I have attached Exhibit BG-3 which is a 28 page exhibit containing, for each meter in this docket, an XmR control chart and the data from which the chart is generated. The analysis is the same for each meter, so the simplest way to explain this is to look at one specific meter. I will describe the analysis shown on pages 1and 2 of this exhibit, for the Target, SR 7 store:

First, for each year of billing information that precedes meter replacement, I determined the average monthly kWhr consumption and the average monthly demand for that year. I then determined the ratio of demand to consumption for each year. Next I determined the mean of this ratio for all available years and the moving ranges, and used this information to determine the UCL and LCL. I then created the chart shown on page 1, which also includes a single data point for the year 2003, which, similarly, is the demand to consumption ratio determined after meter replacement. As you can see in this example, all of the data points lie within the control limits; only the last point (representing data for the time after the meter change) is outside the limits. This indicates that this data is "out of control," because it is below the LCL. Therefore, there is a 99% probability that a change in the process has occurred; namely, that the data "after" is significantly different from the data "before."

Have you prepared a summary of observations from these control charts?

Yes. Attached as Exhibit BG-4 is a summary of the results from this control chart analysis.

Can you draw any other observations from these charts?

Yes. Even though several meters are "in control," each meter for which a demand refund is sought shows a significant decrease in the demand/consumption ratio after meter replacement, and generally are significant at the 90% level.. Note that those meters not showing a significant decrease are also accounts where the actual meter readings are highly suspect.

REBUTTAL TESTIMONY OF BILL GILMORE

The type of analysis done here is entirely consistent with techniques normally used by FPL. In fact, that is where I learned and first used Statistical Process Control.

Does this complete your rebuttal testimony?

Yes.

BY MR. HOLLIMON:

Q Mr. Gilmore, have you prepared a summary?

A Yes, I have.

Q Would you please present that.

A Yes. I'm testifying today about the history of the meters that are subject to this docket and my analysis of that history and also the results that cannot logically be drawn from the analysis. Also, I'm addressing the testimony of PSC Commission staff Sid Matlock and his analysis.

I'm an engineer from Georgia Tech with an MBA from the University of Florida. I've spent 20 years with Florida Power & Light and after that was a consulting engineer for ten years. During that time and at FPL, I learned the techniques that I'm describing here and used them scores of times at FPL and at many other large companies throughout the United States and Great Britain.

My analysis is based on the fact that kilowatt hours and kilowatt demand are related and typically go up or down together not exactly but very close. I tested this relationship by conducting a correlation analysis. This correlation confirmed that there is a statistical positive relationship between kilowatt hour and consumption -- kilowatt consumption and demand. The reason I did this, because I'm trying to see over the years if there is a change in these meters. The problem with checking that is over the years,

typically at any location you do have a slight increase in demand. And you might consider that that would be some type of a meter issue until you look and see that the kilowatt hours is also going up at about the same rate. So my analysis tries to take that out, and I use a ratio of demand and kilowatt hours and chart that using control charts over a period of time. That way I can determine if the demand is actually changing in relationship to the kilowatt hour usage.

I constructed control charts to determine if there has been a change here. **The control charts I submitted measure** whether or not there was a statistically significant change in the demand kWh ratio over time. And if there is a point or points outside the control limits, you can conclude that something significant has occurred; otherwise, you cannot necessarily conclude that.

Not all my charts are telling. However, for most, there's an obvious change in this ratio only when the new meter was installed. There is not a gradual change which might be an indication of a meter slowly beginning to run out of tolerance. So if the meter is running out of tolerance at test time and it did not go bad over time, there's no indication of that, I'm saying that it must have been out of tolerance when it was installed.

Also, in my testimony I responded briefly to Mr. Matlock's testimony regarding Rule 25-6.052(2)(a) that

requires that a thermal demand meter must be accurate to within 4 percent of full-scale when tested at any point between 25 and 100 percent. And I'm actually questioning there the definition of any and whether that means all or just one location. That was the extent of my testimony. And that's my summary.

MR. HOLLIMON: We tender this witness for cross.

COMMISSIONER DEASON: Mr. Menton.

MR. MENTON: Thank you, Commissioner.

CROSS EXAMINATION

BY MR. MENTON:

Q Good afternoon, Mr. Gilmore. Steve Menton representing FPL. You do not have a degree in statistics, do you?

A No, sir, I do not.

Q And you do not belong to any professional or academic organizations related to statistics or statistical analysis, do you?

A No, sir, I do not.

Q And you have never before testified before this Commission or in any judicial or administrative proceeding regarding statistical analysis, have you?

A This is the first time.

Q Now, I understand from your testimony that you are principal and vice president of Southeastern Utility Services, Inc.

A That is correct.

Q And that's SUSI, as we've referred to it sometimes here?

A Yes, sir.

Q And you started with SUSI in 2003?

A Approximately, yes.

Q And that was basically after all of the thermal demand meters in this case had been switched out; isn't that right?

A I think so.

Q And isn't it true, Mr. Gilmore, that 99 percent of your work with SUSI has been related to FPL thermal demand meters?

A No, sir, that is not true, not any longer.

Q Well, at the time that I took your deposition back on September 9th, 2004 that was correct; isn't that right?

A I think I testified to that. During this later time -- I haven't been there very long. During this later time I've done mostly other things.

Q So you do not disagree that as of September 9th, 2004, a couple months ago, 99 percent of your work with SUSI had been related to FPL thermal demand meters?

