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BEFORE THE
FLORIDA PUBLIC SERVICE COMMISSION

In the Matter of:

DOCKET NO. 20170007-EI

ENVIRONMENTAL COST RECOVERY
CLAUSE.

VOLUME 5
PAGES 600 through 783

PROCEEDINGS: HEARING

COMMISSIONERS
PARTICIPATING: CHAIRMAN JULIE I. BROWN
COMMISSIONER ART GRAHAM
COMMISSIONER RONALD A. BRISÉ
COMMISSIONER DONALD J. POLMANN
COMMISSIONER GARY F. CLARK

DATE: Thursday, October 26, 2017

TIME: Commenced at 1:30 p.m.
Concluded at 8:35 p.m.

PLACE: Betty Easley Conference Center
Room 148
4075 Esplanade Way
Tallahassee, Florida

REPORTED BY: DANA W. REEVES
Court Reporter

APPEARANCES: (As heretofore noted.)

PREMIER REPORTING
114 W. 5TH AVENUE
TALLAHASSEE, FLORIDA
(850) 894-0828

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I N D E X

WITNESSES

NAME: PAGE NO.

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Examination by Mr. Murphy 678
Examination by Ms. Morse 701

MICHAEL SOLE

Examination by Ms. Cano 706
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EXHIBITS

NUMBER:		ID	ADMITTED
45 - 46	previously identified		704
81	1990 Dames and Moore excerpts		725
82	Panday demonstratives 4, 5, 6		725
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1 P R O C E E D I N G S

2 (Transcript follows in sequence from Volume
3 4.)

4 CHAIRMAN BROWN: All right. Shortly is here.
5 Dr. Panday welcome to the Florida Public Service
6 Commission.

7 THE WITNESS: Thank you, Madam Chair.

8 CHAIRMAN BROWN: Thank you. Do you need some
9 water?

10 THE WITNESS: I got it. Thank you.

11 CHAIRMAN BROWN: All right. Mr. Rehwinkel.
12 Oh, sorry.

13 MS. MORSE: That's all right. Thank you.

14 EXAMINATION

15 BY MS. MORSE:

16 Q Good afternoon, Doctor.

17 A Good afternoon.

18 Q Would you please state your name and business
19 address for the record?

20 A My name is Sorab Panday. My business address
21 is 626 Grant Street, Suite C, Herndon, H-E-R-D-O-N,
22 Virginia 20710.

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

25 A I'm employed by GSI Environmental as a

1 principal.

2 Q Have you prepared and caused to be filed in
3 this docket 46 pages of prepared direct testimony?

4 A Yes.

5 Q Did you also prepare and cause to be filed
6 exhibits SP-1 through SP-3 with your testimony?

7 A Yes.

8 Q On September 13th, 2017 and October 23rd,
9 2017, OPC filed errata sheets for your direct testimony
10 and exhibits, correct?

11 A Yes.

12 Q Also on September 15th, 2017, OPC filed a
13 substitution for your Exhibit SP-2 and on October 23rd,
14 2017, OPC filed a substitution for your demonstrative
15 19, which is part of your Exhibit SP-3, correct?

16 A Yes.

17 Q Thank you, Dr. Panday. With those errata and
18 substitutions, if I asked you the same questions
19 contained in your direct testimony today, would your
20 answers be the same?

21 A Yes, they would.

22 MS. MORSE: Madam Chair, I note that his
23 Exhibits SP-1, revised SP-2 and SP-3 exhibits have
24 been identified in staff's comprehensive exhibit
25 list as Nos. 44 through 46.

1 CHAIRMAN BROWN: Those are noted, but would
2 you like his prefiled testimony entered into the
3 record?

4 MS. MORSE: Yes, I'm getting there. Yes. So,
5 yes, I would, in fact, ask that Dr. Panday's
6 prepared direct testimony be inserted into the
7 record as though read.

8 CHAIRMAN BROWN: Dr. Panday's prefiled
9 directed testimony along with the errata will be
10 inserted into the record as though read.

11 (Whereupon, prefiled testimony was inserted.)

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ERRATA SHEET

WITNESS: SORAB PANDAY – DIRECT TESTIMONY

Testimony Errata

<u>PAGE NO.</u>	<u>LINE NO.</u>	<u>CHANGE</u>
9	20	Punctuation: insert question mark (?) at the end of the line
11	2	Insert “and canal” after the term “levee”
25	6	Change "2017" to "2016"
26	13	Change "Bay" to "Aquifer"
30	14	Change “seems” to "seem"
38	19	Punctuation: delete the period (.) after the word “yes”
SP-2 Table 1	Ref. No. 25	Change “16” to “18”
SP-2 Table 2	Ref. No. 23	Change “16” to “18”
SP-3	23 of 32	For Demonstrative 19, remove Tetra Tech (2013b), Figure 4a, and insert Tetra Tech (2013b) Figure 5 (attached)

ERRATA SHEET

WITNESS: SORAB PANDAY – DIRECT TESTIMONY

Testimony Errata

<u>PAGE NO.</u>	<u>LINE NO.</u>	<u>CHANGE</u>
11	Footnote 6	Change "FPL, 2004" to "FPL, 2005"
18	Footnote 26	Change "FPL, 2004" to "FPL, 2005"
27	Footnote 52	Change "FPL, 2004" to "FPL, 2005"
27	Footnote 53	Change "Ecology and Environment, 2016" to "Ecology and Environment, 2016b"
43	Footnote 80	Change "Tetra Tech, 2016" to "Tetra Tech, 2016m"

1 **DIRECT TESTIMONY**

2 OF

3 **SORAB PANDAY**

4 On Behalf of the Office of Public Counsel

5 Before the

6 Florida Public Service commission

7 Docket No. 20170007-EI

8 **I. INTRODUCTION**

9 Q. **PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.**

10 A. My name is Sorab Panday. My office address is GSI Environmental Inc., 626
11 Grant Street, Suite C., Herndon, VA 20170.

12
13 Q. **WHAT IS YOUR OCCUPATION?**

14 A. I am a Principal at GSI Environmental. I am a hydrogeologist and an expert in
15 groundwater modeling.

16
17 Q. **ON WHOSE BEHALF ARE YOU APPEARING IN THIS PROCEEDING?**

18 A. I am appearing in this proceeding on behalf of Florida Office of Public Counsel.

19
20 Q. **PLEASE DESCRIBE YOUR EDUCATIONAL BACKGROUND AND**
21 **EXPERIENCE.**

22 A. I earned a Ph.D. in Civil and Environmental Engineering in 1989. During my
23 28 years of experience, my clients have included numerous private companies and

1 government agencies such as the U.S. Environmental Protection Agency, the U.S.
2 Department of Defense, and the Southwest Florida Water Management District. I am
3 the lead author of the MODFLOW-USG code, released by the U.S. Geological Survey
4 (USGS) in 2013. Additionally, I was elected as a member of the National Academy of
5 Engineering. More details of my educational background and experience are
6 summarized in Exhibit SP-1 of my testimony.

7

8 **Q. PLEASE ELABORATE ON YOUR EXPERIENCE WITH RESPECT TO**
9 **HYDROGEOLOGY, CONTAMINANT TRANSPORT MODELING, AND**
10 **REMEDICATION ANALYSES.**

11 A. My career has been devoted to analyses of groundwater flow, contaminant
12 transport, and numerical modeling. I have evaluated issues of water supply,
13 contaminant transport, remediation, saltwater intrusion, and surface-
14 water/groundwater interaction among other subsurface flow and transport analyses.
15 This information is detailed in my resume which is included in Exhibit SP-1 of my
16 testimony.

17

18 **Q. PLEASE IDENTIFY SOME OF THE CASES IN WHICH YOU PROVIDED**
19 **TESTIMONY OR ANALYSIS WITH RESPECT TO HYDROGEOLOGY,**
20 **SALTWATER INTRUSION ANALYSES, GROUNDWATER FLOW**
21 **ANALYSES, CONTAMINANT TRANSPORT MODELING AND**
22 **REMEDICATION ANALYSES.**

1 A. I have provided testimony in the following cases: *State of Florida v. State of*
2 *Georgia*, No. 142, Original, Supreme Court of the United States, Docket No. 220142;
3 *Tilot Oil, LLC v. BP Products North America, Inc.*, U.S. Eastern District of Wisconsin,
4 Case No. 09-CV-0210; and *Santa Maria Valley Water Conservation District v. City of*
5 *Santa Maria, et al.*, Santa Clara County Superior Court Case No. 1-97-CV-770214.
6 This information is detailed in my resume which is included in Exhibit SP-1 of my
7 testimony.

8

9 **Q. ARE YOU OFFERED AS AN EXPERT IN THIS PROCEEDING?**

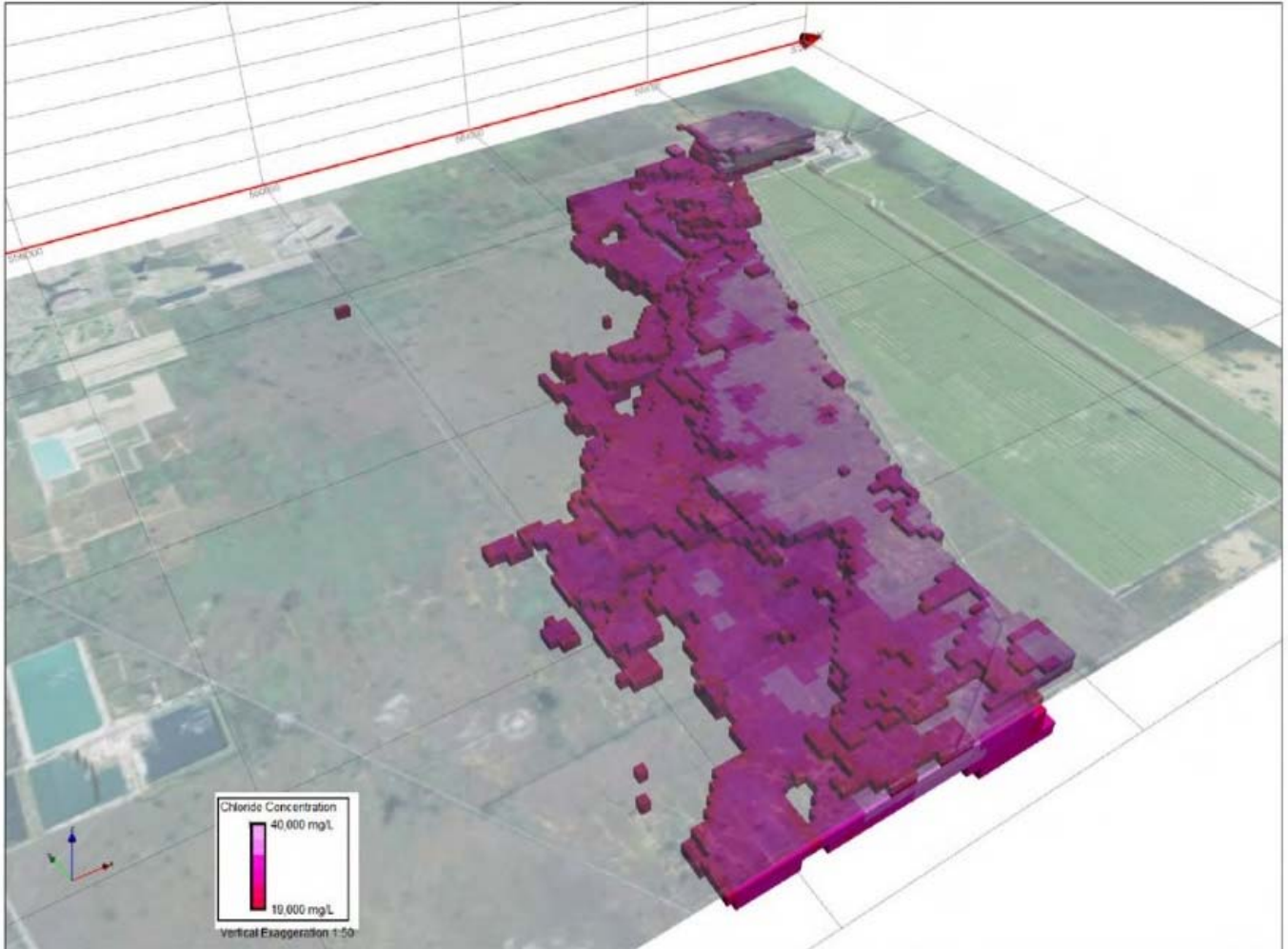
10 A. Yes, I am testifying as an expert in hydrogeologic analysis and modeling.

11

12 **Q. PLEASE DESCRIBE GENERALLY THE ISSUE(S) THAT YOUR**
13 **TESTIMONY ADDRESSES.**

14 A. Florida Power and Light Company (“FPL”) has agreed to implement a process
15 to try to retract a saltwater plume that moved from underneath its Turkey Point Nuclear
16 Generating Plant Cooling Canal System (“CCS”) to a location several miles westward.
17 The following is a graphic representation of chloride concentrations greater than
18 seawater, from a study performed for FPL.¹

¹ Enercon, 2016 Enceron 2016; Exhibit SP-3, Demonstrative 14b. References to studies and data are listed in Exhibit SP-2, Table 1 (Master List).



1 It is discussed later in my testimony, but I have included it here as a clear
2 representation of the current (or very recent) extent of saltwater intrusion that has been
3 growing since the CCS has been in operation. I discuss later in my testimony (1) the
4 long-standing body of evidence of the growth of this saltwater and hypersaline plume,
5 (2) FPL's proposed method of trying to address it, (3) the effectiveness of the proposal
6 to remedy the condition, and (4) an allocation percentage for cost recovery. The
7 ultimate issue of concern is whether the ratepayers are being charged appropriately for
8 actions being taken now, or that were taken in the past, by FPL to manage the CCS and
9 underlying aquifer.

1 Q. **WHAT IS THE PURPOSE OF YOUR TESTIMONY HEREIN?**

2 A. The purpose of my testimony is to evaluate past actions and proposed remedial
3 solutions by FPL and its contractors regarding the intrusion of saltwater into the
4 Biscayne Aquifer as a result of the CCS. Specifically, I first present testimony
5 regarding the extent to which the hypersaline plume in the Biscayne Aquifer which
6 originated from the CCS was the result of FPL's hydrogeologic decisions associated
7 with groundwater and the CCS.

8 I also evaluate the proposal by Florida Power & Light (FPL) to conduct
9 hydrogeologic projects termed Alternative 3D, proposed by FPL to correct FPL's
10 violations of groundwater standards and environmental regulations. The proposal
11 consists of a project for freshening the CCS to seawater conditions using 14 million
12 gallons per day ("MGD") of Floridan Aquifer water, and another project for
13 construction of a system of wells to retract the hypersaline plume in the Biscayne
14 Aquifer which has migrated from the CCS. I have evaluated the feasibility and
15 projected efficacy of each of these proposals.

16 Finally, I have also evaluated FPL's proposed allocation of costs for the system
17 of retraction wells between retraction and containment of the hypersaline water within
18 the boundaries of the CCS.

19 The fact that I do not address any other particular issue or aspect of the salinity
20 caused by the CCS in my testimony, or that I am silent with respect to any portion of
21 FPL's direct testimony in this proceeding, should not be interpreted as an approval of
22 any position taken by FPL in its direct testimony or the projects discussed in this matter.

1 I have based my analyses and recommendations on the information that FPL has
2 provided in discovery.

3

4 **Q. PLEASE DESCRIBE WHAT YOU REVIEWED AND ANALYZED IN**
5 **PREPARING YOUR DIRECT TESTIMONY.**

6 A. I have reviewed the documents referenced in this testimony, including those
7 listed in Exhibit SP-2, Tables 1-4. I have also reviewed the model files for the following
8 models developed on behalf of FPL: the three-dimensional density-dependent flow and
9 saltwater transport SEAWAT models described by Tetra Tech² and the transient CCS
10 spreadsheet model described by GeoTrans and Tetra Tech³. I have also conducted an
11 analysis of the impact of the proposed retraction wells by performing my own
12 simulations with the SEAWAT model, and conducted analysis using a steady-state
13 spreadsheet model of the CCS for different cases. Some of these documents and model
14 files were produced by FPL in discovery. While I have also reviewed other production
15 by FPL in discovery, I have only referenced in my testimony those documents that I
16 have expressly relied upon in preparing my testimony.

17

18 **Q. PLEASE SUMMARIZE YOUR CONCLUSIONS.**

19 A. My evaluation of the documents produced by FPL related to salinity in the
20 Biscayne Aquifer indicates that FPL should have known about the salinity intrusion
21 that resulted due to the presence of the CCS at least by 1992. There were other
22 indications as well, in monitoring reports through 2013, that salinity and hypersalinity

² Tetra Tech, 2016c, 2016f, 2016m.

³ GeoTrans, 2010a, 2010b Appendix E and Tetra Tech, 2014a.

1 in the Biscayne Aquifer was increasing as a result of the CCS. In addition, my
2 evaluation of the modeling efforts by FPL’s contractors regarding Remedial
3 Alternative 3D indicates that the pumping wells are ineffective in retracting the
4 hypersaline plume. Finally, my evaluation of the simulations conducted to apportion
5 costs for these remediation wells between hypersaline plume retraction and
6 containment indicates that the apportioning proposed by FPL was incorrect.

7

8 **Q. WHAT IS AN AQUIFER AND WHY IS IT IMPORTANT?**

9 A. An aquifer is the permeable rock under the ground that can contain and transmit
10 groundwater. Groundwater enters the ground by a process called recharge. Recharge
11 occurs as a result of precipitation seeping into the soil. Groundwater leaves the
12 subsurface by a process called discharge. Water in aquifers discharges into water wells
13 and surface water bodies (e.g., rivers, canals, bays or the ocean), or is lost to
14 evapotranspiration or deeper aquifers. Aquifers are a significant source of freshwater
15 and one of the most important natural resources of Florida.

16

17 **Q. WHAT IS SALINITY AND HOW IS IT DEFINED?**

18 A. Salinity is the mass of dissolved salts per mass of solution. Salinity of seawater
19 is approximately 34 ppt (parts per thousand or PSUs or ‰). Salinity is also sometimes
20 expressed in terms of a chloride concentration or chlorinity. Seawater has a chlorinity
21 of approximately 19 ppt (or 19,000 mg/L)⁴. “Brackish” water has a salinity that is
22 below the salinity level of seawater, while “hypersaline” is the generalized

⁴ Miami Dade County, 2015b.