A Yes, sir.

Q Now, Mr. Gilmore, isn't it true that the bulk of your compensation is based on the profits of SUSI?

A If SUSI does not make money, I don't make money.

Q Well, isn't it correct that you draw a nominal salary only from SUSI?

A That's correct.

Q And the bulk of your compensation is based upon the profits of the company.

A It's based partially on the profits of the company and partially on my own activities.

Q And SUSI, I think Mr. Brown has already testified, has a contingency fee arrangement with its clients regarding payment if it is successful in achieving refunds in this proceeding; correct?

A I think that was his testimony.

Q And as a principal of SUSI, you stand to benefit financially if the refunds in this case are extended beyond the one year provided in the rule; correct?

A Yes.

Q Could you please refer to your Exhibit BG-2.

A Could you tell me what that is?

Q It's the backup data for the billing data that you put together.

A Okay.

Q And this is a composite exhibit of billing data for the meters that are at issue in this docket; correct?

A BG-2?

Q Yes.

A Yes, sir.

Q And take a look at the first page of that composite.

A What store is that?

Q Target State Road 7.

A Yes.

Q This is the Target store in Boca; correct?

A Yes, sir, on State Road 7.

Q Now, that store is not actually included in this docket; isn't that right?

A I'm not aware of that, sir.

MR. MENTON: Commissioner Deason, if I might, this is the Target store that was referred to earlier, the Target Boca store, and there are two portions -- or actually three portions of his testimony that refer to the Target store in Boca which I believe is not part of this docket and should be stricken from the exhibit. And specifically it's Page 1 of BG-2 here. And then going back to his next exhibit, which is BG-3, which is a composite exhibit that has the control charts and the tables that were used in preparing the control charts, the first two pages of that exhibit also relate to the Target store on State Road 7.

And then in addition to that, if you look at his testimony on Page 6, that is the -- beginning on Line 19 and carrying over to Page 7, he uses this particular store as an

exhibit. So I would move to strike those portions of his exhibits and testimony as they relate to a meter that is not at issue in this docket.

COMMISSIONER DEASON: Mr. Hollimon.

MR. HOLLIMON: Yes, Commissioner Deason. I assume we can handle this the way we handled the earlier issue. That would be fine with us.

COMMISSIONER DEASON: The record reflects that the Customers acknowledge that this particular meter is not subject to further determination by this Commission as to a refund, and so I'll just let the record reflect that. And there's no need to go through the exercise of striking portions of exhibits or portions of prefiled testimony.

MR. MENTON: And just one other area where it does show up on Exhibit 4 as well. It's the first one in Line 4 of his exhibits.

COMMISSIONER DEASON: Very well.

MR. MENTON: Thank you, sir.

BY MR. MENTON:

Q Mr. Gilmore, on Page 4 of your testimony, you indicate that one of the assumptions that you made in your analysis was that there is a relationship between consumption and demand; correct?

A Yes, sir.

Q And to conduct your analysis, you calculated a ratio

of demand to consumption utilizing maximum demand to total kilowatt consumption for a given period; correct?

A Would you repeat that? I want to make sure.

Q To conduct your analysis, you calculated a ratio of demand to consumption utilizing maximum demand to total kilowatt consumption for a given period.

A Yes.

Q Would you please refer to your Exhibit BG-1.

A For what store?

Q BG-1.

A Oh, BG-1. Okay. Yes.

Q And this exhibit purports to reflect the extent to which there is a correlation between demand and consumption for each of the meters in question as well as the Target Boca that we talked about earlier; correct?

A That's correct.

Q In other words, whether or not there was the ratio that you've utilized actually shows a relationship between demand and consumption.

A That's correct.

Q Now, on Page 6, Lines 5 through 6 of your testimony, you indicate that you believe a correlation of .70 would be considered a strong correlation; correct?

A Yes, that's a very strong correlation.

Q Now, even if we accept all of the other aspects of

your approach, and I'm going to talk about some of the problems that we see with it in a minute, but even if we accept all of the other aspects of your approach, when the correlation is below .7, you would agree that it's harder to draw any conclusions from the data; isn't that right?

A Harder, but not out of the question.

Q So it is harder. All right.

Now, let's take a look at your Exhibit BG-1.

A Okay.

Q Four of the meters that you've listed on here, Delray, Target Hollywood, J.C. Penney Naples, and Dillard's Coral Springs, the correlation that you calculated is well below the .70 figure that you reference in your testimony; correct?

A A correlation -- the reason I can't answer yes or no is the definition of well below. The correlation could be anywhere from minus one to plus one.

Q Okay. For Dillard's Coral Springs it's .33?

A Yes.

Q Okay. And J.C. Penney Naples is .48?

A Yes.

Q Okay. Now, for some of these where the correlation was below the standard of .7 that you had referenced, you made some footnotes here off in the right-hand column. Do you see that?

A Yes.

Q And if you would take a look at Note 3, which relates to the J.C. Penney's Naples store, down below here you have a little explanation as to -- well, why don't you just read us what your Footnote 3 says.

A Number 3. Underlying data is suspect. For example, in 1994, there are four consecutive months (April through July) where the demand is 480, even though the kilowatt hour consumption increases from 189,000 to 248,000.

Q Okay. So you're saying that the 1994 data for J.C. Penney's Naples is suspect and, therefore, that that might provide an explanation for why the correlation isn't as great as you were hoping it to be; correct?

A That's a possible explanation, that's correct.

Q Would you please refer to Exhibit 3, Page 11.

A What store is that?

Q It's the J.C. Penney's Naples that we just referenced. I'm sorry, it's Exhibit 2 in the billing data.

A Exhibit 2?

Q Yes.

A Page 11?

Q Yes.

A I have it.

Q Okay. So this is the meter that you were just talking about where the data for 1994 was supposedly suspect;

correct?

A Yes.

Q Okay. If you look at the billing data, the billing data doesn't even pick up until 1996, does it?

A That's what it shows, sir.

Q Okay. So there is no data for 1994 as referenced in your footnote for Number 3 back on BG-1; isn't that right?

A Yes, sir, there is data. It's just not here.

Q You have data for J.C. Penney's Naples prior to 1996?

A I want to make sure I look at the right one. I have a lot of them here.

Okay. I was looking at the wrong one. Yes, that is correct, there is no data for that.

Q So the footnote in your Exhibit BG-1 does not provide any explanation for why the correlation for this meter is below the .70 that you have identified as constituting a strong correlation; isn't that right?

A You're going to have to repeat. Say that again.

Q Well, the point is, is that the footnote that you have here, Number 3, that purports to explain why there might not be a correlation is, in fact, not correct because there is no 1994 data that it could be in error as you referenced in this footnote; correct?

A Yes, sir. That's an error.

Q And you don't have any explanation for why the

correlation for the Dillard's Coral Springs would be .33, do you?

A I have some suspicions, but I have no data.

Q Okay. In your Exhibit BG-1 here that purports to show the correlation for the various meters, you don't have Dillard's Port Charlotte listed on here, and that's one of the meters that's in this docket; isn't that right?

A No, sir, I do not.

Q So you haven't provided us with any information regarding the correlation for that meter that is in this docket; correct?

A That's correct.

Q Okay. Mr. Gilmore, would you take a look at the control charts which are included as part of your Exhibit BG-3. Let's basically move to Exhibit BG-3.

A Okay. Any one specific?

Q Yes. Let's take a look at the Port Charlotte control chart.

A Port Charlotte Dillard's?

Q Target, Target Port Charlotte, which is about halfway through --

A I'm sorry, what did you say? Target Port Charlotte?

Q Target Port Charlotte control chart, which is about halfway through your exhibit pack. The pages aren't numbered, I'm sorry.

A Target Port Charlotte.

Q And this is one of the exhibits that you have presented to the Commission to demonstrate your theory that somehow some of these meters are, quote, out of control; is that right?

A That's part of the reason I submitted it.

Q Okay. And by out of control, that means that it falls below the lower control limit; is that right?

A Yes.

Q Okay. And the control limits -- if a meter falls within the control limits, that essentially means that any variation that occurs can be explained by natural chance; isn't that right?

A Well, it's somewhat the opposite of that. If it falls in there, you cannot conclude that it has a specific cause other than natural variation.

Q Well, let's look at Target Port Charlotte for a second here.

A Okay.

Q The next page is the page that is used to calculate the lines that are reflected on the chart; is that right?

A That is correct.

Q If you look at the chart, the following page behind the chart for Target Port Charlotte, you have calculated a mean for this meter of 2.49; correct?

A That's correct.

Q And you have calculated a lower control limit of 2.349; correct?

A That is correct.

Q Let's go back to the chart and take a look at the chart that you have for this exhibit. This exhibit would seem to reflect a mean of 2.549 roughly, wouldn't it?

A It's over 2.5, yes.

Q And the control limit on your chart is 2.45 or above; correct?

A Yes, sir, that's correct.

Q Well, if we had actually graphed the control limits that you had calculated here with a lower control limit of 2.349, you would agree that this meter would be in control; isn't that right?

A No. Actually, I would agree that I don't have the right data corresponding to this.

Q Now, which is wrong? The chart or the calculating data that you have behind the chart?

A I'm not quite sure.

Q Mr. Gilmore, you would agree that there are a number of items that could impact upon a customer's electrical usage and kilowatt demand consumption; correct?

A That's correct.

Q For example, weather, change in usage, equipment

deterioration, installation failures, changes in business practices, conservation, all of those could have an impact upon either or both of a customer's electrical usage in kilowatt demand consumption; correct?

A Yes. But some of those you mentioned would have a very small effect and some would have a very large effect -- could have a large effect.

Q Okay. Now, we've already talked a little bit about what it means for a control chart to be, quote, in control, and that means that the variation conforms to a statistical pattern that might reasonably be produced by chance causes. Is that a fair statement?

A Again, you cannot conclude that any of the variation is not chance cause. It's sort of the negative to what you said.

Q Well, when a sample is out of control, so to say, when it falls below the control limits, it's not possible to trace the variation to any particular cause, is it?

A Not from the control chart itself. That is a flag to say something is out of control, and you go back and look at the data and the circumstances to determine what it was.

Q But you can't draw a conclusion from a control chart as to what the particular cause is in any situation, can you?

A Without further data, you cannot.

Q Now, going back to your Exhibit BG-2, as reflected on

your BG-2, you had at least five months of data for the year 2004 at the time you prepared your analysis; correct?

A Had at least what? I'm sorry.

Q You had at least five months of data for the year 2004 at the time you prepared your analysis.

A Yes, I did.