1 classification of water that has a salinity level above that of seawater. Generally,
2 saltwater and saline water are generic terms that mean water containing any amount of
3 salt. The drinking water standard for chlorides is 250 mg/L, above which water tastes
4 salty. The drinking water standard for Total Dissolved Solids (TDS) is 500 mg/L (0.5
5 ppt or PSU). It is not safe for humans to drink water containing a chloride concentration
6 greater than the drinking water standard (i.e., TDS greater than 0.5 PSU).

7

8 **Q. WHAT IS SALTWATER INTRUSION INTO AN AQUIFER AND HOW DOES**
9 **IT OCCUR?**

10 A. Saltwater intrusion occurs when saline water moves into freshwater aquifers. It
11 occurs naturally in most coastal aquifers due to the hydraulic connection between
12 groundwater and seawater, as a result of the higher density of saline water as compared
13 to freshwater. The heavier saline water sinks to the bottom of the aquifer in offshore
14 regions and forms a wedge of saltwater that intrudes landward. Saltwater intrusion can
15 be further exacerbated by anthropogenic or (human-caused) factors such as
16 groundwater withdrawals further inland, or engineered structures such as the CCS.
17 Hypersaline water is even heavier than seawater which will cause a wedge to intrude
18 even further landward. Saltwater intrusion erodes the natural resource within an aquifer
19 and it is a process that can be costly and slow to reverse.

1 **II. EVIDENCE REGARDING THE HISTORY OF WATER FLOW AND**
2 **SALINITY IN AND AROUND THE CCS**

3

4 **Q. TO YOUR KNOWLEDGE, WHAT DATA AND STUDIES HAVE BEEN**
5 **AVAILABLE REGARDING SALINITY WITHIN THE CCS AND ITS**
6 **EFFECT ON GROUNDWATER AND THE BISCAYNE AQUIFER SINCE**
7 **THE TIME FPL BEGAN USING THE CCS?**

8 A. Data and studies dating from 1978 to 2017 regarding salinity within the CCS
9 are listed in Exhibit SP-2, Table 1.

10

11 **Q. TO YOUR KNOWLEDGE, WHAT ANALYSES WERE CONDUCTED BY OR**
12 **ON BEHALF OF FPL SINCE 1978 TO EVALUATE SALTWATER**
13 **MIGRATION IN THE BISCAYNE AQUIFER AND THE IMPACT OF**
14 **HYPERSALINE WATER FROM THE CCS?**

15 A. Analyses conducted by or on behalf of FPL since 1978, as disclosed by FPL in
16 response to discovery, are listed in Exhibit SP-2, Table 2.

17

18 **Q. TO YOUR KNOWLEDGE, WHAT ANALYSES HAVE BEEN AVAILABLE**
19 **TO WHICH FPL HAD, OR SHOULD HAVE HAD, ACCESS (STUDIES BY**
20 **OTHERS SUCH AS UNITED STATES GEOLOGICAL SURVEY, ET AL.)**

21 A. Analyses available to FPL as disclosed in response to discovery, are listed in
22 Exhibit SP-2, Table 3.

1 **Q. TO YOUR KNOWLEDGE, WERE ANY ANALYSES CONDUCTED BY OR ON**
 2 **BEHALF OF FPL TO MEASURE THE EFFECT, IF ANY, OF FPL'S EFFORTS**
 3 **TO REDUCE SALINITY IN THE CCS?**

4 A. Analyses available to FPL, according to FPL's responses to discovery, are
 5 listed in Exhibit SP-2, Table 4, attached.

6

7 **III. MIGRATION OF THE HYPERSALINE PLUME BEYOND THE**
 8 **GEOGRAPHIC BOUNDARIES OF THE CCS AND MOVEMENT OF THE**
 9 **SALINE INTERFACE AS A RESULT OF OPERATION OF THE CCS**

10

11 **Q. WHEN DOES FPL CLAIM TO HAVE BECOME AWARE THAT THE SALINE**
 12 **WATER FROM THE CCS CAUSED THE SALTWATER INTERFACE TO**
 13 **MOVE WESTWARD, AND WHEN DO YOU AS A HYDROGEOLOGIST**
 14 **BELIEVE THAT THEY SHOULD HAVE BEEN AWARE OF THIS?**

15 A. FPL's response to OPC's First Set of Interrogatories, No. 14, suggests that 2013
 16 was the first indication that salt concentrations were increasing through time in the
 17 Biscayne Aquifer west of the CCS, and that the saltwater plume was moving westward
 18 to the degree that FPL should have considered taking some action to mitigate the
 19 conditions.

20 However based on my expertise and review of the available studies and data,
 21 and contrary to FPL's suggestion, the 1978 salinity investigation and the 1990 and 1992
 22 groundwater monitoring reports by Dames & Moore⁵ sufficiently demonstrated a

⁵Dames & Moore, 1990, 1992.

1 significant salinity contribution from the CCS moving westward of L-31 (which is a
2 levee that travels the length of and just west of the western edge of the CCS). As early
3 as 1978 and at least by 1990 or 1992, FPL should have known that saline water from
4 the CCS was intruding into groundwater outside of FPL's property. Subsequent
5 groundwater monitoring reports made available by FPL for the period between 2003
6 and 2010⁶ also contained salinity data that indicated the need to consider taking
7 corrective action. The conclusions of these reports by FPL and its contractors, however,
8 downplay the significance of such correction-suggestive data.

9

10 **Q. ARE THERE OTHER INDICATORS THAT THE CCS WAS THE SOURCE OF**
11 **THIS CONTRIBUTION TO THE SALINITY OF THE GROUNDWATER**
12 **WEST OF THE CCS?**

13 A. Yes. Tritium levels in groundwater also indicated increasing contributions of
14 contaminated water from the CCS to the Biscayne Aquifer. The CCS' tritium
15 fingerprint was identified in groundwater west of the CCS in the 1975 and 1976 data
16 found in the 1978 Dames & Moore report.⁷ The tritium markers in the 2011 and 2012
17 Uprate Project Semi-Annual and Annual Reports further evidenced a progression of
18 CCS-contributed saltwater from the 1976 position to a point as far as 3 miles out in
19 2012.⁸

⁶ FPL, 2003, FPL, 2004, Golder, 2008c, 2008d, 2008e, 2008f, Golder, 2009, Golder, 2010

⁷ Dames & Moore, 1978 [Figure 5.1]

⁸ Ecology and Environment, 2011a, 2011b, 2012a showed increased tritium concentrations west of the CCS compared to 1978 Dames & Moore report conditions; the 2012 Initial Ecological Conditions report showed elevated tritium levels in groundwater locations to the west of L-31 (Ecology and Environment, 2012b); the 2012 Comprehensive Pre-Uprate report for the Units 3 and 4 Uprate Project (Ecology and Environment, 2012c, page 5-11, second paragraph and page 7-1, third bullet) reported that CCS water was in groundwater immediately to the west and extending 3 miles away.

1 **Q. AFTER 2013, WHAT DID THE DATA TO WHICH FPL HAD ACCESS SHOW**
2 **REGARDING THE WESTWARD MIGRATION OF CCS-INFLUENCED**
3 **SALTWATER?**

4 A. Studies conducted after 2013 show that saltwater from the CCS had migrated
5 from the western boundary of the CCS westward by about 3,300 to 8,200 feet, at a
6 depth of about 55 feet below ground surface. There was even evidence that before 2010,
7 the saltwater boundary had moved to well G-28 and G-21, which are 3.3 and 4.1 miles
8 due west of the CCS western boundary respectively.⁹

9
10 **Q. GIVEN THE INFORMATION FROM 1975 AND 1976 THAT WAS**
11 **CONTAINED IN THE 1978 REPORT WHAT DID FPL DO TO ADDRESS THE**
12 **INFORMATION CONTAINED IN THAT REPORT?**

13 It is unclear that FPL took any affirmative action in response to this report. The
14 1978 Dames & Moore report identified saltwater migrating west of the system as a
15 result of the presence of the CCS. Specifically, the report indicated increasing
16 concentrations of salinity west of L-31 directly attributable to saline water contribution
17 from the CCS.¹⁰ This is also indicated in plots of salinity through time, shown on
18 Exhibit SP-3, Demonstrative 1. The report further identified salinity contours at
19 different times, indicating a growing saltwater wedge west of the CCS, as noted on

⁹ 2014 Annual Post-Uprate report and 2016 Comprehensive Post-Uprate Report (Ecology and Environment, 2014, 2016b) which evaluated the western extents of hypersalinity in groundwater west of the CCS; the 2016 Enercon report which estimated that hypersaline groundwater extended from the margin of the CCS westward between 3,300 and 8,200 feet, at a depth of about 55 feet below ground surface (Enercon, 2016); and the 2016 Tetra Tech groundwater flow and transport model which reiterated that the freshwater-saltwater interface moved to well G-28 and G-21 prior to 2010 (Tetra Tech, 2016c).

¹⁰ Dames & Moore, 1978, page 60.

1 Exhibit SP-3, Demonstrative 2. Further evidence of the CCS' role in the westward
2 migration of saltwater was in the form of tritium found in groundwater west of the
3 L-31 levee¹¹ and according to that 1978 report, "evidence that cooling canal water is
4 found in the aquifer ... a portion of the chloride increases is due to the mixing of the
5 saline cooling canal waters with brackish ground waters."¹²

6 Dames and Moore also developed a conceptual model for the CCS' contribution
7 to the saltwater wedge.¹³ According to this conceptual model, CCS salinity increases
8 as a result of evaporation. In addition to precipitation, freshening of the CCS naturally
9 occurs as dense (saltier) water from the CCS sinks below the CCS and is replaced with
10 less salty groundwater.¹⁴ A key assumption in this conceptualization is that the
11 exchange between the saline CCS waters and groundwater will cease once the CCS'
12 water and groundwater salt concentrations are similar.¹⁵ Based upon the CCS and
13 Biscayne Bay chlorinities being similar at the time of the report, estimated at
14 approximately 23 ppt,¹⁶ Dames & Moore calculations suggested that "by the mid-
15 1980's to mid-1990's the chloride levels should stabilize and the wedge should extend
16 inland [westward] on the order of a mile farther, and with little change in vertical
17 movement."¹⁷ As will be discussed later, this assumption was flawed, given the way
18 FPL would operate the CCS, and chloride levels did not stabilize. Although FPL
19 submitted monitoring reports that showed that the chloride levels had not stabilized,

¹¹ Exhibit SP-3, Demonstrative 3.

¹² Dames & Moore, 1978, page 58.

¹³ Dames & Moore, 1978, page 68.

¹⁴ Dames and Moore, 1978, page 68.

¹⁵ Dames and Moore, 1978, page 69.

¹⁶ Dames and Moore, 1978, page 69, Section 6.2.

¹⁷ Dames and Moore, 1978, Table 6.2 on page 71, Table 6.4 on page 85.

1 FPL appears to have done no follow-up analysis or meaningful corrective action on this
2 issue for at least the next two decades.

3

4 **Q. ARE YOU SAYING THAT THE CONCEPTUAL MODEL THAT WAS**
5 **POSTULATED IN THE 1978 REPORT WAS IN ERROR?**

6 A. No, I am not. The conceptual model presented for the CCS saline contribution
7 to the Biscayne Aquifer remains applicable even when salinity in the CCS is greater
8 than the salinity of Biscayne Bay or Card Sound. For example, when FPL was not
9 allowed to discharge water from the CCS into Biscayne Bay for managing CCS salinity
10 (when it became 110% of that of the surrounding bay),¹⁸ it would have been reasonable
11 to conclude that CCS salinities would continue to get higher due to the process of
12 evaporation, which would then contribute additional salt mass to the Biscayne Aquifer
13 due to the exchange with groundwater. This is actually what happened, and as
14 discussed later, I believe that this circumstance required FPL to consider other
15 operational actions to lessen the impact of the CCS on Aquifer salinity.

16

17 **Q. SHOULD FPL HAVE BEEN AWARE THAT THE SALTWATER PLUME**
18 **WOULD HAVE MOVED FURTHER WESTWARD AS A RESULT OF THE**
19 **CCS OPERATION?**

20 A. Yes, it appears reasonable to assume that FPL should have realized that the
21 operation of the CCS was influencing a westward movement of the saltwater plume
22 and that stabilization had not occurred. Dames & Moore's monitoring report from 1990

¹⁸ See, FPL's Response to OPC's First Set of Interrogatories, Nos. 14 and 32.

1 shows FPL possessed groundwater monitoring salinity data prior to 1990 with
2 concentrations of salt in the groundwater steadily rising and exceeding the salinity
3 values from the Biscayne Bay referenced in 1978,¹⁹ clearly indicating that stabilization
4 of groundwater salinity had not occurred from 1978 to 1990. These saltwater
5 concentrations should have prompted FPL to, at a minimum, consider pursuing actions
6 (such as additional CCS freshening) to reduce the CCS' contribution of salinity to the
7 Biscayne Aquifer west of the CCS. The FPL data showed that salinity in groundwater
8 at the CCS had continued to increase since 1978 across multiple depth intervals (20 to
9 60 feet below the top of the casing). The time history plot of chlorinity (saltwater
10 concentration) for well L-3 located west of the Interceptor Ditch is provided as Exhibit
11 SP-3, Demonstrative 4. Although no measurements of salinity of the CCS water itself
12 have been made available for the period 1972-1990, FPL appears to have been required
13 by its 1972 Agreement with the South Florida Water Management District (SFWMD)²⁰
14 to sample surface water (in the CCS) and groundwater for water conductivity
15 measurements of salinity on a frequent basis (daily to bi-weekly) and provide that data
16 to SFWMD.²¹ A plot of salinity in the CCS since inception published by Chin on
17 behalf of the Miami-Dade County Division of Environmental Resources (DERM) in
18 2016 is shown on Exhibit SP-3, Demonstrative 5. This plot, based on site data, shows
19 that salinity within the CCS was steadily increasing. This data plot is consistent with
20 average yearly salinity values tabulated by FPL in response to Staff's First Set of
21 Interrogatories, No. 2, which is reproduced here as Exhibit SP-3, Demonstrative 6.

¹⁹ Dames & Moore, 1990, Appendix A, PDF pp. 38 to 45.

²⁰ The SFWMD was formerly called the Central and Southern Florida Flood Control (FCD).

²¹ Agreement between FPL and FCD dated February 1972, pp. 6 and 7.

1 Dames & Moore, in the 1990 report, note that the monitoring wells display
2 chlorinity excursions (or readings) above historical limits for the October 1989 data
3 and also note that they represent a continuation of a slightly increasing trend.²²
4 However, this was not considered by Dames & Moore in further evaluations, or in its
5 conclusions of the report, which mainly attributed the chlorinity excursions to
6 decreased rainfall.

7

8 **Q. GIVEN THE DATA REPORTED BETWEEN 1978 AND 1990 BY DAMES &**
9 **MOORE, SHOULD FPL HAVE KNOWN THERE WAS AN ISSUE WITH**
10 **WESTWARD MIGRATION IN THE BISCAYNE AQUIFER OF SALINE AND**
11 **HYPERSALINE WATER INFLUENCED BY THE CCS?**

12 A. My expert review of data and analyses reported by Dames & Moore in their
13 1978 and 1990 reports clearly indicate that these reports reveal the impact of the CCS
14 on the groundwater.

15 Only two years later, the 1992 Dames & Moore monitoring report continued to
16 show a trend of increasing chlorinity.²³ Exhibit SP-3, Demonstrative 7 shows the
17 chlorinity with depth plots for 1990 and 1992 for well L-3, which is west of the
18 interceptor ditch (see discussion of Interceptor Ditch at the end of Section III),
19 illustrating the increasing trend of CCS influence on saltwater in the Biscayne Aquifer.
20 Maximum chlorinity at this well was close to 30 ppt, which was well above the range
21 of values for Biscayne Bay and also above values for chloride concentration of

²² Dames & Moore, 1990, p. 8.

²³ Dames & Moore, 1992, Appendix A, PDF Page 36 to 43

1 seawater. Therefore, the CCS water was known to have impacted the groundwater
2 beyond the CCS boundaries by 1992. This should have come to no surprise to FPL,
3 given the data trends since 1976. The emphasis on rainfall-related justifications
4 appears to have masked the long-term data trends, and thus lent superficial support for
5 Dames & Moore’s conclusions regarding the aquifer that “the increase in ground-water
6 salinity has been very small and does not represent significant change in the wedge
7 movement or configuration.”²⁴ This is verbatim the same conclusion from the 1990
8 report, which focused on rainfall patterns, without addressing the increasing
9 groundwater concentrations.²⁵ Ultimately, FPL’s contractor Dames & Moore in 1990
10 and 1992 failed to address or act upon the most relevant point, which was the evidence
11 of increasing concentrations of salinity in the groundwater.

12

13 **Q. AFTER THE 1992 REPORT, WHAT DID THE EVIDENCE FPL PRODUCED**
14 **SHOW ABOUT WHAT WAS OBSERVED, REPORTED AND ACTED UPON**
15 **BY FPL BETWEEN 1992 AND 2013?**

16 A. I am not aware of reports or data collection activities for the period between
17 1992 and 2003. Nor have I seen evidence of actions initiated as a result of the three
18 earlier Dames & Moore reports during this time. Annual monitoring reports provided
19 for 2003 to 2011 continued to show increases in electrical conductivity measurements
20 (or saltwater concentrations) in the groundwater. However, this information was
21 downplayed or even ignored in the Annual Reports’ conclusions, which were uniformly

²⁴ Dames & Moore, 1992, p. 12.

²⁵ Dames & Moore, 1990, p. 11.

1 stated as “no adverse impacts.”²⁶ In the cover letter, Golder emphasized the increases
2 in groundwater salinity concentration were occurring at depth for 2005, 2006, 2007,
3 and 2008, and later reports indicated salinity exceeding historical levels at depth.²⁷ Yet
4 in all cases, FPL’s contractor Golder, appears to have de-emphasized this information
5 by contending that the saltwater wedge movement typically is seasonal in response to
6 variations in rainfall and water levels. Thus, while each annual report focused on
7 potential short-term explanations for salinity trends, the evidence of a long-term trend
8 of increasing salinity of CCS water steadily moving westward was obscured or ignored.

9 The annual reports from 2003 through 2008 provided plots of chloride relative
10 to depth which showed further exceedances in chlorinity from the historical envelope
11 (or boundary) identified in the 1992 Dames & Moore report. Also, the time-history
12 plots that indicated salinity trends at various wells at different depths since the 1970s²⁸
13 were not presented in any of these later monitoring reports until the 2009 monitoring
14 report.²⁹ As a result of these omissions, the indications of long-term changes through
15 time were not presented again (or re-evaluated) even though that data was readily
16 available or should have been periodically collected.