Q And there was additional 2004 data available subsequent to the preparation of your testimony; isn't that right?

A Yes, sir.

Q And you have not included any of the 2004 data as part of your control charts, have you?

A No, sir, I would never do that.

Q Okay. And you haven't done any analysis of the 2004 data, have you?

A Yes, sir, I have.

Q Well, do you recall during your deposition when I took it back on September 9th I asked you that question?

A Yes, sir, that was two months ago.

Q Two months ago. So at the time that I took your deposition, you had not done any analysis of the 2004 data, have you?

A No, I had not. It would have been improper to do so.

Q And you did not at the time we took your deposition provide us with any benefit of your insight into what the 2004

data might show, did you?

A You have to have all four seasons in the data before it counts, before it means anything.

Q And when I asked you at your deposition on September of this year whether the 2004 data was consistent with the analysis that you presented in your testimony, you couldn't answer that question, could you?

A At the time I could not.

Q So the analysis that you've presented with respect to your charts here, it only shows in certain situations there was one year that seemed to change after the meter change out; is that right?

A You're going to have to repeat that. I'm sorry.

Q Well, maybe I'll skip that one and move on. I'm going to try to skip over and speed up, so we can get finished here.

Would you agree with me that knowledge of the behavior of chance variations is the foundation on which control chart analysis rests?

A You're going to have to repeat that again. I'm having trouble hearing you.

Q Knowledge of the behavior of chance variations is the foundation on which control chart analysis rests.

A I'm not sure it's a foundation, but it's certainly part of it.

Q So you don't disagree that that's a very important component of any controlled chart analysis; correct?

A No, I do not.

Q And you would agree that the more data points that are utilized in a controlled chart analysis, the better you are able to draw any conclusions from it; isn't that right?

A Good and more good and appropriate data makes your analysis better, but more data if it's not appropriate or wrong data does not help you.

Q Well, when you use these data points on here, these are the points that you're utilizing to calculate the mean in the upper and lower control limits; correct?

A Yes, sir.

Q And from a statistical standpoint, isn't it better to have more data to include to draw those kinds of lines, the mean and the upper and lower control limits, rather than less that?

A Yes, sir. But we went back to the extent of records. We used all the data available.

Q Well, you had the ability to do a monthly analysis of this data, did you not?

A Yes, sir. But I'm not understanding why I would want to do that, why would anyone want to do that.

Q Well, you did not do an analysis of the monthly data, did you?

A You mean comparing January to February and then February to March?

Q Yes, sir. You could calculate a demand ratio for every month for every year in which you had this data, and you could use that to calculate control limits, calculate a mean and to do an analysis; isn't at right?

A If you did that, you would insert seasonal variation in the ratio, and the ratio has a seasonal variation.

Q Could you answer my question first; then you can explain.

A Could you mathematically do it?

Q Yes.

A Yes, I can take the calculator out and do it. Yes, sir, I could.

Q And if you did that, you would be using a lot more individual data points from which you would be drawing your mean and from which you would be drawing your upper and lower control limits; correct?

A You have more numbers, yes, sir.

Q By aggregating 12 months' worth of data into a single point, which is what you've done here with your analysis; isn't that right?

A Yes, sir, I have.

Q You are not able to determine whether in any particular year there were any abnormal or unusual seasonal

variations; correct?

A I put 12 months in, yes, sir. No, sir, I could not. I put the 12 months in specifically to avoid seasonal variations. We all know we have seasonal variations. We weren't looking for seasonal variations. We were looking from year to year change.

Q But you only have one year after the change, so how can you draw any conclusions from one year's worth of post-data?

A You can draw two different conclusions possibly if the chart shows it. One is all the points before the meter change out are in control. There's no evidence of any slow change. Two, there is for the year after a significant change, and you'd say now what caused that change? What was the difference between this year and all the rest?

Q Mr. Gilmore, you had information that told you when these meters were actually removed; isn't that right?

A Yes, sir.

Q Did you do any analysis of what happened in the months immediately after the meters were removed and compared those to the months in the prior years to see whether there was any change?

A That's in here.

Q Where is the monthly data --

A The monthly, it's not. It's aggregated.

Q Okay. You never did an analysis of what happened. Let's take, for example, a meter that was removed in November of '02, which is when a lot of these meters were removed.

A Right.

Q You never looked at whether or not the demand ratio in December of '02 was different than the demand ratio in December of '01. You never looked at whether January '02 was different. You didn't look if February '02 was different. You didn't look at whether March or April was different, did you?

A Yes, sir, I did do some preliminary on that.

Q Mr. Gilmore, during your deposition I asked you that question, did I not?

A Not exactly like that.

Q I asked you whether you had done any monthly analysis, did I not?

A Yes, sir. I thought you meant, say, January to February to March to April.

Q Well, during your deposition when I asked you whether you had done any monthly analysis, you told me that you had not; isn't that right?

A I have no meaningful analysis to provide.

Q So if you're using yearly analysis, if there was a sudden drop-off six months after the meter changed out, we wouldn't be able to tell that from the data or the information that you've presented, would we?

A If you're talking about -- yes, I'm sorry. No, you'll not be able to change -- show dramatic changes. It's an average, comparing years to years.

Q And you wouldn't be able to tell when in a particular year the data may have changed even if it did change, would you?

A No, sir. This is yearly data.

MR. MENTON: Commissioner, just give me a couple more minutes. I'll try to skim through this.