17 The time series plots of salinity at various wells at different depths were
18 produced in the 2009-2011 groundwater monitoring reports in an appendix to the
19 report. The 2009 and 2010 monitoring reports made no mention of this appendix, thus
20 effectively neglected the trend data. Exhibit SP-3, Demonstrative 8³⁰ shows chloride

²⁶ FPL, 2003; FPL, 2004; Golder, 2008c, 2008d, 2008e, 2008f; Golder, 2009; Golder, 2010; Golder, 2011a.

²⁷ Golder, 2008c, 2008d, 2008e, 2008f, 2009, 2010.

²⁸ From Dames & Moore 1990 and 1992, and as presented in Exhibit SP-3, Demonstrative 4.

²⁹ Golder, 2009.

³⁰ Golder, 2011a

1 concentrations in well G-28 at depths of 15, 30, and 45 feet bgs (below ground surface).
2 From this plot, it is noted that although the Biscayne Aquifer at Tallahassee Road had
3 not yet reached the hypersaline threshold by 2011, contribution of salinity from the
4 CCS had reached well G-28 at Tallahassee Road. It is further noted that the level and
5 extent of salinity was steadily increasing in that portion of the aquifer. In addition, the
6 increase in salinity at well G-28 is similar to the rise in hypersalinity observed at well
7 L-3.³¹ This evidence was later confirmed by the estimates from a salinity model
8 constructed using electric resistivity measurements which estimated that hypersalinity
9 extended westward from the CCS about 8,200 feet by 2016.³²

10 FPL's monitoring reports, tables, and figures refer to depths below -15 feet msl
11 (mean sea level) as being "intermediate" and "deep." However, the Biscayne Aquifer
12 bottom (underlying confining layer) occurs at about 80 to 100 feet below sea level.³³
13 Therefore, samples from 30 or 45 feet below sea level still represent only the upper
14 portion of the Biscayne Aquifer and may not have reflected the true extent of the
15 saltwater intrusion that resulted from the CCS.

16 As shown in Exhibit SP-3, Demonstrative 10, the 2011 Uprate Project Semi-
17 Annual and Annual Reports and 2012 Uprate Project Semi-Annual Report showed
18 elevated values of the unique CCS tritium fingerprint in groundwater west of the CCS,
19 with concentrations increasing with depth, indicating that this tritium was not deposited
20 through the atmosphere.³⁴ The CCS tritium concentration values shown in Exhibit SP-

³¹ Reproduced from Golder, 2011a, as shown in Exhibit SP-3, Demonstrative 9.

³² Enercon, 2016.

³³ Ecology and Environment, 2012c, Figure 5.1-2.

³⁴ Ecology and Environment, 2011a, 2011b, 2012a.

1 3, Demonstrative 10 are also much increased from the estimated 1970s concentrations
2 shown in Exhibit SP-3, Demonstrative 3.

3 The 2012 Comprehensive Uprate Report hydrogeological assessment performed
4 on behalf of FPL contained additional pre-2013 evidence of the westward progression
5 of saltwater from the CCS. It stated that “[t]here are two surface water stations located
6 in canals immediately adjacent to the CCS that potentially could be affected by the
7 CCS via a groundwater pathway (TPSWC-4 and TPSWC-5). At both locations, tritium
8 values approached or exceeded 1000 pCi/L at depth during one sampling event.”³⁵ The
9 report further states:

10 [f]or groundwater, there are also stations that show evidence of CCS
11 water via a groundwater pathway. Figure 5.2-35 shows the wells that
12 are suspected to be influenced by a groundwater pathway. The tritium
13 concentrations in the shallow samples at fully screened wells L-3 and
14 L-5 may be attributable to atmospheric influences, however, the higher
15 values found at depth are associated with a groundwater pathway. The
16 westerly extent of CCS water in the groundwater is near Tallahassee
17 Road.

18
19
20 In other words, tritium found at deeper intervals in the wells indicated in the
21 figure was a result of water that moved from the CCS into the ground (the groundwater
22 pathway) rather than due to deposition from the atmosphere (the atmospheric pathway).
23 Exhibit SP-3, Demonstrative 11, is a reproduction of Figure 5.2-35 from Ecology and
24 Environment (2012c).

25 Based on the CCS tritium fingerprint data, the rate of CCS water migration
26 westward within the Biscayne Aquifer was estimated by 2012 to be about 525 feet per

³⁵ Ecology and Environment, 2012c, Page 5-12

1 year in the northern portion of CCS, to 660 feet per year in the southern portion of
2 CCS.³⁶

3 The 2012 Comprehensive Uprate Report also estimated the contribution of CCS
4 water at different wells based on well chloride concentrations, background chloride
5 concentrations and CCS concentrations of chlorides.³⁷ This computation also shows
6 that CCS water has had an impact west of L31E canal.

7

8 **Q. DID FPL APPROPRIATELY MONITOR THE PLUME SINCE THE 1970's?**

9 A. No, FPL did not appropriately monitor the plume since the 1970s. The
10 monitoring record provided in discovery is poor for the 1970s, 1980s, and 1990s. The
11 reports from the 2000s demonstrate long delays in FPL's submittal of data to SFWMD:
12 the 2005, 2006, and 2007 monitoring reports were submitted in 2008, just prior to the
13 drafting of the 2009 Supplemental Agreement with SFWMD which dictated much
14 more stringent monitoring requirements (SFWMD, 2009). The long delays in FPL's
15 submittal of data to SFWMD appears to be inconsistent with FPL's apparent
16 obligations to provide the information. Additionally, as SFWMD indicated in 2010
17 based on their 2009 review of FPL's monitoring data (SFWMD, 2010), the monitoring
18 reports and monitoring efforts by FPL did not evaluate the impact of the CCS or
19 identify saltwater migration west of L31E canal in groundwater that occurs
20 with/without the existence of the CCS.³⁸

21

³⁶ Ecology and Environment, 2012c, Page 5-12, second to last paragraph

³⁷ Exhibit SP-3, Demonstrative 12.

³⁸ SFWMD, 2010, paragraph 3.

1 **Q. WHAT DOES THE EVIDENCE AFTER 2013 SHOW ABOUT THE**
2 **WESTWARD MIGRATION OF CCS-FED SALINE GROUNDWATER?**

3 A. The 2014 USGS report on saltwater in the Biscayne Aquifer found that
4 groundwater samples within 8.5 kilometers from the CCS contained elevated tritium
5 compared to samples from the rest of the study area which is within the eastern portion
6 of Miami-Dade County.³⁹ Groundwater samples near the CCS averaged 12.4 tritium
7 units (TU) instead of 1.3 TU over the study area and ranged from 4.1 to 53.3 TU.⁴⁰

8 As shown in Exhibit SP-3, Demonstrative 13, the 2016 Comprehensive Post-
9 Uprate Report corroborates the Pre-Uprate reports and confirms that the CCS has
10 impacted water in the Biscayne Aquifer west of the CCS towards Tallahassee Road and
11 past Tallahassee Road since at least the early 2010s.⁴¹ Wells TPGW-4 and TPGW-5
12 are located along Tallahassee Road.

13 The 2016 areal electromagnetic survey (AEM) by Enercon, as shown in Exhibit
14 SP-3, Demonstrative 14, estimated the extent of hypersaline water from the CCS to
15 extend “westward 3,300 to 8,200 feet west from the margin of the CCS” water⁴² with
16 maximum salinity at a depth of about 55 to 65 feet below land surface. The highest
17 concentrations of chloride, up to 40,000 ppm (twice the concentration of sea water)
18 occur within 3,300 feet of the western and northern boundaries of the CCS (Enercon,
19 2016, Bottom of Page 13). This clearly shows the impact of CCS water on the Biscayne
20 aquifer west of the CCS.

21

³⁹ USGS, 2014.

⁴⁰ USGS, 2014, p. 38, top right and p. 47, top right.

⁴¹ Ecology and Environment, 2016b, Figure 5.2-7.

⁴² Enercon, 2016, p. 11.

1 **Q. WERE THERE ANY ANALYSES PERFORMED INDICATING THE CCS**
2 **COULD HAVE AN IMPACT ON THE SALINE PLUME'S MOVEMENT**
3 **WESTWARD OF THE L-31 IN EXCESS OF THOSE AMOUNTS THAT**
4 **WOULD HAVE OCCURRED BUT FOR THE EXISTENCE OF THE CCS?**

5 A. Yes, there were analyses performed, because there was concern that the CCS
6 would impact saline plume movement westward of the L-31 canal as early as 1978.
7 Studies regarding the CCS's role in saltwater intrusion include the 1978 Dames &
8 Moore salinity migration evaluation; the 2009 publication by Hughes, et al. in
9 Hydrogeology Journal numerically demonstrating the behavior of CCS water migrating
10 beyond its boundaries; the GeoTrans 2010⁴³ and Tetra Tech 2013 models based on
11 Hughes, et al.; and the Tetra Tech flow and transport model of 2016. Also, in 2010, the
12 SFWMD indicated that data FPL submitted was insufficient to evaluate impacts of the
13 CCS on the Biscayne Aquifer.

14 As far back as 1978, FPL's contractor Dames & Moore provides an analysis of
15 the impact of the CCS on salinity conditions as compared to baseline conditions without
16 the existence of the CCS. They computed the position and the shape of the interface
17 and presented their results to FPL in Figures 6.5-6.8 of their 1978 report, indicating
18 that saltwater intrusion at the base of the Biscayne Aquifer could have been as much as
19 a mile westward at that time. Also, the computed interface was higher by 1990 (about
20 10 feet under L-31) taking into account the operation of the CCS, as opposed to without
21 it. This is clearly shown in Exhibit SP-3, Demonstrative 15 which includes Figures 6.7

⁴³ Appendix D.

1 and 6.8 of the Dames & Moore 1978 report showing the computed interface with and
2 without the CCS.

3 Another analysis of the impact of the CCS on the movement of the saline plume
4 (portions of which were hypersaline) was provided in 2009.⁴⁴ They present a cross-
5 sectional density-dependent saltwater intrusion model to demonstrate the impact of the
6 CCS on the underlying saline plume. Due to uncertainty of hydraulic conductivity
7 values (the ease with which water can flow in the aquifer), they simulated four cases
8 that bracket the range of values reported at the site. Exhibit-SP-3, Demonstrative 16
9 from Hughes et al (2009), which shows the results of simulating hypersaline water in
10 the CCS interacting with the Biscayne Aquifer, indicates that hypersaline CCS water
11 sinks to the bottom of the aquifer and migrates westward.⁴⁵ The saltwater wedge did
12 not reach equilibrium within the 25-year simulation period for these simulations which
13 considered the extent of hypersaline water in the CCS.

14 Exhibit SP-3, Demonstrative 17 reproduced from Hughes, et al. (2009)
15 indicates that the 1 ppt TDS concentration moves as much as 400 to 11,000 meters in
16 25 years at the base of the aquifer as a result of the CCS. Note that 1 ppt is about twice
17 the drinking water standard for TDS. Exhibit SP-3, Demonstrative 18 reproduced from
18 Hughes, et al. (2009) indicates that salt content in the aquifer increases by 40 to 160
19 million kilograms in 25 years. Thus, it was clearly demonstrated in 2009 that the CCS
20 increased the Biscayne Aquifer's salinity.

⁴⁴ Hughes, et al. in 2009

⁴⁵ Exhibit SP-3, Demonstrative 16; Hughes, et al, 2009, Figure 4

1 The 2013 cross-sectional model of the CCS by Tetra Tech simulates salinity
2 reduction of the hypersaline plume in the Biscayne Aquifer.⁴⁶ The 2015 conditions for
3 the remediation simulations show a hypersaline plume with salinity greater than 35 ppt
4 extending westward from the CCS to Tallahassee Road, as shown in Exhibit SP-3,
5 Demonstrative 19.

6 The 2017 groundwater flow and transport model of the Biscayne Aquifer notes
7 that model wells G-21 and G-28 (west of the CCS along Tallahassee Road) were used
8 as targets for chloride breakthrough (i.e., saltwater concentrations through time were
9 evaluated at these locations to consider if the model represents observed conditions)
10 between 1968 and 2010.⁴⁷ Though this breakthrough does not directly demonstrate the
11 extent of an accompanying hypersaline plume, the model results were generally
12 consistent with the 2016 electromagnetic survey, and simulated a hypersaline plume
13 with similar extents.⁴⁸ In my expert opinion, considering the data provided by FPL and
14 in the references included with my direct testimony, and subject to additional data that
15 I have not been provided which may indicate otherwise, the models of Tetra Tech⁴⁹ are
16 a reasonable representation of the saltwater intrusion processes and hydrogeology of
17 the Biscayne Aquifer in the vicinity of the CCS.

⁴⁶ Tetra Tech, 2013b

⁴⁷ Tetra Tech, 2016c, p. 13.

⁴⁸ Enercon, 2016; Tetra Tech, 2016c, p. 16

⁴⁹ Tetra Tech (2016c), Tetrattech (2016d), and Tetra Tech (2016f)

1 **Q. IS THERE EVIDENCE THAT FPL PRESENTED ANY ANALYSES PRIOR**
2 **TO 2009 TO DEMONSTRATE WHETHER THE INTERCEPTOR DITCH OR**
3 **THE “ID” WAS EFFECTIVE IN CONTROLLING THE WESTWARD**
4 **MOVEMENT OF THE HYPERSALINE PLUME?**

5 A. Effectively, no. FPL collected sufficient data to perform an evaluation of the
6 effect of the ID on CCS water within the Biscayne Aquifer; however, in all monitoring
7 reports but one, FPL failed to analyze or address the effectiveness of the ID in
8 preventing westward movement of CCS water. Despite its collection of this chloride
9 data, FPL failed to provide its analysis of the data, in terms of the effectiveness of the
10 ID prior to 2011. Only in the 2011 annual groundwater monitoring report did FPL
11 directly address the purpose of the ID operations by discussing the effect of the ID on
12 CCS saline water. FPL acknowledged the presence of and westward migration of CCS
13 water within the Biscayne Bay below the depth of the Interceptor Ditch.⁵⁰

14 The stated original purpose of the Interceptor Ditch when it was placed in
15 service at the inception of the CCS was to restrict movement of saline water from the
16 cooling canal system westward of L31 canal to those amounts that would occur without
17 the existence of the cooling canal system.⁵¹ Prior to the 2009 revision to the CCS
18 monitoring plan, FPL’s reports did not include an analysis of whether CCS saline water
19 was present in the Biscayne Aquifer or whether CCS saline water, if present, was
20 moving westward. The data necessary to address the purpose of the ID were collected
21 and presented by FPL in the annual groundwater monitoring reports in the form of

⁵⁰ Golder, 2011c, p. 12.

⁵¹ CFD, 1972

1 excursion plots and time history plots of chlorides (Demonstratives 4 and 7 in Exhibit
2 SP-3).⁵² FPL's subsequent (after 2009) reporting of the ID relapsed into discussions
3 of relative trends of chloride within wells and groundwater gradients, and ignored the
4 effect ID operations had, if any, on the hypersaline conditions within the Biscayne
5 Aquifer.⁵³

6 A review by SFWMD in 2009 described these monitoring practices as “errors,
7 omissions and inconsistencies that raise concern as to whether the operations of the
8 Interceptor Ditch were always consistent with the Revised Operating Manual contained
9 in the 1983 Agreement.”⁵⁴ SFWMD further stated that “the reports contain conclusions
10 that are inconsistent with the objectives identified in Paragraph A.1. of the
11 Agreement...the subject reports do not identify the location and orientation of the saline
12 water westward of Levee 31E⁵⁵... and “[t]he conclusions....that the Interceptor Ditch
13 is continuing to be responsive and effective in performing its design function, is not
14 recognized as a performance measure within the Agreement” ...”⁵⁶ In short, FPL's
15 conclusions about “effective” ID operations were based on groundwater gradients or
16 historical landward sea water extents, but were not related to the presence of CCS water
17 in the Biscayne Aquifer or the migration of this water.

18

⁵² Dames & Moore, 1990, 1992, FPL, 2003, 2004; Golder, 2008c, 2008d, 2008e, 2008f, 2009, Golder, 2010.

⁵³ Ecology and Environment, 2012c, p. 6-5; Ecology and Environment, 2014, Page 6-4; Ecology and Environment, 2016, Page 7-6.

⁵⁴ SFWMD, 2010, PDF Page 3 second paragraph

⁵⁵ SFWMD, 2010, PDF Page 3, third paragraph

⁵⁶ SFWMD, 2010, PDF Page 3, fourth paragraph

1 **IV. EVALUATION OF THE FEASIBILITY AND EFFECTIVENESS OF FPL'S**
2 **PROPOSAL TO HALT THE MIGRATION OF THE HYPERSALINE PLUME,**
3 **STABILIZE SALINITY LEVELS WITHIN THE CCS, AND RETRACT THE**
4 **HYPERSALINE PLUME FROM AREAS BEYOND THE CCS BOUNDARIES**

5
6 **Q. PLEASE DESCRIBE THE HYDROGEOLOGIC STRUCTURE OF THE**
7 **BISCAYNE AQUIFER.**

8 A. The Biscayne Aquifer is about 100 feet thick in the vicinity of the CCS, but it
9 thins to the north and west. The Aquifer consists of two primary water-bearing units:
10 the near-surface Miami Limestone, and the underlying Fort Thompson Formation.
11 These hydrogeologic units contain areas with extensive tubes, channels and voids that
12 likely act as preferential subsurface flow pathways. Such zones are identified by JLA
13 Geosciences (2010) in the vicinity of the CCS. Unconsolidated sediments (weathered
14 rock) overlying the Miami Limestone are thin and include coarse-textured fill, organic-
15 rich soils and marls. The less permeable units of the Tamiami Formation that underlie
16 the Fort Thompson Formation form the base of the Biscayne Aquifer.

17
18 **Q. HAVE YOU ANALYZED FPL'S THREE DIMENSIONAL DENSITY-**
19 **DEPENDENT SALTWATER INTRUSION MODEL, AND IF SO, WHAT ARE**
20 **YOUR OBSERVATIONS?**

21 A. Yes I have analyzed the model. FPL has developed a three-dimensional
22 saltwater intrusion model of the Biscayne Aquifer in the vicinity of and beneath the
23 CCS. I have reviewed Tetra Tech's reports documenting the model and the related

1 modeling files.⁵⁷ Generally, the model simulated conditions in the Biscayne Aquifer
2 both before and after creation of the CCS, and it simulated the movement of salinity in
3 the water under various conditions through 2010. Specifically, the calibrated model
4 simulated the predevelopment steady-state conditions prior to 1940, followed by
5 transient salinity movement under steady flow conditions for 1940-1968, which
6 represent the start of groundwater development in the model domain. The model then
7 simulated seasonal transient conditions between 1968 and 2010 with the CCS
8 beginning in May 1973. Finally, the calibrated model then simulated conditions from
9 2010-2015 on a monthly stress-period basis.

10 Tetra Tech then applied the model to evaluate the impact of several alternative
11 remedial solutions for retracting the hypersaline plume in Biscayne Aquifer back into
12 FPL's Turkey Point plant boundaries. FPL ultimately selected the remedial scheme
13 named Alternative 3D as the desirable methodology for retracting the hypersaline
14 plume; it is a predictive simulation that starts in 2016 and goes through 2025 for a total
15 simulation time of 10 years. This alternative consists of pumping hypersaline water
16 from the Biscayne Aquifer within the CCS boundary for one year followed by
17 pumping saline and hypersaline water from the Biscayne Aquifer from a set of wells
18 along the western periphery of the CCS for nine years. Disposal plans for extracted
19 water were not explicitly detailed. The well placement for Alternative 3D is shown
20 on Figure 19 of Tetra Tech, 2016c, reproduced here as Exhibit SP-3, Demonstrative

⁵⁷ Tetra Tech, 2016c, 2016d, 2016f. The model development effort is documented in Tetra Tech, 2016c.

1 20. The remedial scheme named Alternative 3D also includes the assumption that the
2 CCS salinity is at 35 PSUs, which is roughly the same salinity as seawater.⁵⁸

3 The Tetra Tech, 2016f report documents a recalibration effort of the 2016c
4 model using the parameter estimation software named PEST. Ultimately, the results
5 reflected in Tetra Tech’s earlier model were similar to the results shown in the PEST
6 model.⁵⁹ Tetra Tech’s report states that “both models similarly simulate breakthrough”
7 at wells G-21 and G-28 aside from the G-28 deep screen.⁶⁰ Tetra Tech concluded that
8 “while there are subtle differences between the modeled salt concentrations throughout
9 the 10-year predictive timeframe, in general, the simulated salt concentrations and the
10 manner in which they change over time are similar in the two models.”⁶¹ Finally,
11 comparisons of the predictive analyses from the 2016c and 2016f models show the two
12 models are also generally similar in that respect.⁶²

13 From my review of the hydrogeology of Biscayne Aquifer in the vicinity of the
14 CCS,⁶³ the models seems to be representative of the hydrogeologic system, unless
15 either Tetra Tech or FPL possesses other undisclosed compelling data or unless
16 additional data becomes available that denotes otherwise.

⁵⁸ Further modifications were made to the model boundary conditions and documented in Tetra Tech, 2016d. As noted in their conclusions (Tetra Tech, 2016d), “Based on an evaluation of calibration and prediction models’ results, the revisions have an overall minor impact to the historical and future simulated hydrologic and water quality conditions”.

⁵⁹ Table 6 and Figures 7 through 15 of Tetra Tech, 2016f show a comparison of the manually calibrated results of Tetra Tech, 2016c, against the PEST calibrated results. The quality of the calibration was only marginally improved in the 2016f model as compared to the 2016c model. Figures 7 and 8 of Tetra Tech 2016f indicate that PEST achieved a model calibration slightly better, yet very similar to that achieved by manual calibration.” Tetra Tech, 2016f, p. 9.

⁶⁰ 2016f; Page 9 and Figure 9.

⁶¹ Tetra Tech, 2016f, page 10 and Figures 10 through 12.

⁶² Tetra Tech 2016f, Figures 13 through 15. The slightly larger differences between the predictive simulation results of the two models may be attributed to the slightly different configuration of the remedial extraction wells of Alternative 3D simulated with the later model (also shown in Figure 1 of Tetra Tech, 2016m and reproduced here as Exhibit SP-3, Demonstrative 21.

⁶³Hughes et al, 2009; JLA Geosciences, 2010; Tetra Tech, 2016c.

1 The model domain was divided vertically into 11 numerical model layers –
2 from top to bottom, these are the unconsolidated sediments (layer 1); Miami Limestone
3 (layers 2 and 3); a high hydraulic conductivity zone at the base of the Miami Limestone
4 (layer 4); and the Ft. Thompson Formation (layers 5-11). Layer 8 is a high hydraulic
5 conductivity zone within the Ft. Thompson Formation. Multiple numerical layers were
6 used in the numerical model of the aquifer, so as to provide vertical resolution for the
7 density effects of flow of saline water in the aquifer from the CCS and from Biscayne
8 Bay.

9 FPL produced two Tetra Tech models to OPC in response to discovery requests.
10 Both of the Tetra Tech models are constructed on the same hydrogeologic
11 conceptualization, use identical numerical gridding, have acceptable calibration
12 statistics that are alike, generally replicate historical or expected behavior of salinity,
13 and give similar predictive results for application of remedial Alternative 3D. Both
14 models appear to be generally representative of the system and adequate in evaluating
15 historical migration of saline water in the aquifer, movement of hypersaline water from
16 the CCS into the aquifer, and future salinity conditions subject to salinity management
17 in the CCS, the remediation extraction well system, or changes in the other external
18 stresses such as canal stages and depths, lateral boundary conditions or pumping within
19 the aquifer.⁶⁴

⁶⁴ The models appear to be generally representative and adequate, but as with any model, they are subject to uncertainties and unknowns within the aquifer, vertical and horizontal resolution of the numerical grid, time-scales of simulation, and modeling assumptions.

1 Q. **HAVE YOU FORMED AN OPINION REGARDING FPL'S PROPOSED**
2 **PROJECT FOR RETRACTING THE HYPERSALINE PLUME AND**
3 **HALTING ITS MIGRATION OUTSIDE THE BORDERS OF THE CCS?**

4 A. Yes, I have. FPL's proposal titled "Alternative 3D," as outlined in the Tetra
5 Tech Reports includes both "freshening" which means adding water with less or no
6 salinity to the CCS, and "retraction" which means removing hypersaline water from
7 the aquifer west of the CCS via so-called "retraction wells."⁶⁵ Review and evaluation
8 of the model used to simulate the proposed remediation project indicates that the
9 freshening component of the proposal may be a viable method for decreasing Biscayne
10 Aquifer groundwater hypersalinity. However, the retraction well component, as
11 proposed, would have only a marginal effect on hypersalinity in the groundwater west
12 of the CCS. In any event, the combined remedial measures proposed by FPL
13 (freshening and retraction wells), do not retract either the saline plume that is further
14 west of the CCS, or the hypersaline portions immediately west of the CCS, to the
15 Turkey Point boundary within the simulation period of 10 years.

16 FPL used Tetra Tech's three-dimensional density-dependent saltwater intrusion
17 model to evaluate the proposed project for retracting the saline plume, i.e., Alternative
18 3D, which consists of two components.⁶⁶ The first component of this project is to
19 stabilize the CCS salinity at a concentration of 35 PSUs, with a related freshening
20 impact on the aquifer. The model assumes that the CCS salinity will be immediately
21 decreased to 35 PSUs and held constant at that concentration. The second component

⁶⁵ Tetra Tech 2016c, 2016f.

⁶⁶ Tetra Tech 2016c, 2016f.

1 of this project consists of retraction wells with operations as detailed in Tetra Tech
2 reports 2016c and 2016f, and summarized above.⁶⁷ Tetra Tech's model therefore
3 simulates the combined impact of both project components simultaneously; however,
4 that methodology hinders the ability to establish the impact of one project component
5 versus that of the other. The simulation period is 10 years, and is intended to cover the
6 period from January 2016 through December 2025.

7 Because of the deficiencies in the way that the simulations were conducted,
8 which simulates the combined impacts of both project components simultaneously, I
9 have conducted simulations with the Alternative 3D model files without the retraction
10 well component, in order to compare the effectiveness of the two components
11 independently of each other. Exhibit SP-3, Demonstrative 22 compares the simulation
12 results in layer 8 after 1 year for this case without pumping of the retraction wells versus
13 the case with pumping of the retraction wells. The model results showed that the
14 simulated concentrations are not materially different between the two cases, even
15 though the case with retraction wells includes a well pumping within the footprint of
16 the CCS for the first year. Exhibit SP-3, Demonstrative 23 compares the simulation
17 results in layer 8 after 10 years for the case without pumping of the retraction wells
18 versus the case with pumping of the retraction wells. The results show that the impact
19 of the retraction wells is minor; most of the freshening that was simulated in the aquifer
20 occurred as a result of CCS salinities being modeled at 35 PSUs, not as a result of
21 retraction well pumping. Exhibit SP-3, Demonstrative 24 compares the simulation
22 results in layer 11 after 10 years for the case without pumping of the retraction wells

⁶⁷ See, Exhibit SP-3, Demonstrative 18 or 19 for the locations of the retraction wells.

1 versus the case with pumping of the retraction wells. Again, the model results show
2 that the simulated concentrations are similar, which indicates that the impact of the
3 retraction well system was minor in comparison to that of the CCS freshening to 35
4 PSUs. Note in Exhibit SP-3, Demonstratives 23, 24 and 25 that concentration units are
5 relative to seawater concentration, and therefore, a concentration of unity (one)
6 represents seawater while a concentration greater than one indicates hypersalinity.

7 Exhibit SP-3, Demonstrative 25 shows the difference in concentration values
8 between the simulations with and without pumping for layers 8 and 11 (in 25a and 25b
9 respectively) after 10 years of simulation. This difference represents the freshening that
10 would occur due to the retraction wells alone (without impact of CCS concentrations
11 being stabilized at 35 PSUs or other simulated differences that may be present between
12 the calibration and prediction simulations). The maximum impact of retraction well
13 pumping on groundwater salinity is about 8 PSUs within 2.5 miles west of the CCS in
14 model layer 8 after 10 years of simulation. However, this is a region where the plume
15 is largely not hypersaline (see Exhibit SP-3, Demonstrative 23). The impact of
16 remedial pumping is negligible in model layer 11 after 10 years as shown in Exhibit
17 SP-3, Demonstrative 25b. Thus, pumping is noted to have some impact on salinity in
18 shallower layers, *but not in deeper layers where the salinity is greatest and where the*
19 *plume is hypersaline*. In Tetra Tech's remedial simulations of Alternative 3D,
20 freshening of the CCS to 35 PSUs had, by far, the greater impact on salinity in the
21 Biscayne Aquifer, compared to using retraction wells. Nonetheless, while reducing
22 and stabilizing CCS salinity appears to be a viable way to reduce hypersalinity within
23 the Biscayne Aquifer, timeframes for reduction in hypersalinity in the aquifer will vary

1 depending on many factors of the project implementation, including the rate at which
2 the CCS is stabilized at 35 PSUs and the successful maintenance of such
3 concentrations.

4

5 **Q. HAVE YOU FORMED AN OPINION REGARDING FPL'S PROPOSAL FOR**
6 **FRESHENING OF THE CCS TO 35 PSU?**

7 **A.** Yes, I have. FPL proposes that 14 MGD of Floridan Aquifer water would
8 freshen up the CCS to 35 PSU. I do not believe that the analysis conducted on behalf
9 of FPL⁶⁸ can provide an appropriate solution in terms of required volume and timing
10 for the necessary freshening. Contrary to FPL's assertion, my analysis shows that 31
11 MGD of Floridan Aquifer water would be required to freshen up the CCS to 35 PSU,
12 and the number could be higher due to other uncertainties. Because FPL's groundwater
13 remediation project proposal is based on an invalid underlying assumption regarding
14 its ability to freshen the CCS to 35 PSU, the proposal itself is flawed.

15 FPL has used a steady-state spreadsheet-based water and salt balance CCS
16 model to evaluate the impacts of adding 14 MGD of Floridan Aquifer water to the
17 CCS.⁶⁹ The Tetra Tech model concluded that 14 MGD of Floridan Aquifer water will
18 be sufficient to ultimately freshen the CCS from 60 to 35 PSUs. However the CCS
19 model includes the exchange of salts with the Biscayne Aquifer, and therefore, the CCS
20 freshening scheme also considers a mechanism for the exchange of salts between the
21 CCS and groundwater. As I noted above regarding the three-dimensional density-

⁶⁸ Tetra Tech, 2014a

⁶⁹ Tetra Tech, 2014a; the water and salt balance model formulations are discussed by GeoTrans (2010b) which is also presented as Appendix E of Geo Trans (2010b).

1 dependent saltwater intrusion model, groundwater freshening was dependent largely
2 on the CCS being at 35 PSUs. The steady-state CCS freshening analysis discussed here
3 depends on (and assumes) groundwater salinity being at 35 PSUs to simulate total
4 added water of about 14 MGD. Essentially, each model assumes that the other model
5 instantly reaches 35 PSUs, in order for that model to be valid. Therefore, because the
6 assumptions underlying each model are not valid, and because each model is dependent
7 on the other for validity, the plan developed by FPL on the strength of these two models
8 is itself invalid. Specifically, Tetra Tech stated that groundwater beneath the CCS has
9 a salinity of about 55 PSU.⁷⁰ As noted on Exhibit SP-3, Demonstrative 26, if the
10 groundwater salinity was 55 PSUs in the Tetra Tech 2014c CCS model, then 31 MGD
11 of Floridan Aquifer water would be required to freshen the CCS to a salinity of 35
12 PSUs, assuming that all other numbers are similar to Table 1b of Tetra Tech (2014a).

13 Exhibit SP-3, Demonstrative 26 does not account for the impact of added water
14 on groundwater inflow or outflow to the CCS though Tetra Tech estimates that impact
15 to CCS water level is negligible, being 0.1 foot for 10 MGD of added water to the
16 CCS.⁷¹ However, Exhibit SP-3, Demonstrative 26 clearly shows the impact of errors
17 or uncertainties in model inputs. If estimates of groundwater inflow/outflow or
18 evaporation are incorrect, then the computation for required additional Floridan
19 Aquifer water for freshening is also incorrect. Moreover, the impact of such errors on
20 the ultimate model computation can be substantial.

21

⁷⁰ Figure 14 of Tetra Tech, 2016c.

⁷¹ 2015a, top of page 6.

1 The transient CCS spreadsheet model described by Tetra Tech (2014a)
2 similarly uses estimates of groundwater exchange flux (inflow or outflow) with the
3 CCS, groundwater concentrations, precipitation / runoff into the CCS, and evaporation
4 fluxes from the CCS to evaluate CCS salinity, subject to adding 14 MGD of Floridan
5 Aquifer freshening water. If Tetra Tech’s estimates are incorrect, then as a result, their
6 transient flow computations are also incorrect. Consequently, the incorrect transient
7 flow computations invalidate not only the computed dilution, but also the time to
8 dilution.

9 FPL’s method of modeling of the CCS separately from the three-dimensional
10 density-dependent saltwater intrusion model therefore does not provide a reliable
11 solution to the two interdependent problems which include interactions between both
12 the CCS and groundwater, and which depends on the respective water levels and
13 salinities. Lack of feedback between the various models makes FPL’s steady-state and
14 transient spreadsheet model results inaccurate, as demonstrated above. In addition,
15 significant uncertainties exist in the CCS steady-state spreadsheet model that translate
16 to large changes in the calculated Floridan Aquifer freshening water volumes.

17

18 **Q. BASED ON THE DOCUMENTATION PRODUCED IN THIS CASE, DID FPL**
19 **IDENTIFY MORE THAN ONE OPTION TO REDUCE SALINITY IN THE**
20 **CCS? IF SO, HOW WAS THE PROPOSAL AT ISSUE CHOSEN?**

21 A. Yes, more than one option was proposed or considered. FPL’s contractor Tetra
22 Tech has evaluated alternative measures for CCS salinity reduction.⁷² The transient

⁷² Tetra Tech, 2015a.

1 water and salt balance model was used for the evaluations by running a 2-year time
2 period for a “normal weather scenario” and another two-year time period for a “dry
3 weather scenario.” CCS freshening alternatives were also considered by GeoTrans for
4 FPL as a remedial measure for retracting the hypersaline plume from beyond the CCS
5 boundaries and halting further migration.⁷³

6 Tetra Tech evaluated six alternatives and three additional alternatives termed
7 “sensitivity.” The alternatives included freshening water from Floridan Aquifer wells,
8 the interceptor ditch, L-31 Canal and Card Sound, and sediment removal. Tetra Tech
9 then ranked these options considering the efficiency (defined in terms of the long-term
10 salinity reduction) of the alternative in freshening the CCS depending on different
11 initial CCS salinities. Ultimately, FPL chose the alternative of using 14 MGD of
12 Floridan Aquifer water for freshening.

13
14 **Q. BASED ON THE DOCUMENTATION PRODUCED IN THIS CASE, DID FPL**
15 **IDENTIFY MORE THAN ONE OPTION TO HALT MIGRATION OF THE**
16 **HYPERSALINE PLUME AND REDUCE THE SIZE OF THE HYPERSALINE**
17 **PLUME SO THAT IT DOES NOT EXTEND BEYOND THE BOUNDARIES OF**
18 **THE CCS? IF SO, HOW WAS THE PROPOSAL AT ISSUE CHOSEN?**

19 **A.** Yes., more than one option was proposed or considered. GeoTrans, on behalf
20 of FPL, evaluated several options for stopping westward migration of saline and
21 hypersaline water as a result of the CCS.⁷⁴ Remediation options identified by GeoTrans
22 included stopping westward migration of saltwater within groundwater; lowering

⁷³ GeoTrans, 2010b.

⁷⁴ GeoTrans 2010b

1 concentrations within the CCS to those of seawater; replacing the CCS with an alternate
2 system consisting of cooling towers; and desalinating a portion of the CCS to lower
3 concentrations within the CCS. GeoTrans outlined thirty-two preliminary alternatives.
4 The thirty-two preliminary alternatives were narrowed down to thirteen for a more
5 detailed feasibility study which, in turn, identified five alternatives that GeoTrans
6 postulated had the greatest chance of success. The five alternatives selected by
7 GeoTrans included the following: a slurry wall around the CCS; Interceptor Ditch
8 modifications; shallow pumping wells in CCS; freshening of CCS with Floridan
9 Aquifer water; and hydraulic barrier pumping and injection.