BY MR. MENTON:

Q Mr. Gilmore, are you familiar with Professor Shewhart?

A Yes, sir.

Q Professor Shewhart is kind of considered the guru of control charts, is he not?

A He's definitely one of the authorities.

Q Let me read you a quote from Professor Shewhart and see whether you agree with this or not. "It has also been observed that a person would seldom, if ever, be justified in concluding that a state of statistical control of a given repetitive operation or production process has been reached until he had obtained, under presumably the same essential conditions, a sequence of not less than 25 samples of size 4 that are in control."

MR. HOLLIMON: Objection. Can we have that given to

the witness and get some foundation for that?

MR. MENTON: Your Honor, this came from a Web site that Mr. Gilmore cited me to as part of the information that he relied upon in developing his testimony. And it's a quote from Professor Shewhart who is a recognized authority in the area.

THE WITNESS: I'm familiar with the quote.

BY MR. MENTON:

Q You are familiar with the quote?

A Yes, I am.

Q You don't disagree that a sequence of not less than 25 samples of size 4 should be in control before you draw any conclusions with respect to a control chart; isn't that right?

A Yes, sir, I disagree with that because of the way it has been used over the many years since Dr. Shewhart made the statement. You will see authorities, people who know control charts much better than I, using available data when they have 6, 7 points. They acknowledge the fact that they don't have as many points as they would like, but they could use it. And it's not considered bad data. It's just you would like to have more.

Q And let me ask you to continue on with that page that Mr. Hoffman has now handed you. The last sentence there which quotes from Quesenberry, who is another well-respected expert in the area of control charts; isn't that right? Could you read that last sentence into the record, please.

A "It's important to note that control" --

Q No, just the last sentence beginning with when.

A "When the control limits are not computed from a large amount of data, the actual properties might be quite different from what is assumed."

Q Do you agree or disagree with Professor Quesenberry's statement there?

A Yes, sir, I agree. It's well known that you need more -- the more data, the better. But I would add, you would not put in irrelevant data to allow you to have more.

MR. MENTON: Just a couple more points, Commissioner. I'll try to speed up here.

BY MR. MENTON:

Q You would agree, Mr. Gilmore, that there is no general statistical principle that would allow you to discard data that you don't like; isn't that right?

A No. I'm sorry. Would I agree? I agree that I know of no statistical concept that says you can under this exact circumstance throw out data that is suspect or something.

Q Well, one of the reasons for doing a statistical analysis is try to make sense of the world of data that you've accumulated; isn't that right?

A Yes, sir.

Q So you can't just willy-nilly discard data that you don't like; isn't that accurate?

A You would never do it willy-nilly, but there are many cases where -- that you analyze aberrations in data, try to come up a reasonable cause for it, mark it as being this is probably the cause, and take it out of your sample.

Q Well, and that's what you did in connection with some of the charts that you have presented to the Commission today; isn't that right?

A Yes, sir. There was some data that we just plain did not understand. We used the data from FPL. We used what we got --

Q Okay. And then some of that data you excluded when you prepared your charts and your analysis for your testimony; correct?

MR. HOLLIMON: Excuse me. Can we let the witness answer, complete his answers?

MR. MENTON: I'm sorry.

THE WITNESS: Yes, sir, once or twice. Maybe you could point out more than that, but once or twice we took out certain data that was consecutive meter reads.

BY MR. MENTON:

Q But there was no fixed standard that you utilized in determining to exclude data, was there?

A No, sir. If somebody else did it, they might take out more.

Q So it was a subjective standard that you applied in

certain instances to exclude data as you were preparing your testimony for this Commission.

A Yes, sir.

Q Now, for example, for Target Hollywood, you did not use the data for 1994; isn't that right?

A That's correct.

Q And that data, if included, would have significantly impacted upon the mean and the control limits that you would have projected; isn't that correct?

A I'm looking at the data, sir.

Q And this is Page 6 of Exhibit 2.

A Yes, sir, that was a subjective call on my part to -- when I scratched my head long enough in looking at the data, I said, I don't understand it, how it could be this way.

Q And as I understood your testimony at your deposition when I asked you, it was because you had consecutive demand readings of the same number, and therefore, you used that as a basis to exclude the 1994 data when you calculated your mean and your control limits; is that right?

A Yes, sir. In other places there's also multiple readings, and this one just stuck out.

Q Okay. So, for example, in '94 there's several readings of -- demand readings of 480. So you used that as a basis to exclude that data; correct?

A Yes, sir.

Q But isn't it true, Mr. Gilmore, that for that same meter if you look at the data for 1996, for 1997, for 1999, and for 2001, there are identical situations which you did not exclude when you did your analysis?

A If they were identical, I wasn't aware of it. I thought I was picking out the worst cases.

Q And it's because in 1994 you had four consecutive 480 readings of demand from the months of July -- or I guess this is upside down, but it would be from April through July; correct?

A Yes, sir.

Q Okay. But if you look at 1997, if you look at March through September, you had even more months with the same consecutive demand reading, and you did not exclude that data, did you?

A I probably should have taken that one out too.

Q And you could have done the same thing in '99, and you could have done the same thing in 2001, and you could have done the same thing in 1996 if you were being consistent; isn't that right?

A I was trying to use the best data available. If I was inconsistent, it was not an intent.