10 GeoTrans used a cross-sectional, variable-density groundwater flow and
11 saltwater transport model to evaluate the impact of the selected five alternatives on
12 saltwater movement in the Biscayne Aquifer beneath, and in the vicinity of, the CCS.
13 The cross-sectional model development and calibration was described in GeoTrans
14 2010b, Appendix D of and in Tetra Tech 2013b. GeoTrans further estimated quantities
15 of water required for the CCS freshening alternative by using the water and salt balance
16 models for the CCS described by GeoTrans (2010a), and Tetra Tech (2014a).

17 The results of GeoTrans' model showed that Interceptor Ditch (ID)
18 modifications such as lowered head, deeper ID, or pumping beneath the ID were not
19 effective, especially with deeper portions of the hypersaline plume. Pumping from
20 beneath the CCS was determined to be ineffective, and the westward migration of
21 saltwater during the 15-year simulation was only about 250 feet less than for a
22 simulation with current operational conditions. CCS freshening had a large simulated
23 impact on the saline plume even though it did not retract or affect the westward

1 migration of the plume. The slurry wall alternative was not accurately simulated by a
2 cross-sectional model; however, the simulations indicated that a slurry wall would not
3 be as effective as originally envisioned unless it was also anchored into the confining
4 unit at the bottom.

5 In 2016, Tetra Tech developed a three-dimensional density-dependent
6 groundwater flow and salt transport model of the CCS and vicinity.⁷⁵ This model was
7 used to test seven remediation scenarios including a no-action case. Alternatives 2
8 through 5 evaluated CCS salinity abatement along with extraction wells to retract the
9 hypersaline groundwater plume west of the CCS footprint. Alternatives 6 and 7 were
10 intended to stabilize or retract the toe, or front edge, of the saltwater interface. The
11 alternatives were ranked according to several criteria and Alternative 3D, a CCS
12 freshening alternative in conjunction with groundwater pumping, was selected by Tetra
13 Tech as the one with the highest ranking.

14

15 **Q. HAS THE METHOD CHOSEN BY FPL BEEN EMPLOYED SUCCESSFULLY**
16 **ANYWHERE ELSE?**

17 A. The method selected by FPL (Alternative 3D of Tetra Tech, 2016c) includes a
18 combination of freshening of the CCS and pumping from retraction wells along the
19 CCS western boundary. I am not aware of any systems where this combination has
20 been deployed.

⁷⁵ Tetra Tech 2016c.

1 Freshening of the CCS is viable, and is noted to occur during wet periods (though it
2 has not been freshened to Biscayne Bay salinity values). If the CCS can be freshened
3 to 35 PSUs and maintained at that concentration level, the density dependent flow and
4 transport modeling analyses also indicated that freshening of groundwater was viable.

5 Injection barriers and retraction/containment wells have been employed
6 successfully elsewhere to prevent contaminant migration in groundwater from
7 occurring, as well as to form barriers to saltwater intrusion. Modeling analyses have
8 successfully guided these operations in Florida, California and elsewhere. FPL's
9 proposal depends on Tetra Tech's model for salinity migration within Biscayne
10 Aquifer; however Tetra Tech's model shows that the retraction wells do not meet their
11 stated objective of retracting the hypersaline plume from west of the CCS footprint, as
12 I have shown in my analysis above.⁷⁶ As such, the retraction well component of FPL's
13 proposal is not reasonably effective in retracting the hypersaline plume.

14

15 **V. EVALUATION OF THE COST ALLOCATION IN THE FPL PROPOSAL**

16

17 **Q. WHAT DO YOU RECOMMEND TO THE COMMISSION WITH RESPECT**
18 **TO FPL'S REQUEST TO ALLOCATE 17% OF THE PROJECT AS**
19 **REMEDICATION AND 83% OF THE PROJECT AS**
20 **PREVENTION/CONTAINMENT, FOR PURPOSES OF ENVIRONMENTAL**
21 **COST RECOVERY FROM RATEPAYERS?**

⁷⁶ Tetra Tech, 2016c, 2016f.

1 First, I express no opinion in my testimony regarding whether the proposal or suggested
2 basis to allocate any costs to customers is appropriate. However, if there is to be an
3 allocation between remediation and prevention/containment, it is my opinion that the
4 allocation percentages proposed by FPL are not supported by the evidence.

5 Tetra Tech conducted an evaluation for allocating a portion of the costs for the
6 recovery system of hypersaline water to retraction, and the remaining to containment.⁷⁷
7 It was proposed from this evaluation that 17% of the project costs should be allocated
8 as retraction or remediation and the remaining 83% of the costs should be allocated as
9 containment/prevention. My recommendation is to reject FPL's suggestion, as there
10 are several deficiencies in the analyses for a 17-83 percentage split between
11 remediation and prevention/containment.

12 Additionally, the remediation function of the suggested design was only related
13 to hypersaline water, and does not address saline water that was pushed further inland
14 (westward) as a result of the operation of CCS. In fact, the proposed remedial
15 alternative does not consider retraction of saline water further west of the hypersaline
16 plume. In that regard, the remedial wells' impacts were noted to occur mainly in
17 regions where the plume is not hypersaline, as seen in Exhibit SP-3, Demonstratives
18 25a, 25b, and 22, thus not achieving the stated goal of hypersaline plume retraction.

19 Also, the cost allocation mass calculations that underlie the suggested 17-83
20 percentage split between remediation and prevention/containment does not evaluate
21 mass in the entire model. Specifically, "model layers 10 and 11 were omitted from

⁷⁷ Tetra Tech, 2016l, 2016m.

1 hypersaline mass calculations due to suggested uncertainties in hydraulic parameters
2 in the deepest portion of the aquifer along the southwestern border of the CCS.”⁷⁸
3 Omitting results from model layers with assumed uncertainties in parameters is not a
4 scientifically valid or accepted methodology for quantifying the impact of uncertainty
5 or variability. The model was calibrated using information from all layers so all of them
6 should all be used in the evaluation. Otherwise, one could omit all results since there is
7 uncertainty in parameter values for all model layers. If there is uncertainty in parameter
8 values for model layers 10 and 11, the appropriate method of evaluating the impact
9 would be, at the least, to bracket the parameter value range and bound the mass removal
10 simulation results accordingly. The objective of the modeling effort of Tetra Tech was
11 to evaluate relative mass recovery amounts between containment versus retraction of
12 the hypersaline plume.⁷⁹ It was noted that the “model appears to under-simulate the
13 extraction well influence in the bottom two layers of the model,”⁸⁰ therefore, in that
14 case, it would do so for both retraction and containment portions of the hypersaline
15 plume, thus providing similar ratios. For this reason, the cost allocation calculations
16 should have used the entire model results and should not have omitted layers 10 and
17 11. In this case, the 20-year average split between retraction and containment was noted
18 to be a 26-74 percentage split and not a 17-83 percentage split.

19 Regarding omitting model layers 10 and 11 in the mass allocation calculations,
20 Tetra Tech suggested that the lower two layers have a low permeability and are not part
21 of the Biscayne Aquifer.⁸¹ Tetra Tech further suggested that the 2015 Consent

⁷⁸ Tetra Tech, 2016m.

⁷⁹ Tetra Tech, 2016m.

⁸⁰ Tetra Tech, 2016.

⁸¹ Tetra Tech 2016m.

1 Agreement between FPL and Miami-Dade County only required retraction of the
2 contents of the hypersaline plume in the Biscayne Aquifer. I have noted that the lower
3 two layers have hydraulic conductivities in excess of 500 feet/day in the model. This is
4 not a low number and does not reflect confining or aquitard-like conditions. Further, if
5 the model appeared to under-simulate the extraction well influence in the bottom two
6 layers, it is likely that modeled hydraulic conductivities need to be even larger.
7 Hydraulic conductivity values larger than 500 feet/day are reflective of transmissive
8 aquifer conditions.

9 In addition, the cost allocation and mass reduction computations were averaged
10 over a 20-year period. However, it is noted that the “retraction hypersaline mass to the
11 west and north of the CCS is fully removed after approximately 11 years.”⁸² Evaluating
12 the results for mass reduction in all model layers for 11 years gives a 35-65 percentage
13 split between retraction and containment (if layers 10 and 11 were omitted, that would
14 yield a 30-70 percentage split averaged over 10 years).

15 Finally, the mass reduction numbers indicate that the effectiveness of the wells
16 for mass removal diminishes significantly over the years. Demonstrative 27 in Exhibit
17 SP-3, reproduces the annually recovered mass through time for the case where all layers
18 are evaluated.⁸³ It is noted that mass retraction is almost negligible after year 11.
19 Containment mass is also greatly diminished after year 11. However, operation of the
20 wells was not adjusted to reflect the reduction in mass removal efficiency; instead, the
21 wells are pumped at the same rate for 20 years even though mass removal by the wells

⁸² Tetra Tech, 2016m.

⁸³ Figure 6 of Tetra Tech, 2016m.

1 is greatly diminished. Simulations that use variable pumping rates to reflect this
2 situation should be conducted to evaluate containment and retraction of the hypersaline
3 plume, and those simulations are more appropriately used to reflect cost allocation, if
4 the Commission authorizes it.

5 Recovery ratios are also transient, as suggested by FPL's modeling study and
6 shown on Exhibit SP-3, Demonstrative 27. Therefore, the cost should be apportioned,
7 if at all, on a more regular basis, as per the varying ratios. Exhibit SP-3, Demonstrative
8 28 reproduces the proportions of recovered mass through time for the case where all
9 layers are evaluated.⁸⁴ With the currently modeled amounts of pumping for Alternative
10 3D (the FPL-proposed alternative to retract the hypersaline plume), approximately 41%
11 of the cost should be allocated towards containment and 59% for retraction for the first
12 two years. In my opinion, two years is a reasonable time-frame for monitoring and re-
13 evaluation since the model suggests significant changes in hypersaline mass removal
14 in that time period. Monitoring and additional modeling at that stage can determine
15 success of the strategy, adaptive management of the remedial scheme moving forward,
16 and required associated costs.

17 Just because the operational life of the remediation wellfield is 20 years does
18 not mean that it has to be operated for 20 years, if the objectives have been achieved
19 earlier than that. Again, an adaptive management plan along with periodic monitoring
20 will help guide long-term efforts and adjust for errors or uncertainties that occur in the
21 current computations. A presentation by Tetra Tech considered 5-year and 10-year

⁸⁴ Figure 6 of Tetra Tech, 2016m.

1 averages, but these were not proposed in the ultimate cost allocation memorandum of
2 Tetra Tech.⁸⁵

3

4 Q. **DOES THIS CONCLUDE YOUR DIRECT TESTIMONY?**

5 A. Yes

6

⁸⁵ Tetra Tech, 2016l; 2016m.

1

2 BY MS. MORSE:

3 Q Dr. Panday, have you prepared a summary of
4 your direct testimony?

5 A Yes.

6 Q Okay. Will you please provide your summary to
7 the Commission at this time?

8 A Yes. Good afternoon, Madam Chair and
9 Commissioners. My testimony is based on my expertise as
10 a hydrologist and my experience in analyzing
11 hydrological issues, aquifers, saltwater intrusion and
12 associated modeling and modeling analysis. Based on my
13 review of the documentation provided by FPL, it is my
14 expert opinion that FPL had sufficient information long
15 before 2013 to know that the build-up and movement of
16 salt from the CCS was occurring in Biscayne Aquifer west
17 of the boundary of the CCS such that they had ample
18 opportunity to take action to reduce those impacts.

19 My demonstrators four, five and six clearly
20 show trends in increasing salinity and hypersalinity
21 inside the CCS and in groundwater outside of the CCS
22 boundaries. This data was collected from the earliest
23 days of the CCS. I am presenting this evidence to show
24 what is known and knowable at the time that the data was
25 collected over the years as per the agreements with the

1 Water Management District. I also testify that the FPL
2 seawater model shows the proposed remedial retraction
3 well system, the RWS, to be ineffective in retracting
4 the hypersaline plume as required under the consent
5 order and consent agreements with the Florida DEP and
6 Miami-Dade County.

7 The remedial system was not effective at
8 retracting the hypersaline plume, as you see in the
9 hypersaline plume in my demonstrative 14B. There was
10 barely any effect in the lower portions of the aquifer
11 in ten years. Also, the retraction that was noted in
12 the high-conductivity zone in the aquifer indicated that
13 the proposed CCS freshening caused most of that impact.

14 In addition, my analysis shows that the CCS
15 freshening floor proposed by FPL from the Floridan
16 Aquifer will likely be inefficient -- insufficient and
17 that FPL may require as much as additional 17 million
18 gallons per day more to freshen the CCS to 35 PSU's and
19 a slight error in the inputs causes considerable change
20 in the results.

21 Finally, my evaluation of FPL's model
22 demonstrates that to the extent the allocation between
23 remediation and containment is required from a
24 hydrological standpoint most of the retraction noted in
25 the high-conductivity zone in the aquifer occurred due

1 to CCS freshening and very little due to the retraction
2 well system.

3 Also, the retraction goals were not achieved
4 in deeper portions of the aquifer. However, if the cost
5 of the RWS are to be based on the initially-hypersaline
6 mass of salt that was extracted from the model from
7 inside was outside of the CCS boundary then the
8 allocation would be 59 percent remediation and 41
9 percent containment over a two-year period.

10 Further, I do not agree that the analysis
11 should be conducted using a 20-year period. In my
12 opinion, two years is a reasonable time frame for
13 monitoring and reevaluation. Also, since the analysis
14 shows that the retraction would be complete in 11 years,
15 the system would be redundant in 11 years.

16 That concludes my summary. Thank you.

17 MS. MORSE: Thank you, Doctor. Madam Chair, I
18 tender the witness for cross-examination.

19 CHAIRMAN BROWN: Thank you, Ms. Morse. And
20 just a reminder to FIPUG and SACE, when we get up
21 to you, no friendly cross will be allowed. We will
22 start with Florida Power & Light.

23 MR. BUTLER: Thank you, Madam Chairman. I am
24 going to be relying on, I think, with one possible
25 exception, exclusively exhibits that are already in

1 the record, Exhibit 71 initially, and then several
2 out of Mr. Sole's testimony. I know that Dr.
3 Panday has access to those documents and rather
4 than burden the record with extra copies of the
5 same stuff I'm just going to be referring to those
6 numbers.

7 CHAIRMAN BROWN: Thank you, and we have all of
8 those copies so you don't need to distribute more
9 paper.

10 MR. BUTLER: Thank you.

11 EXAMINATION

12 BY MR. BUTLER:

13 Q Good afternoon, Dr. Panday.

14 A Good afternoon, Mr. Butler.

15 Q To start, I have a fairly complicated
16 hypothetical involving cattle I'd like to discuss. I'm
17 just kidding. I don't.

18 Do you have a copy of Exhibit No. 71 available
19 to you?

20 A Yes, I do.

21 Q Okay.

22 MR. REHWINKEL: Madam Chairman, I just would
23 note for the record that I did my hypothetical so
24 he couldn't do his.

25 CHAIRMAN BROWN: Right.

1 BY MR. BUTLER:

2 Q Dr. Panday, are you familiar with this
3 agreement that FPL entered into with Central and South
4 Florida Flood Control District on February 2, 1972
5 concerning the operation of the CCS at Turkey Point?

6 A I am generally familiar with it, yes.

7 Q Okay. Is it your understanding that the
8 Central and South Florida Flood Control District was the
9 predecessor to the present-day South Florida Water
10 Management District?

11 A Yes.

12 CHAIRMAN BROWN: Just one moment.

13 Commissioners, it is Exhibit 71 that he's referring
14 to.

15 MR. BUTLER: I'm sorry if I didn't mention
16 that. Yes. Exhibit 71.

17 BY MR. BUTLER:

18 Q Is it okay with you to refer to this agency as
19 the Water Management District for the purpose of my
20 questions?

21 A Yes.

22 Q Okay. Would you agree that the 1972 agreement
23 contained provisions concerning the operation of the
24 interceptor ditch that FPL constructed on the west of
25 the CCS?

1 A I believe there was reference to making an
2 interceptor ditch, yes.

3 Q Okay. In fact, would you agree, subject to
4 check, that paragraphs B-6 through B-13 discuss the
5 interceptor ditch?

6 A Yes, I believe so.

7 Q Thank you. I'd like you to turn to paragraph
8 B-1, and would you agree that paragraph B-1 in this
9 agreement required FPL to submit, for the Water
10 Management District approval, a plan for the interceptor
11 ditch showing its location and dimensions as well as the
12 location and size of the associated seepage control pump
13 or pumps?

14 A Yes.

15 Q Okay. And would you agree that FPL was not
16 permitted to begin construction of the CCS until the
17 Water Management District had reviewed and approved
18 interceptor ditch design? That's paragraph B-3.

19 A Yes.

20 Q And are you aware that FPL was not permitted
21 to operate the CCS until it documented to the Water
22 Management District that the interceptor ditch had been
23 constructed in accordance with the approved design?
24 Refer you to paragraph B-5.

25 A Yes.

1 Q And, likewise, are you aware that FPL was
2 required to submit for Water Management District review
3 and approval the operating criteria for the interceptor
4 ditch pumps? Refer you to paragraph B-11.

5 A Yes.

6 Q Okay. I'm going to get out of the B's for a
7 moment and ask you about something in C. Would you
8 agree that the 1972 agreement on -- required FPL to
9 install and monitor a series of groundwater and surface
10 water monitoring stations whose locations were specified
11 in Exhibit A to the agreement. I'll refer you to
12 subsections C-1 and C-2 of the agreement.

13 A Yes.

14 Q Going back briefly to the B section. Do you
15 have any information to suggest that the Water
16 Management District did review and approve the design
17 and operating criteria for the interceptor ditch?

18 A No, I don't know one way or the other.

19 Q Okay. Now, paragraph C-4, would you agree
20 that it provides that FPL is -- or obligates FPL to
21 report the results of the monitoring to the Water
22 Management District on a regular schedule?

23 A Yes, there's a schedule in here, correct.

24 Q And the schedule has somewhere between daily
25 and every two weeks for submissions of data. Would you

1 agree?

2 A Yes.

3 Q And would you agree that paragraph C-7
4 provides for FPL and the Water Management District to
5 meet quarterly to review the effectiveness of the
6 monitoring system, starting in July 1972?

7 A Yes, that's in this agreement.

8 Q Are you aware of any time where the Water
9 Management District advised FPL that the monitoring
10 system required under the 1972 agreement was
11 ineffective?

12 A I believe the 2013 notice, April 2013 notice,
13 to FPL mentioned that it was ineffective.

14 Q Mentioned what? I'm sorry. I didn't hear the
15 last couple of words there.

16 A Mentioned that it was ineffective.

17 Q Are you aware of anything prior to that -- the
18 date you just referred to was the April 2013
19 notification for consultation, is that right?

20 A Yes.

21 Q Okay. Are you aware of anything prior to 2013
22 where any objections to the monitoring system would have
23 been given by the Water Management District to FPL?

24 A No, not that I recall.

25 Q Okay. I asked you to look back to Paragraph

1 B-6 of the agreement.

2 A Yes.

3 Q Would you agree that according to paragraph
4 B-6 the purpose of the interceptor ditch is to, A,
5 restrict movement of saline water from CCS westward of
6 the L31 levy to amounts that would occur without the CCS
7 and, B, to limit the loss of freshwater from the area
8 west of the L31 levy to the amounts that would occur
9 without the CCS?

10 A Yes.

11 Q Would you agree that paragraph B-12 of the
12 1972 agreement empowered the Water Management District
13 to require FPL to make immediate revisions to the
14 interceptor ditch operating criteria if the district
15 determined that the objectives of paragraph B-6 were not
16 being met?

17 A It specifically says, in fact, any time it is
18 determined by FCD that FPL operate. That's correct.

19 Q Okay. Are you aware of any instance in which
20 the Water Management District required FPL to revise the
21 interceptor ditch operating criteria pursuant to
22 Paragraph B-12 of the 1972 agreement?

23 A I believe if it was not working they were
24 required to modify the operations of the interceptor
25 ditch.

1 Q And I'm asking you whether you're aware of any
2 instances in which the Water Management District advised
3 FPL that it wasn't working and told them to operate it
4 differently?

5 A No, I'm not aware of that right now.

6 Q And similarly, isn't it true that under
7 paragraph B-13 of the 1972 agreement if the Water
8 Management District determined that operational changes
9 for the interceptor ditch would not be sufficient to
10 meet the objectives of paragraph B-6, the Water
11 Management District was empowered at its sole discretion
12 to require FPL to make what we'll refer to as
13 "engineeringly feasible" changes to the design of the
14 interceptor ditch?

15 A Yes, that's what it says here.

16 Q Okay. Are you aware of any instance in which
17 the Water Management District directed FPL to make
18 engineeringly feasible changes to the interceptor ditch
19 design pursuant to this paragraph B-13?

20 A No, not that I recall, except I believe there
21 was some modifications at some stage later on in the
22 operations of the interceptor ditch.

23 Q Now, you're aware that the 1972 agreement had
24 been amended by FPL and the Water Management District
25 five times, correct?

1 A I don't recall the five times number, but I do
2 know that it was amended.

3 Q Okay. Are you familiar with the fourth such
4 amendment which was dated July, 1983?

5 A With the what document? Excuse me?

6 Q The fourth amendment to the Water Management
7 District, FPL on agreement that was dated July 1983.
8 Just to orient you, this was Exhibit MWS-20 to Mr.
9 Sole's rebuttal testimony and ask you to turn to it.

10 CHAIRMAN BROWN: MWS-20.

11 MR. BUTLER: Twenty, yes.

12 CHAIRMAN BROWN: All right. Commissioners,
13 it's in the same book.

14 MR. BUTLER: That's been identified as hearing
15 Exhibit 47.

16 THE WITNESS: Sorry. I don't know what that
17 exhibit is. His rebuttal testimony.

18 MR. BUTLER: Rebuttal testimony, yes.

19 THE WITNESS: Yes, I have it open.

20 BY MR. BUTLER:

21 Q Okay. Thank you. Would you agree that this
22 fourth amendment contained essentially that same
23 authority for the Water Management District to direct
24 FPL to make operational changes if the interceptor ditch
25 was not adequately achieving its goal of restricting

1 movement of saline water from the cooling canal system
2 westward of the L31 levy to amounts that would occur
3 without the CCS?

4 A Where are you reading this from, please?

5 Q Yes. I'm referring to paragraphs A-1 and A-2
6 of the fourth amendment.

7 A Sorry. I have his rebuttal testimony open.
8 I'm not sure I have the fourth -- oh, it is an
9 attachment. I get it. Sorry.

10 Q It should be on page 2 of 29 in Exhibit
11 MWS-20, if it helps.

12 CHAIRMAN BROWN: Yes, it is. You're looking
13 at the rebuttal testimony of Mr. Sole?

14 THE WITNESS: Yes. And it's an attachment,
15 right?

16 CHAIRMAN BROWN: Yes.

17 THE WITNESS: Yes, and on page two --

18 CHAIRMAN BROWN: Yes.

19 THE WITNESS: Paragraph A-2.

20 MR. BUTLER: Yes.

21 THE WITNESS: Yes.

22 BY MR. BUTLER:

23 Q My question to you is, would you agree that
24 paragraphs A-1 and A-2 in the 1983 fourth amendment
25 contained essentially the same authority for the Water

1 Management District to direct FPL to make operational
2 changes if the interceptor ditch was not adequately
3 achieving its goal of restricting movement of saline
4 water from the cooling canal system westward of the L31
5 levy to amounts that would occur without the cooling
6 canal system?

7 A Yes, that's correct.

8 Q And would you agree further that the fourth
9 amendment contained essentially the same authority for
10 the Water Management District to require engineering
11 changes to the interceptor ditch if the Water Management
12 District determined that operational changes were
13 insufficient to achieve the goal of restricting movement
14 of saline water from the CCS westward of the L31 levy?
15 And refer you to paragraphs A-1 and A-3.

16 A Yes.

17 Q Now, you're aware that there is a fifth and
18 most-recent amendment to this 1972 agreement, that was
19 dated October 2009, and referred to as the fifth
20 supplemental agreement? Are you familiar with that?

21 A Yes, I'm aware of that.

22 Q And that is Exhibit MWS-4 in Mr. Sole's direct
23 testimony.

24 A I don't believe I have his direct testimony.

25 CHAIRMAN BROWN: If you could assist him. And

1 that's MSW-4 attached to Mr. Sole's direct
2 testimony.

3 MR. BUTLER: That's right.

4 BY MR. BUTLER:

5 Q So would you agree that, so far as you know at
6 least, there's no amendment between the fourth amendment
7 dated 1983 and the fifth amendment date 2009?

8 A I would guess not, yes.

9 Q So would you agree that the fourth amendment
10 was in effect for more than 26 years from 1983 to 2009
11 before the fifth supplemental agreement was executed in
12 2009?

13 A Yes.

14 Q Are you aware of there being any time in those
15 26 years that the Water Management District ever advised
16 FPL that the interceptor ditch was not achieving its
17 goal of restricting movement of saline water from the
18 CCS westward of the L31 levy in amounts that would occur
19 without the CCS?

20 A No, I'm not aware that the Water Management
21 District directed that.

22 Q Okay. Are you aware of there being any time
23 in those 26 years that the Water Management District
24 directed FPL to make changes to its operation of the
25 interceptor ditch?

1 A No, I'm not aware of that either.

2 Q Are you aware of there being any time in those
3 26 years that the Water Management District directed FPL
4 to make design changes to the interceptor ditch?

5 A I don't recall that they've asked them to make
6 any design changes since then, no.

7 Q Now, would you agree that the fifth
8 supplemental agreement provided that if the Water
9 Management District determined that the interceptor
10 ditch was not achieving the goal of restricting the
11 movement of saline water from CCS westward of the L31
12 levy and FPL was to enter into consultations with the
13 Water Management District to identify measures to
14 mitigate, abate or remediate impacts from the CCS?

15 A Yes.

16 Q I reference you to paragraphs 2-D and D-3.

17 A Yes.

18 Q You're aware of that?

19 A Yes.

20 Q Okay. And would you agree that the Water
21 Management District sent FPL a letter in April 2013
22 asking FPL to enter into consultations with the Water
23 Management District?

24 A Yes.

25 Q And I think we briefly referenced that

1 earlier -- oh, that's not a good thing -- Exhibit MWS-6,
2 which is attached to Mr. Sole's direct testimony. Do
3 you have a copy of that available to you?

4 A I don't have it.

5 Q The April 16, 2013 letter?

6 A Can you say that again?

7 Q Do you have a copy -- it's MWS-6. It's the
8 April 6th, 2013 letter from the South Florida Water
9 Management District to FPL asking for consultation.

10 A I do have that document, yes. Let me just
11 open it.

12 Q Do you know whether FPL entered into
13 consultations with the Water Management District and the
14 Florida Department of Environmental Protection once it
15 received the April 2013 letter?

16 A I believe they did, because the letter asks
17 them to do so.

18 Q Are you aware of any request from the Water
19 Management District for consultation prior to the
20 April 2013 letter?

21 A I do not recall, no.

22 Q You said you had a copy of the letter
23 available to you?

24 A Yes.

25 Q I'd like to read you the first sentence in the

1 second paragraph of that letter. It says: Based on
2 technical evaluation of all available information, the
3 SFWMD has determined that saline water from FPL's Turkey
4 Point Power Plant Cooling Canal System has moved
5 westward of the L31 levy in excess of those amounts that
6 would have occurred without the existence of the CCS and
7 has moved into water resources outside the plant's
8 property boundaries. Do you see that?

9 A Yes.

10 Q Are you aware of any communication from the
11 Water Management District to FPL prior to April 2013 in
12 which the Water Management District communicated that
13 determination?

14 A I'm not aware, no, or I don't recall.

15 Q I'd like to ask you to turn to Exhibit MWS-8.
16 Do you have a copy of that? This is the October 2015
17 consent agreement with Miami-Dade DERM. I'm sorry. I
18 said MWS-8. I meant MWS-9. The consent agreement. Do
19 you have a copy of that?

20 A I do have a copy of Miami-Dade consent
21 agreement from 2015.

22 Q And do you have a copy -- I didn't meant to
23 refer to MWS-8, so my apologies -- of the notice of
24 violation and orders for corrective action that is
25 identified as Exhibit MWS-8. Do you have a copy of

1 that?

2 A I do have a copy of what is called the notice
3 of violation and I believe it's a letter from October
4 2nd, 2015, if that's what you're referring to.

5 Q Yes. Notice of violation and orders for
6 corrective action?

7 A That is correct.

8 Q Okay. And this refers to -- do you see toward
9 the bottom of the first paragraph it refers to a
10 violation of water quality standards in section 24-42(4)
11 of the Miami-Dade code? Do you see that?

12 A Yes, I do.

13 Q Do you know where the -- when section 24-42 of
14 the code was adopted?

15 A I do not know these code details. I'm sorry.

16 Q Would you accept, subject to check, that it
17 was in 2004?

18 A I wouldn't know, but, sure, if you say so.

19 Q Okay. Just trying to keep this short. I can
20 run through the exhibit if you'll need it, but if you'll
21 accept that, subject to check, fair enough.

22 A Sure. I'll accept, subject to check.

23 Q Are you aware of Miami-Dade County DERM ever
24 issuing a notice of violation with respect to the CCS
25 prior to October 2015?

1 A No, I'm not aware of it and I don't recall.

2 Q I'd like you to turn to Exhibit MWS-11.

3 A Can you tell me what that is, please?

4 Q Yes. This is the -- on April 2016 FDEP
5 warning letter and notice of violation. Do you have a
6 copy of that?

7 A I'll just check. I'll tell you what, I'll
8 make this easier. Do you have a copy of MWS-12, which
9 is the consent order, June 2016 consent order, between
10 DEP and FPL?

11 CHAIRMAN BROWN: You should.

12 THE WITNESS: 2016 consent order I do have a
13 copy of it, yes.

14 BY MR. BUTLER:

15 Q You do have it. Okay. Sorry. Apologize for
16 the delay. I lost my place in this.

17 Dr. Panday, would you turn to page two of the
18 consent order, and you'll see in paragraph four there's
19 a reference to condition 4.1 of the permit providing
20 that discharges to groundwater shall not cause a
21 violation of the minimum criteria for groundwater
22 specified in rules 62-520.400 and 62-520.430. Do you
23 see that?

24 A Yes, I see that.

25 Q Okay. Do you know if there is any point

1 before the issuance of this -- or the entry of this
2 consent order in June 2016 in which the Florida
3 Department of Environmental Protection had alleged that
4 FPL had violated either rule 62-520.400 or Rule
5 62-520.430?

6 A I'm sorry. Can you repeat the -- I missed the
7 beginning of the question there.

8 CHAIRMAN BROWN: Is there an easier way to do
9 this, Mr. Butler?

10 MR. BUTLER: I'm working on it.

11 BY MR. BUTLER:

12 Q Let's me just ask it this way. Dr. Panday,
13 what is the first date you are aware of in which the
14 Florida Department of Environmental Protection alleged
15 that FPL had violated any rule or requirement of the
16 Florida environmental regulations with respect to
17 operation of the cooling canal system at Turkey Point?

18 CHAIRMAN BROWN: I understood that one.

19 THE WITNESS: Sorry. I do not recall, but you
20 pointed me to the 2016 one. I know there have been
21 other entities besides Florida DEP, as well, who
22 were involved with this.

23 BY MR. BUTLER:

24 Q Are you aware of there being any notice or
25 other communication to FPL regarding violation of

1 Florida water quality standards by FPL with respect to
2 the Turkey Point Cooling Canal System before the
3 June 2016 consent order?

4 A You mean by Florida DEP or FPL?

5 Q By Florida DEP.

6 A I do not know and I do not recall.

7 Q Okay. I'd like you to turn back to Exhibit
8 MWS-9, please. This is the October 2015 consent
9 agreement. Do you have a copy of that available to you,
10 the consent agreement with Miami-Dade DERM?

11 A Yes, I do.

12 Q Okay. Are you aware that the consent
13 agreement provides that a violation by FPL of a
14 requirement in the consent agreement may result in
15 several penalties and that DERM may institute an
16 enforcement action in court? I'd reference you to
17 paragraphs 19 and 22.

18 CHAIRMAN BROWN: Which are on page nine of 24
19 of MSW-9.

20 MR. BUTLER: Yes.

21 THE WITNESS: Thank you, Madam Chair. I
22 just -- yes, that's what it says here.

23 BY MR. BUTLER:

24 Q And are you aware that FPL has required under
25 this consent agreement to install and operate a recovery

1 well system? I'd direct you to paragraph 17-B(1). This
2 is on page five.

3 A Yes. I meant yes to that's on page five.
4 Sorry.

5 Q And you're also -- the yes also applies, would
6 you agree, that FPL is required to install and operate a
7 recovery well system pursuant to the consent agreement?

8 A It says -- yes, based on the results of a
9 variable density groundwater flow model, FPL shall
10 design, permit and construct a Biscayne Aquifer Recovery
11 Well System.

12 Q I'd like you to turn to pages 21 to 24 of --
13 this is Exhibit MWS-9.

14 A Which is the same exhibit?

15 Q Same exhibit. It's the last three pages of
16 it. It's an attachment to it, a letter to FPL from
17 Miami-Dade DERM. Do you have that?

18 A I'm sorry. The document I have has only 13
19 pages.

20 CHAIRMAN BROWN: Would it be helpful if you
21 could just hand him the document?

22 Thank you.

23 BY MR. BUTLER:

24 Q Have you seen this letter before?

25 A I do not recall seeing it and I do not have it

1 in my reference documents here.

2 Q But you don't dispute that it's pages 21 to 24
3 of Exhibit MWS-9 to Mr. Sole's direct testimony in this
4 case, do you?

5 A Yes. It says it's Exhibit MWS-9, pages 21
6 through 24.

7 Q Okay. Would you agree that this letter
8 evidences DERM's approval of FPL's phase one remedial
9 action plan?

10 A I'll have to read it.

11 Q I think you can confirm that from that opening
12 paragraph before the indented paragraph one.

13 MS. MORSE: Just for the record, the witness
14 is entitled to review the document.

15 CHAIRMAN BROWN: Absolutely.

16 THE WITNESS: The first paragraph says that,
17 yes, the revised groundwater model submitted is
18 adequate to support the design of the RWS.

19 BY MR. BUTLER:

20 Q And as such, DERM hereby approves the phase
21 one RAP subject to the following conditions, right?

22 A Right. That's what it says here.

23 Q I'd ask you to turn back to where we were
24 looking earlier, paragraph 17-B(1) of the same exhibit.
25 It's on page five.

1 **CHAIRMAN BROWN: Five of 24.**

2 THE WITNESS: Yes.

3 BY MR. BUTLER:

4 Q Do you have that?

5 A Yes, I do.

6 Q Just confirm the reference to the phase one
7 **RAP, is referring to approval of the phase one RAP, FPL**
8 **was to submit with respect to design, permitting and**
9 **constructing Biscayne Aquifer Recovery Well System,**
10 **would you agree?**

11 A Where are you reading that from, please?

12 Q Sorry. In paragraph 17-B(1) where it
13 **discusses phase one.**

14 A Yes.

15 Q Okay. So would you agree that DERM approved
16 **FPL's design for the recovery well system in May 2017?**

17 A Yes. DERM has approved of FPL's RWS system.

18 MR. BUTLER: Thank you. That's all the
19 cross-examination I have. Thank you, Dr. Panday.

20 CHAIRMAN BROWN: All right. FIPUG.

21 MR. MOYLE: We have no questions.

22 CHAIRMAN BROWN: SACE.

23 MR. CAVROS: We have no questions.

24 CHAIRMAN BROWN: Staff.

25 MR. MURPHY: We have just a few questions.

1

EXAMINATION

2 BY MR. MURPHY:

3 Q Hey, Dr. Panday, I'm Charles Murphy on behalf
4 of Commission staff.

5 CHAIRMAN BROWN: Louder if you could, Mr.
6 Murphy.

7 MR. MURPHY: Get up closer.

8 BY MR. MURPHY:

9 Q On page four, line six of your testimony you
10 indicate that you will discuss the allocation percentage
11 for cost recovery, is that correct?

12 MR. BUTLER: I apologize. Could you repeat
13 the page reference?

14 MR. MURPHY: Page four, line six of his
15 testimony.

16 THE WITNESS: Yes.

17 BY MR. MURPHY:

18 Q And on page 42, line one through two, you
19 testified that, I express no opinion in my testimony
20 regarding whether the proposal or suggested basis to
21 allocate any cost to customers is appropriate. Is that
22 correct?