Q Well, and you did this in other instances as well, didn't you? For Target in Venice, you excluded the data for the year 2001; isn't that right?

A Yes, sir.

Q Okay. And the basis was because there were three months where the meter reading was the same in May, June, and July, and so you excluded 2001 data.

A Just one second. Also, the multiple readings of 576 in 2000 --

Q But you didn't exclude 2000.

A I excluded the 12 months labeled 2001. These 12-month periods are not calendar periods. They're 12-month periods on each one.

Q Well, let me just ask you this way, see if I can speed it up.

You would agree that if you had included the 2001 data for the Target Venice store, it would have significantly impacted upon the mean and the control limits that you have included -- or that you would have calculated; is that fair?

A I took those data points out before I even calculated it. I don't know.

MR. MENTON: Commissioner Deason, I have just one last area that I'll get into, and I'll try to make this brief. This, I think, is going to end up in a brief proffer, but I wanted to lay a couple of questions as a predicate and then I'll come back to it. But this is the last issue.

BY MR. MENTON:

Q Mr. Gilmore, referring back to your

Exhibit B-2 (sic), you utilized those numbers, as we've already talked about, to calculate the ratio which was then used to calculate the control limits and the mean; is that right?

A B-2 is the raw data. Right.

Q And you annualized that data, and then you calculated the mean and the control limits; is that right? Well, let me back up.

You calculated the ratio based upon annualized data, and that's a straight mathematical calculation; right?

A That's correct.

Q And you could take the monthly data, as I think we've already talked about, and run the ratio calculation very simply. It's a straight mathematical calculation; correct?

A Are you referring to month-by-month?

Q Month-by-month.

A You could do it by day if you like. Yes.

Q And we've got the monthly data here in BG-2 which shows each of the readings for each of the months for all of the years in question for each of the meters.

A Right.

Q And so you can calculate that across very easily to determine what the monthly ratio would be; correct?

A Yes.

Q And then you could take the monthly calculation and project that onto a chart calculating the mean, and you could

calculate control limits very simply using the monthly data; isn't that right?

A You could do it mathematically, but I don't know that it would be of any value to you.

Q But you don't know because you haven't done the analysis, have you?

A No. I would not do it that way. I would not recommend anyone else do it that way either.

MR. MENTON: Commissioner Deason, if I might. The reason I just asked those last questions is, Mr. Gilmore's analysis that we've heard about today was presented to us for the first time as rebuttal testimony. We have moved to strike that analysis since it was not included as part of the Customers' case in chief, and that motion was denied. And we certainly respect that ruling. But because we didn't have an opportunity to submit any rebuttal testimony because it wasn't presented in the case in chief, we were a little bit handcuffed in order to try to respond to some of the analysis that he's presented here.

I would like to present as a composite exhibit, we have done those monthly ratio calculations, and we have plotted those onto a graph, and I would like to submit those. Again, I think it's a straight mathematical calculation. I'm not going to belabor the Commission today by going through with him each of the months and trying to calculate it. I just think in our

proposed order we can make some references to it. And alternatively, we would just like to proffer it for the record if -- whatever you like. But let me pass those out.

I have provided these just a couple of days ago to Mr. Hollimon, and I know they haven't had an opportunity to fully run all those calculations. But it's a straight -- I mean, all you need is a little calculator. You can actually get a computer program to run that stuff.

MR. HOLLIMON: Commissioners, we would object to entry of some exhibit prepared by counsel for FPL. If they wanted to have surrebuttal, they could have moved for surrebuttal; they did not do that. We have no opportunity to cross-examine the person that prepared this particular document. And I have been provided a copy of it, but from the information contained in that exhibit, there's no way to determine how, in fact, the graphical analysis was conducted.

As I understand it, it's a computer program that you push the button and all this internal whirring goes on and you get a result, but that doesn't help me understand what the process was that was used as opposed to Mr. Gilmore's testimony where all the information necessary to understand the calculations and the plotting of the graphs is presented in his testimony. Mr. Gilmore is available and is being cross-examined. We don't have a similar opportunity with regard to the information that Mr. Menton has now proffered.

COMMISSIONER DEASON: Mr. Menton.

MR. MENTON: Commissioner Deason, if I might. The composite exhibit that I just handed to you, actually there are two documents related to each of the meters in question. The first document takes the data from Mr. Gilmore's Exhibit Number 2, which is all of the billing data, the kilowatt and the demand readings, and then is a straight mathematical calculation. You can sit there and do each one line by line. And I think it's a matter that can appropriately be officially recognized by the Commission because under the evidence code -- or information that is easily verifiable can be taken -- judicial notice can be taken of that. So I would submit that the first document that I've presented there is a straight mathematical calculation that can be easily verified.

The second one is just a plot of that data. Now, on that plot, on the graphs, there are -- there's a mean, which again is a very straight mathematical calculation of all the data which I don't think can really be contested. And the control limits, I would agree, the control limits are part of a computer program. And again, I don't think it's a controversial issue. It's just a matter of whether you use a sigma 2 or a sigma 3, and the computer will calculate it for you. But I will not make any arguments based upon that. I would proffer it for the record just to demonstrate what we would have presented as rebuttal testimony if this had been

presented in the Customers' case in chief.

COMMISSIONER DEASON: Mr. Keating.

MR. KEATING: I was afraid you were going to look over here.

COMMISSIONER DEASON: It's late in the day.