23 A That is right. What I mean by that is that I
24 express no opinion in my testimony regarding whether the
25 proposal of suggested basis to allocate any costs is

1 inappropriate. The reason is that, first of all, I'm
2 not a financial analyst so I do not directly deal with
3 the costs. Secondly, the proposal was based on a mass
4 basis of what was recovered from inside versus outside
5 and I'm not expressing any opinion whether that is a
6 valid method or not because we could argue about that
7 all night.

8 **Q And I guess the question is, what proposal are**
9 **we speaking of?**

10 A The proposal to allocate costs based on the
11 modeling that was done by Tetra Tech in 2016 for cost
12 allocation.

13 **Q FPL's proposal?**

14 A FPL's proposal, that is correct.

15 **Q Okay. Other places in your testimony you**
16 **appear to discuss allocation of costs between**
17 **containment and retraction, is that correct? Page 45,**
18 **lines 10 and 11, page 44 lines 9 through 14.**

19 A Yes, that is correct.

20 **Q Does cost allocation between containment and**
21 **retraction relate to how costs should be allocated to**
22 **customers?**

23 A From what I was given to believe -- and,
24 again, I'm not a financial expert or an expert on how
25 costs should be allocated to the ratepayers, but what I

1 was given to believe was that the retraction costs -- I
2 should say the containment costs can be appropriated to
3 ratepayers.

4 **Q I'm struggling how that fits with your other**
5 **testimony that you're not going to opine how it would**
6 **work, how it would apply to rates.**

7 A Sorry. I should have been more specific there
8 in my first sentence. What I meant was over there is
9 that the suggested basis for allocation, whether it was
10 a mass basis or a volume basis or whether -- or the
11 details of how the financials work for that, that's what
12 I meant in my first two lines on page 42.

13 **Q Does the cost allocation between containment**
14 **and retraction relate to the way that FPL proposes to**
15 **allocate cost?**

16 A Sorry. Can you repeat that again?

17 **Q Well, you're talking about an allocation**
18 **between containment and retraction.**

19 A That is correct.

20 **Q Is there a relationship between that concept**
21 **and the way that FPL proposes to allocate costs in this**
22 **case?**

23 A I'm not very clear what you're asking.

24 **Q What purpose are we to use to apply the**
25 **testimony of how you should allocate costs between**

1 **containment and retraction? Why do you say this? To**
2 **what end?**

3 A Yes. What I say, and I said that in my
4 summary opening statement, as well, is that if it was to
5 be on a mass basis, which is how FPL's contractor has
6 allocated costs, then the costs -- then that is what I
7 refer to and then the following part of my testimony
8 suggests that it should not -- that itself also is not
9 appropriate.

10 MR. MURPHY: That's all I have. Thank you.

11 CHAIRMAN BROWN: Thank you. Commissioners.

12 Commissioner Polmann.

13 COMMISSIONER POLMANN: Thank you, Madam

14 Chairman. Good afternoon, Doctor.

15 THE WITNESS: Good afternoon, Commissioner.

16 COMMISSIONER POLMANN: Let's follow on to the

17 line of questioning that we were just on from Mr.

18 Murphy, on that same page, page 42 of your direct.

19 THE WITNESS: Yes.

20 COMMISSIONER POLMANN: On line three. You

21 referred using the words remediation and then

22 prevention/containment.

23 THE WITNESS: Yes.

24 COMMISSIONER POLMANN: Do you believe you have

25 an understanding of -- in the field, the nature of

1 the infrastructure and then the operation and
2 maintenance, in concept, of what would be required
3 to implement remediation and also to implement
4 their prevention containment, based on your
5 experience with other projects elsewhere?

6 THE WITNESS: Yes, I do.

7 COMMISSIONER POLMANN: Okay. So remediation
8 is a -- is an activity to -- can you kind of fill
9 in that -- the rest of that sentence? What is it
10 that needs to happen there?

11 THE WITNESS: In this specific case,
12 remediation talks about pulling back the
13 hypersaline plume to within the property boundary
14 of FPL.

15 COMMISSIONER POLMANN: Okay. So in order to
16 do that, will there be a need to install certain
17 infrastructure, wells and the pumping equipment and
18 so forth? Is that your understanding?

19 THE WITNESS: My understanding is that they
20 are proposing to install these wells, yes.

21 COMMISSIONER POLMANN: Okay. And then
22 obviously they need to be operated. So there's a
23 capital component and then there's an operating
24 component. Is that your understanding?

25 THE WITNESS: Yes.

1 COMMISSIONER POLMANN: Now, is it similar in
2 nature to the prevention and containment that there
3 also would be an infrastructure component and an
4 operating expense? Is that your understanding?

5 THE WITNESS: My understanding is, at least
6 for the RW system, it is the same system in that
7 they are breaking it up into a containment section
8 and a remediation section. Then, yes, for that
9 containment section there will also be an
10 operating -- well, for the wells themselves there
11 will be an operating cost and a capital cost.

12 COMMISSIONER POLMANN: Okay. So there may or
13 may not be additional infrastructure for
14 prevention, containment and some other -- beyond
15 the RWS system. Regardless, the concept is that
16 there's capital costs, there's operating costs,
17 there's a set of infrastructure. And then what
18 you're saying here, in lines two and three, is if
19 there is to be an allocation between those, and
20 what comes down to is the complicated issue is
21 operating and expense and maintenance and so forth,
22 and let's take that as a premise, is if there's
23 going to be that allocation, your opinion is that
24 the percentages proposed by FPL are not supported
25 by the evidence. That's what this statement says.

1 THE WITNESS: Yes, that is correct.

2 COMMISSIONER POLMANN: So the evidence being
3 the modeling analysis by Tetra Tech?

4 THE WITNESS: Yes, that is correct.

5 COMMISSIONER POLMANN: Okay. Is there
6 additional evidence that you rely upon other
7 than -- and I mean in the sense of FPL's
8 proposal -- anything other than the Tetra Tech
9 analysis?

10 THE WITNESS: No, I do not. That is solely on
11 the Tetra Tech analysis.

12 COMMISSIONER POLMANN: All right. Thank you.
13 Then I'll try not to attack lines one and two.

14 All right. Let's go back to earlier parts of
15 your direct. The same document. Okay. On page 24
16 of your direct testimony, the bottom of the first
17 full paragraph looking that lines 11 through 13,
18 review that sentence for us.

19 THE WITNESS: Yes. The saltwater wedge did
20 not reach equilibrium within the 25-year simulation
21 period for these simulations, which considered the
22 extent of hypersaline water in the CCS.

23 COMMISSIONER POLMANN: I assume it was
24 purposeful in your writing to distinguish saltwater
25 wedge from hypersaline water, is that correct?

1 THE WITNESS: Yes, that is correct, because
2 that is the way it was worded also in this document
3 by Hughes.

4 COMMISSIONER POLMANN: And is this a
5 conclusion, this sentence, is that taken from the
6 work of Hughes or is that your writing?

7 THE WITNESS: I don't recall if it was exactly
8 the words of Hughes, but --

9 COMMISSIONER POLMANN: Okay. Is this a
10 conclusion that you've made where you've taken this
11 conclusion, perhaps paraphrase, but you've taken
12 this assertion from the work of others?

13 THE WITNESS: I have taken this assertion from
14 the work of Hughes 2009, yes.

15 COMMISSIONER POLMANN: Okay. Do you agree
16 with it? Did you review that work and you're
17 relying upon it in any regard?

18 THE WITNESS: I reviewed the paper and
19 hydrogeology journal, which I reference here. I do
20 not have the model itself to review that.

21 COMMISSIONER POLMANN: Can you describe for us
22 your understanding in this context and with regard
23 to the analysis that you performed the -- describe
24 for us the concept of equilibrium?

25 THE WITNESS: Yes. Certainly, I can. By

1 equilibrium, what I mean is that if --

2 COMMISSIONER POLMANN: Let me clarify. What
3 you mean or what he meant? Is this your word
4 equilibrium or his word?

5 THE WITNESS: No. These are his words, and I
6 believe what is meant by equilibrium is that the
7 saltwater wedge continued to move and did not
8 stabilize, did not stop moving.

9 COMMISSIONER POLMANN: Okay. This says that
10 equilibrium was not reached, so define what is
11 meant by that which was not reached. What is
12 equilibrium?

13 THE WITNESS: Equilibrium means that for the
14 system everything stabilizes and it had not
15 stabilized, is what this report suggested.

16 COMMISSIONER POLMANN: Okay. Is there --
17 is that essentially similar to a steady state? Are
18 those interchangeable words or if there some
19 distinction? Because there's use of the phrase or
20 the words, steady state, elsewhere in your
21 testimony.

22 THE WITNESS: Yes, in general, equilibrium
23 would mean that it reached a steady state
24 condition, but there can be movement in the sense
25 of seasonal movement, but so in a quasi-steady

1 state sense is what I meant by equilibrium. And
2 this analysis, for example, did not look at
3 seasons. So it was focused on how the CCS water
4 was moving in the aquifer and that did not reach
5 equilibrium.

6 COMMISSIONER POLMANN: Can you conceive of any
7 circumstance at this facility on FPL property, and
8 I'm going to use this phrase almost for
9 entertainment, in the vicinity of the property?
10 Can you conceive of any circumstance under and what
11 conditions that equilibrium or steady state would
12 be achieved or would occur including the operation
13 of the project that's proposed?

14 THE WITNESS: Steady state, like
15 I mentioned --

16 COMMISSIONER POLMANN: That's first a yes or
17 no. Can you conceive of any circumstance that it
18 would occur -- steady state?

19 THE WITNESS: No in the sense of that there
20 are seasonal effects, but yes in the sense that on
21 a quasi-steady state basis that it reaches some
22 stable zone in which it would move and does not
23 continue to move further, and that is what I meant
24 by equilibrium or by steady state.

25 COMMISSIONER POLMANN: Okay. Thank you. In

1 the next paragraph refers to your Exhibit SP-3 in
2 demonstrative 17, and it's reproduced from Hughes.

3 THE WITNESS: Yes.

4 COMMISSIONER POLMANN: I didn't read the
5 Hughes paper, but you indicated that you did. And
6 there's some discussion here and it's just simply
7 unclear to me why you included those in your
8 testimony and I'm wondering how this is meaningful
9 and useful for decision-making. Is it informative
10 in some way simply or is it useful for
11 decision-making with regard to implementing the
12 project out in the field -- or how is this used?

13 THE WITNESS: This is not used for
14 decision-making in the sense of retracting the
15 hypersaline plume. I mention it here, because all
16 the agreements that I saw between the Flood Control
17 District and now the Water Management District and
18 FPL do not talk about the hypersaline plume. They
19 talk about salinity, saline wedge. So over here --
20 right.

21 COMMISSIONER POLMANN: All right. Thank you.
22 We'll turn to page 25, and I think this is an
23 important point, on 13 through 17. On line 13, the
24 sentence that starts, in my expert opinion, and it
25 ends with, the models of Tetra Tech are a

1 reasonable representation of the saltwater
2 intrusion processed and hydrogeology of the
3 Biscayne Aquifer in the vicinity of -- and thank
4 you so much for using that phrase -- of the CCS.
5 And do you mean, the models of Tetra Tech, by that
6 phrase do you mean the groundwater flow and
7 transport model?

8 THE WITNESS: Yes, I specifically mean the
9 three-dimensional variable-density groundwater flow
10 and transport model.

11 COMMISSIONER POLMANN: Okay. So you accept
12 that model as -- it says a reasonable
13 representation. So you find it to be useful and
14 appropriate tool for analysis at this site?

15 THE WITNESS: That is correct. For what we
16 know right now, I find that it is appropriate and a
17 useful for decision-making.

18 COMMISSIONER POLMANN: Okay. Thank you.
19 Let's go to page 28, please. Starting on line
20 eight. The Biscayne Aquifer is about 100 feet
21 thick. I'm going to address this right here. In
22 vicinity of -- is the phrase in the vicinity of a
23 term of art in your profession? Do you understand
24 what I mean? A term of art? Is that -- do you
25 represent yourself as a hydrogeologist groundwater

1 modeling? And what are the categories of expertise
2 that you're representing?

3 THE WITNESS: Yes. I am a groundwater modeler
4 and basically for hydrogeology I understand
5 hydrogeology and saltwater intrusion.

6 COMMISSIONER POLMANN: And your degrees are in
7 engineering, is that correct?

8 THE WITNESS: My degrees are in engineering,
9 yes.

10 COMMISSIONER POLMANN: So when we say, in the
11 vicinity of, does that mean at a specific point
12 location?

13 THE WITNESS: No, but generally I meant that
14 beneath the CCS, in general around the CCS.

15 COMMISSIONER POLMANN: Okay. I see that
16 phrase used often and would that be your
17 experience, as well? It's used often in literature
18 and in project reports? Do you think that's a
19 common phrase?

20 THE WITNESS: I'm not sure, Commissioner, but
21 I've used it just to indicate that beneath the CCS
22 and immediately surrounding the CCS.

23 COMMISSIONER POLMANN: Okay. Thank you. All
24 right. Back to the point here, other than that
25 one. It says about 100 feet. Can you give us what

1 you mean there? Is it 100 feet plus or minus one
2 foot, ten feet, 50 feet or --

3 THE WITNESS: Yes, I believe it's between 80
4 and 100 feet beneath the CCS.

5 COMMISSIONER POLMANN: Okay. Thank you. And
6 with regard to the monitoring wells that are on the
7 property, and adjacent to the property, FPL
8 property, do you know -- do you have knowledge of
9 the depth of those monitoring wells, water quality
10 wells?

11 THE WITNESS: In general --

12 COMMISSIONER POLMANN: I just need a general
13 answer.

14 THE WITNESS: Yes. FPL's contractors have
15 indicated the depth at which measurements were made
16 for chlorides in the wells.

17 COMMISSIONER POLMANN: Okay. Is it -- do you
18 know any cases -- any instances within -- across
19 the set of monitoring wells they fully penetrate
20 down to about 100 feet?

21 THE WITNESS: No, I do not.

22 COMMISSIONER POLMANN: Okay. You're not
23 aware?

24 THE WITNESS: I --

25 COMMISSIONER POLMANN: Or --

1 THE WITNESS: -- I am not aware, but in
2 general the documents that I have reviewed do not
3 indicate that they have gone all the way down to
4 the bottom.

5 COMMISSIONER POLMANN: Okay. From the
6 material you have reviewed, is it your
7 understanding that within the Biscayne Aquifer,
8 which is the limestone formation, that the
9 monitoring wells have a section in the limestone
10 that is what we call an open hole?

11 THE WITNESS: Yes, that is correct.

12 COMMISSIONER POLMANN: Okay. Thank you. As a
13 result of there being some length of the well being
14 open in the limestone, how would you characterize
15 the water sample and thus the water quality data
16 that are collected from that length of open hole?
17 How do you think of those data?

18 THE WITNESS: Yes, and I believe Mr. Anderson
19 talked about that also that in his rebuttal to my
20 testimony there was inaccuracies in measurement of
21 chlorides because it wasn't just a point sample,
22 but the sample was collected from the open hole and
23 that they could be mixing. So I would suggest that
24 if there was hypersalinity in that section, then
25 it's a mixed section, so probably there is some

1 water that is of even higher salinity and some
2 water of less salinity, which mixes. So that's how
3 I characterized the measurements.

4 COMMISSIONER POLMANN: All right. Thank you.
5 Let's go to page 31 of your direct testimony. On
6 the top of that page the first sentence indicates a
7 model demand, and this is the three dimensional
8 variable density model that we just talked about
9 produced by Tetra Tech. The model was divided
10 vertically into 11 numerical model layers from top
11 to bottom and so forth.

12 THE WITNESS: Yes.

13 COMMISSIONER POLMANN: Why are the modeled
14 layers important to your analysis?

15 THE WITNESS: The model layers are important
16 because they are at certain depths and FPL talks
17 about retraction from certain model layers so that
18 is why I talk about them, as well.

19 COMMISSIONER POLMANN: Okay. Thank you.
20 Let's go to page 32.

21 THE WITNESS: Yes.

22 COMMISSIONER POLMANN: On line 12 through 15
23 there is some discussion before that, but on line
24 12 it says, in any event. Can you read that
25 sentence through the end of the paragraph, please?

1 THE WITNESS: In any event, the combined
2 remedial measures proposed by FPL, which is
3 freshening and retraction wells, that's in
4 parenthesis, do not retract either the saline plume
5 that is for the west of the CCS or the hypersaline
6 portions immediately west of the CCS to the Turkey
7 Point boundary within the simulation period of ten
8 years.

9 COMMISSIONER POLMANN: Okay. Let's start at
10 the end of that. Within the simulation period of
11 ten years. And is that to say that it would never
12 occur?

13 THE WITNESS: Can you repeat that, please?

14 COMMISSIONER POLMANN: Given that your
15 sentence ends within the simulation period of ten
16 years, so the analysis was for a time limit within
17 ten years, is there any ability to conclude that it
18 would never occur?

19 THE WITNESS: I have not analyzed it for a
20 longer period.

21 COMMISSIONER POLMANN: Okay. Thank you. So
22 your statement, the combined remedial -- and I'm
23 paraphrasing here from within the sentence --
24 combined remedial measures do not retract the
25 saline plume. So you're interpreting their

1 analysis. And is this your conclusion that it does
2 retract the plume?

3 THE WITNESS: Yes, I've looked at the analysis
4 and my -- and we can see that it hasn't, from the
5 analysis itself, that --

6 COMMISSIONER POLMANN: You can -- you can see
7 that, is that correct?

8 THE WITNESS: Even Tetra Tech states that in
9 their own report that in the lower layers it did
10 not retract the plume in ten years.

11 COMMISSIONER POLMANN: Okay. So this gets
12 back to issue of the layers. So within the model
13 there are 11 layers and within particular layers of
14 that numerical model there is a saline plume west
15 of the CCS. Am I reading that in your words? I'm
16 interpreting your words here.

17 THE WITNESS: Right. Saline and hypersaline.
18 Both.

19 COMMISSIONER POLMANN: Okay. So is that to
20 infer the opposite that in some layers the salinity
21 does -- the model does show salinity below -- or
22 that water is below the salinity level that it's
23 met the requirements?

24 THE WITNESS: Yes, that is correct. In fact,
25 in the above layers the interceptor ditch was

1 effective. So there never was salinity in those
2 above model layers, up near the top of the aquifer.
3 The salinity increased with depth, yes.

4 COMMISSIONER POLMANN: Okay. Page 33 on line
5 seven, you start, because of deficiencies in the
6 way the simulations were conducted.