MR. KEATING: It's late in the day. And I understand FPL's dilemma and that this was presented in rebuttal testimony.

COMMISSIONER DEASON: You need to get out your coin and flip it? I'm just kidding. I'll make the ruling, okay, without advice unless --

MR. KEATING: To be honest, I'm not real sure how to handle it right now.

MS. HELTON: May I have a minute to confer with Mr. Keating?

COMMISSIONER DEASON: Surely.

COMMISSIONER DAVIDSON: Someone from legal knew how to handle it when they advised me how to rule on the order.

MR. KEATING: Commissioners, what staff would recommend is that you accept it as a proffer, but for purposes of admitting into the record, we do not believe it should be admitted into the record.

FPL did move to strike portions of Mr. Gilmore's testimony that included this analysis on the grounds that it was improper rebuttal. The Prehearing Officer ruled that it

was proper rebuttal. There wasn't a request for surrebuttal, which this essentially amounts to, but I think it's appropriate for a proffer.

COMMISSIONER DEASON: We will accept it as a proffer. I agree, it should not be in the record. It borders on the -- how should I say? It's not customary to engage in this type of activity, the sponsoring of such massive documents without a witness actually taking the stand.

I would note, however, that to the extent your representation is correct, that it is simply a massive amount of calculations, simple calculations done with data that is already in the record, you may wish to take an example and maybe you could highlight that some way in your brief. I'm not sure. I'm not recommending that you do that. But I'm uncomfortable at this point wholesale admitting all of this information in the record. And so certainly you can proffer it, but we will not even identify it as an exhibit, and it will certainly not be part of the record.

MR. MENTON: Thank you, sir.

COMMISSIONER DEASON: Does that conclude your cross-examination?

MR. MENTON: Yes, sir.

COMMISSIONER DEASON: Staff.

MR. KEATING: Staff has no questions.

COMMISSIONER DEASON: Commissioners.

Redirect.

MR. HOLLIMON: Yes. Thank you, Commissioners.

REDIRECT EXAMINATION

BY MR. HOLLIMON:

Q Mr. Gilmore, you were asked several questions about conducting an analysis with 2004 data. Do you recall that?

A Yes, I do.

Q And why didn't you do an analysis with 2004 data in September of 2004?

A For the data to be meaningful, you need all four seasons into your data points. If you don't do that, you're comparing summer to winter, and the usage patterns and the ratio are different. The ratio is lower in one season and higher in another. I have to figure out which way to do that. That's common. But if you take all four seasons and put them together, then you have the average for the year. If you did it for four or five months, you don't -- you have half a year. So you have half a data point.

Q Since September of 2004 has enough time passed where you have additional data of the correct magnitude?

A Yes, sir. Two of them actually have over two years of data.

MR. MENTON: Commissioner Deason, I'm not sure where we're going with this, but I think, as we've already established in the cross, he did not have any such analysis

available at the time of his deposition. And if they're attempting to back door that now, then I would certainly object.

COMMISSIONER DEASON: You're not trying to back door anything, are you, Mr. Hollimon?

MR. HOLLIMON: Absolutely not. I mean, I believe the door was wide open when on cross-examination he was asked about whether or not he had analyzed 2004 data and whether he had done any additional analysis since --

COMMISSIONER DEASON: You're not trying to introduce any new analysis at this point though, are you?

MR. HOLLIMON: No. I'm simply trying to make the record clear about what he's done since his deposition occurred and why he has done what he's done since his deposition occurred.

MR. MENTON: It sounds to me like he's trying to back door some analysis that we've never been presented with.

COMMISSIONER DEASON: Mr. Hollimon, I'm going to ask you to proceed with your redirect and leave this particular line.

MR. HOLLIMON: Okay.

BY MR. HOLLIMON:

Q Mr. Gilmore, why did you choose to do a yearly analysis instead of a monthly analysis?

A Monthly analysis compares month to month to month,

and it's somewhat meaningless to compare a month in the fall and a month in summer and a month in the winter. We know there's a lot of seasonal variation there and having nothing to do with anything except the weather changes. We know it's there, but we're not trying to capture that. We're trying to capture long-term changes, if they exist, from over a long period of time.

If I were interested in the variation from year to year, I would do that -- I mean, from month to month, I could do that. I could do that, as I said, from day to day with the proper data. It wouldn't have **any meaning, but I could sure** have a lot of data points.

MR. HOLLIMON: Thank you, Mr. Gilmore.

COMMISSIONER DEASON: Okay. Exhibits.

MR. HOLLIMON: Yes. We'd move Exhibit 16.

COMMISSIONER DEASON: Yes. Without objection, show that Exhibit 16 is admitted.

(Exhibit 16 admitted into the record.)

COMMISSIONER DEASON: Thank you, Mr. Gilmore. You maybe excused.

(Witness excused.)

COMMISSIONER DEASON: That's the last witness.

Staff, any final matters?

MR. KEATING: I believe it would be appropriate to establish a due date for post-hearing briefs from the parties.

The CASR for this docket currently indicates that those briefs should be due December 6th, and staff proposes that we use that date.

COMMISSIONER DEASON: Any objection to briefs being filed on the 6th of December?

MR. HOLLIMON: That's fine.

COMMISSIONER DEASON: Okay. Very well. Anything else?

MR. MOYLE: We have just a couple of matters. Mr. Hoffman and I had discussed -- the Customers had listed some additional witnesses that they wanted to use at this hearing, FPL employees that we took a deposition of. Mr. Hoffman and I reached an agreement that in lieu of calling them as adverse witnesses live we would just introduce their depositions. So I have the depositions of Mr. DeMars, Mr. Cain, Mr. Faircloth, and Mr. Hutchinson that I'd like to put into the record.

COMMISSIONER DEASON: Okay. We'll identify the depositions as exhibits. We'll take them one at a time.

MR. MOYLE: Okay. I think Mr. DeMars can be 17.

COMMISSIONER DEASON: It will be identified as 17.

MR. MOYLE: Mr. Cain as 18.

COMMISSIONER DEASON: Exhibit 18.

MR. MOYLE: Mr. Faircloth as 19.

COMMISSIONER DEASON: 19.

MR. MOYLE: And Mr. Hutchinson as 20.

COMMISSIONER DEASON: Exhibit 20.

(Exhibits 17 through 20 marked for identification.)

MR. MOYLE: And there is one other matter that I'm not clear on.

COMMISSIONER DEASON: There is agreement that these depositions can be entered into the record?

MR. HOFFMAN: Yes, sir.

COMMISSIONER DEASON: Show then that Exhibits 17 through 20 are admitted.

(Exhibits 17 through 20 admitted into the record.)

MR. MOYLE: Earlier during the proceeding I had made

MR. HOFFMAN: Commissioner Deason, Mr. Menton informs me that he's got a hearing at DOAH that's scheduled for December 6th, and he is going to be assisting me on this brief. In light of that, if there's no objection, I would ask that

to be filed by December 16.

COMMISSIONER DEASON: When is this scheduled to go to agenda conference?

MR. KEATING: On the CASR right now we've got it scheduled to go to agenda conference on January 18th. The only time limits on taking this to agenda and getting a decision, I believe, are a 90-day limit set forth in Chapter 120 of the Florida Statutes. There's some flexibility there with that date.

COMMISSIONER DEASON: I'm sorry. The 90-day what?

MR. KEATING: There's a 90-day time limit in the Florida Statutes for rendering an order following hearing.

COMMISSIONER DEASON: I never knew that. Is that new? Wow. I guess we've always been so efficient we've never mopped up on the 90 days. When does the 90 days expire? 90 days from today?

MR. KEATING: I believe that's how we've interpreted it. It's not something that's ever come into play, I'll say that.

COMMISSIONER DEASON: So how many days do you need to write the order? It depends on what we decide. Okay. Well, I guess I'll just ask the question to staff. Is there an objection to changing the briefing schedule from December the 6th to the 16th?

MR. KEATING: I don't think we'd have any objection

to that, and I think we could still get this to an agenda. I don't have the agenda schedule in front of me, but if there's one in late January, we could probably --

COMMISSIONER DEASON: There's an agenda on the 18th of January, and then the next agenda is the 1st of February. The 1st of February may be giving you just a short amount of time before this magical 90 days expires.

MR. KEATING: And if the parties don't have any objection to allowing me a little more time to write an order beyond that 90 days, I think --

COMMISSIONER DEASON: Well, I'm sure Mr. Hoffman wouldn't because it's his request.

MR. HOFFMAN: That's true.

COMMISSIONER DEASON: Mr. Moyle, whatever input you have in this --

MR. MOYLE: Mr. Menton has another professional obligation; we respect that. And we would be willing to accommodate a pushback of the filing date of the brief filing date.

COMMISSIONER DEASON: So if it becomes necessary to put this on the February 1st agenda, you'd agree to give staff some latitude in actually writing the order, perhaps some additional time, if necessary.

MR. MOYLE: Yes, that's fine. I guess it would be decided in that agenda, and then the order would come out

shortly after that.

COMMISSIONER DEASON: Is that amenable to staff?

MR. KEATING: Yes.

COMMISSIONER DEASON: Okay. Well, then we can change the briefing schedule then from December the 6th to December the 16th.

MR. HOFFMAN: Thank you, Commissioner.

COMMISSIONER DEASON: Okay. Anything further? Hearing nothing before we conclude, I just want to thank the parties for being mindful of the time constraints we've worked under. I think we've covered a lot of ground in a short period of time, but we've done it efficiently and thoroughly. I think we've had a thorough airing of the issues. I appreciate the thorough and expeditious way in which you conducted your cross-examination. I want both parties to know that you concluded your cross-examination well below the three-hour limit, both parties did, both sides. And staff, your cross-examination was the best I'd ever heard.

MR. KEATING: I don't know if that's a compliment.

COMMISSIONER DEASON: Just being facetious. With that, this hearing is adjourned.

(Hearing concluded at 4:45 p.m.)

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STATE OF FLORIDA)
: CERTIFICATE OF REPORTER
COUNTY OF LEON)

I, TRICIA DeMARTE, RPR, Official Commission Reporter, do hereby certify that the foregoing proceeding was heard at the time and place herein stated.

IT IS FURTHER CERTIFIED that I stenographically reported the said proceedings; that the same has been transcribed under my direct supervision; and that this transcript constitutes a true transcription of my notes of said proceedings.

I FURTHER CERTIFY that I am not a relative, employee, attorney or counsel of any of the parties, nor am I a relative or employee of any of the parties' attorneys or counsel connected with the action, nor am I financially interested in the action.

DATED THIS 15th DAY OF NOVEMBER, 2004.

Tricia DeMarte

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