7 THE WITNESS: Yes.

8 COMMISSIONER POLMANN: Could you clarify which
9 particular simulations you're referring to in that
10 sentence?

11 THE WITNESS: Yes. I was referring to the
12 simulation for the alternative 3-D model, which
13 combined both the freshening and the retraction
14 well system.

15 COMMISSIONER POLMANN: And your suggestion is
16 doing some analysis that does not use both at the
17 same time, is that correct?

18 THE WITNESS: My suggestion was that if he
19 looked at them individually then we could see the
20 impact of one versus that of the other.

21 COMMISSIONER POLMANN: If we could jump ahead
22 for a second to page 37. At the bottom of page 37
23 there is a question that's posed regarding other
24 options, and then the answer rolls over to the next
25 page. There is testimony here regarding

1 alternatives other than 3-D.

2 THE WITNESS: Excuse me. Sorry. Let me
3 just -- this on page 37 is --

4 COMMISSIONER POLMANN: I haven't asked you a
5 question.

6 THE WITNESS: Sorry.

7 COMMISSIONER POLMANN: Bottom of page 37 in
8 your direct.

9 THE WITNESS: Yes, that is specifically with
10 respect to the CCS and there were options for that
11 and there were also options for the groundwater
12 parts. So there were two separate questions. One
13 was for freshening itself of the CCS and the other
14 was for the groundwater component which included
15 the freshening of the CCS, as well as the
16 retraction well system. So for retraction also
17 there was several alternatives and for the CCS
18 freshening also they had evaluated several
19 alternatives. I just wanted to clarify that.

20 COMMISSIONER POLMANN: Thank you for answering
21 the question that I didn't ask. I gather from your
22 enthusiasm that you're fairly passionate about
23 this. That's okay. That wasn't a question either.
24 But since we're on that topic, did you find any of
25 those other analyses useful in forming your

1 opinion?

2 THE WITNESS: I did not look at the other
3 analysis in detail, but I did see that there were
4 other analysis performed, yes.

5 COMMISSIONER POLMANN: Thank you. The
6 remainder -- let's go back to page 33 and then I'm
7 just -- if you'll take me at face value here
8 because this is your testimony. If we, without
9 looking at -- well, let me just do this. On
10 line -- on page 33 and line 12, there is a
11 reference to layer eight.

12 THE WITNESS: Yes, that's correct.

13 COMMISSIONER POLMANN: On line 17 there's a
14 reference to layer eight and line 22 there's a
15 reference to layer 11.

16 THE WITNESS: Yes.

17 COMMISSIONER POLMANN: If we go over on the
18 next page, page 34, there's a reference to layers 8
19 and 11, and line 14 on page 34 is a reference to
20 line 8, and then on line 16 of page 34 is a
21 reference to line 11.

22 THE WITNESS: Yes.

23 COMMISSIONER POLMANN: I don't see you
24 reference any other layers in the model. Can you
25 just give me a very brief explanation of why layers

1 8 and 11 are of particular interest to you?

2 THE WITNESS: Yes. Layers 8 and 11 were what
3 were produced by Tetra Tech in their figures. So
4 these references I have also produced the same
5 figures as what they did, which was layers 8 and
6 layers 11. So I just did what they had done.

7 COMMISSIONER POLMANN: Okay. So a matter of
8 convenience to look at what they did and then you
9 did some comparison?

10 THE WITNESS: That is correct, and so I would
11 be consistent so we can evaluate everything.

12 COMMISSIONER POLMANN: Thank you for that
13 explanation. At the risk of going into a long
14 explanation let's look at -- and I prefer that we
15 not --

16 THE WITNESS: Short. It's short.

17 COMMISSIONER POLMANN: -- of the Chairman.

18 CHAIRMAN BROWN: Both of you, please.

19 COMMISSIONER POLMANN: Page 35.

20 THE WITNESS: Yes.

21 COMMISSIONER POLMANN: Line ten.

22 THE WITNESS: Yes.

23 COMMISSIONER POLMANN: I'm quoting you: My
24 analysis shows that 31 MGD of Floridan aquifer
25 water would be required to freshen the CCS. Maybe

1 I missed it. I didn't see clarity in your
2 testimony of how you came up with 31 MGD. As
3 briefly as you possibly can.

4 THE WITNESS: Yes, I can be very brief.

5 COMMISSIONER POLMANN: Let me be the technical
6 person. How did you do that?

7 THE WITNESS: Yes.

8 COMMISSIONER POLMANN: No, I don't need a
9 bunch of figures.

10 THE WITNESS: No, I'm not showing you a bunch
11 of figures. I'm just referencing myself. There
12 was a steady state model for the CCS, a water and
13 salt balance model of the CCS, which was conducted
14 by Tetra Tech. And what I had done is I looked at
15 that model and I changed one number, which is the
16 groundwater inflow to the CCS, the concentration of
17 groundwater inflow, and they had represented that
18 as 35, and if we look at what another of Tetra
19 Tech's -- one of FPL's contractor's documents, you
20 can see that the concentration there was 55. So I
21 just changed that number from 35 to 55 and the
22 result was 31 MGD for freshening, yes.

23 COMMISSIONER POLMANN: So this was essentially
24 a balance on water and the saline?

25 THE WITNESS: Yes.

1 COMMISSIONER POLMANN: Okay. Thank you.
2 We're getting there. Just a second.

3 I will forego any questions here in the
4 exhibits. That's all I have, Madam Chairman.

5 CHAIRMAN BROWN: Thank you, Commissioner
6 Polmann. Got to love your enthusiasm for these
7 issues. And redirect.

8 MS. MORSE: Thank you.

9 EXAMINATION

10 BY MS. MORSE:

11 Q Dr. Panday, Mr. Butler asked you a series of
12 questions about the various Water Management District
13 agreements over the years, correct?

14 A Yes.

15 Q And, in fact, didn't Dr. Butler also ask you
16 about DEP agreements -- I'm sorry -- Mr. Butler?

17 A Yes.

18 Q Did you see anything in the Water Management
19 District agreements preventing FPL from approaching the
20 district to request or suggest changes in the
21 interceptor ditch design?

22 A No. They could have approached them any time.

23 Q Same as to the water monitoring practices.

24 Was there anything in those -- in the Water Management

25 District agreements which prevented FPL from approaching

1 the Water Management District for changes?

2 A No.

3 Q And the same question as to the CCS
4 operations. Was there anything in those agreements
5 preventing FPL from alerting the Water Management
6 District of a need for change?

7 A No. There was nothing stopping them. And if
8 and when they did see salinity and hypersalinity
9 conditions, they -- I believe they should have gone to
10 the Water Management District.

11 Q Thank you. And similarly you were directed to
12 the April 2013, the letter seeking consultation from the
13 Water Management District by Mr. Butler. Was there, to
14 your knowledge, anything preventing FPL from itself
15 requesting consultation, seeking consultation with the
16 district?

17 A No. They could have sought consultation.

18 Q And going back to the 2013 letter seeking
19 consultation, that April 2013 letter that Mr. Butler
20 directed you to, did the Water Management District say
21 in that letter when it was exactly that they determined
22 that the saline water from the Turkey Point Cooling
23 Canal property had moved west of the L31 canal?

24 A I do not recall. I'll have to see the
25 document.

1 Q You can take a look at the document. It's
2 Exhibit MSW-7.

3 A I have so many documents over here.

4 Q I understand.

5 CHAIRMAN BROWN: Do you have a paper copy
6 maybe? I do.

7 MS. MORSE: We'll get you a paper copy,
8 Doctor.

9 CHAIRMAN BROWN: Take the book. It's 7. It's
10 right there. If she's going to ask more questions,
11 you might want to just take that.

12 MS. MORSE: MSW-7.

13 CHAIRMAN BROWN: You can use my book.

14 THE WITNESS: Can you repeat the question,
15 please?

16 BY MS. MORSE:

17 Q Okay. In the April 26 -- I'm sorry --
18 April 16, 2013 letter from the South Florida Water
19 Management District, specifically paragraph two, on
20 which you were questioned on direct, did that letter
21 say -- did the district specify when they determined
22 that the saline water from the Turkey Point property had
23 moved west?

24 A No, it doesn't that in the letter.

25 Q Thank you. And again returning to the series

1 of questions Dr. Butler asked you about when he walked
2 you through a number of regulatory agreements with the
3 regulatory agencies, did anything in those documents Mr.
4 Butler walked you through state that FPL was relieved of
5 its obligation to comply with all regulations and
6 permits and agreements pertaining to FPL's operation of
7 the CCS?

8 A No, it did not.

9 MS. MORSE: All right. Thank you, Dr. Panday.
10 That's all my questions.

11 THE WITNESS: Thank you.

12 CHAIRMAN BROWN: Thank you, Ms. Morse. We
13 have three exhibits here associated with Dr.
14 Panday's prefiled testimony.

15 MS. MORSE: Yes, Madam Chair. I'd like to
16 move those into evidence.

17 CHAIRMAN BROWN: Seeing no objection from FPL,
18 we will go ahead and move 44, 45 and 46 into the
19 record.

20 And, Dr. Panday, you are excused for the
21 evening.

22 THE WITNESS: Thank you, Madam Chair.

23 CHAIRMAN BROWN: Safe travels back to
24 Virginia.

25 (Whereupon, Exhibit Nos. 45 - 46 were received

1 into evidence.)

2 CHAIRMAN BROWN: Okay. We are at 6:00 right
3 now and you all are probably wondering, are we
4 going to eat. We will eat. I would like to start
5 with the first witness on rebuttal and see how far
6 we can get. I'm thinking we take a dinner break
7 around 7:00, and 45 minutes to an hour, roughly.

8 And, with that, FPL would you like to call
9 your first rebuttal witness?

10 MR. BUTLER: May we have one moment to discuss
11 order of witnesses, please?

12 CHAIRMAN BROWN: Absolutely.

13 Mr. Ferguson first?

14 MR. BUTLER: No, we're just going to stay with
15 the same order we got, thank you, though.

16 CHAIRMAN BROWN: I was contemplating that,
17 too, but --

18 MR. BUTLER: He was pretty disappointed when
19 he heard it wasn't going to work.

20 CHAIRMAN BROWN: I was thinking about it, but
21 I said, let's just go with Mr. Sole.

22 MS. CANO: FPL calls Mr. Sole back to the
23 stand.

24 CHAIRMAN BROWN: Hopefully it won't be
25 five-and-a-half hours on rebuttal.

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EXAMINATION

BY MS. CANO:

Q Mr. Sole, did you prepare and cause to be filed 13 pages of rebuttal testimony in this proceeding on September 25th, 2017?

A I did.

Q Do you have any changes or revisions to your rebuttal testimony?

A I do not.

Q If I were to ask you the same questions contained in your prefiled rebuttal testimony, would your answers be the same?

A They would.

MS. CANO: Chairman Brown, we ask that the prefiled rebuttal testimony be inserted into the record as though read.

CHAIRMAN BROWN: We'll go ahead and insert into the record Mr. Sole's prefiled rebuttal testimony.

(Whereupon, prefiled testimony was inserted.)

1 **BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION**
2 **FLORIDA POWER & LIGHT COMPANY**
3 **REBUTTAL TESTIMONY OF MICHAEL W. SOLE**
4 **DOCKET NO. 20170007-EI**
5 **SEPTEMBER 25, 2017**
6

7 **Q. Please state your name and business address.**

8 A. My name is Michael W. Sole and my business address is 700 Universe
9 Boulevard, Juno Beach, Florida 33408.

10 **Q. Have you previously filed testimony in this docket?**

11 A. Yes.

12 **Q. Are you sponsoring any rebuttal exhibits?**

13 A. Yes, I am sponsoring the following exhibit:

- 14 • MWS-20 FPL and SFWMD Fourth Supplemental Agreement

15 **Q. What is the purpose of your rebuttal testimony?**

16 A. The purpose of my testimony is to respond to the testimony provided by Dr.
17 Sorab Panday on behalf of the Office of Public Counsel (“OPC”).
18 Specifically, I address his allegations that (i) FPL should have taken corrective
19 actions sooner with respect to hypersalinity in the Turkey Point Cooling Canal
20 System (“CCS”) and, ironically, that (ii) FPL is now moving too quickly to
21 implement the required corrective actions.

22 **Q. Please summarize your rebuttal testimony.**

1 A. OPC witness Panday makes two ill-founded criticisms of FPL’s evaluation
2 and response to hypersalinity associated with the CCS. First, he relies on the
3 benefits of hindsight to opine as to what he believes should have motivated
4 FPL corrective actions in earlier years. However, his conclusions are at odds
5 with the evaluations and analyses of the CCS that were developed at the time,
6 through a robust regulatory process involving private, local and state experts
7 in the field of hydrogeology over many decades. Second, OPC witness
8 Panday criticizes the corrective actions for the CCS that FPL is presently
9 taking with the concurrence of the relevant regulatory agencies. In doing so,
10 he ignores ample evidence that FPL’s approach has been open and
11 collaborative, working with Miami-Dade County (“MDC”), the Florida
12 Department of Environmental Protection (“FDEP”), and the South Florida
13 Water Management District (“SFWMD”) which has resulted in a sound
14 project design in compliance with regulatory directives and in the best interest
15 of FPL customers and the environment. Because of these serious flaws, this
16 Commission should not rely on OPC witness Panday’s testimony in this
17 docket.

18

19 **FPL’S HISTORIC ACTIONS AND APPROACH**

20

21 **Q. Does OPC witness Panday’s testimony focus on the issues FPL has been**
22 **directed to address in the 2015 Consent Agreement between FPL and the**
23 **MDC Department of Environmental Resources Management (“2015**

1 **CA”) and the 2016 Consent Order executed by FPL and the FDEP (“2016**
2 **CO”), governing FPL’s abatement and remediation activities?**

3 A. No. OPC witness Panday’s testimony spends a considerable amount of time
4 discussing saline groundwater and the saltwater interface generally and
5 inappropriately contributes all movement of the saltwater interface to the
6 CCS. Moreover, he ignores the fact that FPL’s remediation obligations are on
7 the retraction of the *hypersaline* plume – not saline water or the saltwater
8 interface.

9
10 OPC witness Panday’s allegation that the CCS has been a major contributor to
11 the movement of the saltwater interface – and that FPL should have been
12 aware of that contribution decades ago – is simply unsupported by the facts.
13 While he briefly acknowledges the complex interaction of modern
14 developmental activities upon the rate and extent of saltwater intrusion (page
15 8 line 15), throughout the remainder of his testimony he ignores these facts
16 and inappropriately implies that any movement of the saltwater interface is the
17 result of movement of hypersaline water from the CCS into the Biscayne
18 Aquifer. The facts regarding the complex and challenging relationship
19 between the saltwater interface and the hypersaline plume are clearly
20 acknowledged in the April 2013 SFWMD letter (Exhibit MWS-6), on page 3
21 of 10 of the FDEP Administrative Order (Exhibit MWS-7) and in the 2016
22 CO (Exhibit MWS-12, page 12). His testimony is inconsistent with these
23 facts.

1

2 Recognizing this complicated relationship, the 2016 CO requires FPL to
3 complete an analysis that seeks to allocate relative contributions of *other*
4 entities or factors to the movement of the saltwater interface. Moreover, early
5 on in the monitoring of the CCS, the 1978 Salinity Evaluation report
6 referenced in witness OPC witness Panday's testimony noted that "No reliable
7 technique was found to distinguish between the relative contribution of
8 salinity increases from either natural intrusion or canal water and ground
9 water interchange." This is a rather key point that OPC witness Panday
10 ignores.

11

12 Because of the challenges created by this complex hydrogeological
13 relationship, it was not until the additional monitoring required in the 5th
14 supplemental agreement (Exhibit MWS-4) that FPL and the governmental
15 entities involved determined that corrective action was needed as evidenced in
16 the SFWMD's April 13, 2013 letter (MWS-6), FDEP Administrative Order
17 (MWS-7) and Miami-Dade Notice of Violation (MWS-8). Via a series of
18 regulatory requirements, FPL has committed to take corrective actions
19 addressing the movement of hypersaline water that originates in the CCS into
20 the saltwater intruded portion of the Biscayne Aquifer.

21 **Q. OPC witness Panday states that as early as 1978 and at least by 1990 or**
22 **1992, FPL should have known that saline water from the CCS was**

1 **intruding into groundwater outside of FPL's property. How do you**
2 **respond to this statement?**

3 A. OPC witness Panday is essentially trying to substitute his opinion for the
4 opinions of the independent investigators and regulatory agencies charged
5 with oversight of the CCS at the time the data he references was collected and
6 reported. Beginning with the design and construction of the CCS, FPL has
7 worked collaboratively with federal, state, and local agencies to make
8 decisions and take action to meet all applicable regulatory requirements
9 concerning the CCS.

10

11 FPL, as required by the regulatory agreements outlined in my July 19, 2017
12 direct testimony, performed monitoring beginning in the earliest days of the
13 CCS to understand the extent and movement of saline groundwater. This
14 monitoring was performed so as to put both FPL and the regulators in a good
15 position to evaluate the impact of the CCS and assess whether there was a
16 need and sufficient information to implement further measures. Throughout
17 the CCS's operating history, FPL has provided the relevant environmental
18 regulatory agencies with monitoring reports and any monitoring data that has
19 been requested. Until quite recently, that large body of data did not lead any
20 of the relevant regulators to conclude that the impacts of the CCS warranted
21 implementing any further measures.

22 It is telling that OPC witness Panday has chosen to discard the conclusions
23 provided in the three specific reports that he references. The conclusions on

1 page 105 of the January 5, 1978 report clearly state “that there are not forces
2 or mechanisms at work within the system that can lead to massive ongoing
3 salt water intrusion of the aquifer and that any increases in salinity will be
4 limited to the near vicinity of the system.” The August 30, 1990 Dames and
5 Moore monitoring report concludes on page 11 that “...the increase in
6 ground-water salinity has been very small and does not represent significant
7 change in the wedge movement or configuration...We see no indication that
8 these small changes are due to other than natural ground-water elevation/salt
9 water wedge dynamics.” Finally, the authors of the 1992 Dames and Moore
10 Report note that “the increase in ground-water salinity has been very small
11 and does not represent significant change in the wedge movement or
12 configuration. With the continuation of normal to increased rainfall amounts
13 and ground-water levels, wedge movement has stopped and chloride contents
14 at respective locations has returned to the historical limits.” These reports and
15 their conclusions were reviewed by the appropriate regulatory agencies
16 without comment or direction for further action on the part of FPL. They
17 speak for themselves as refutation of OPC witness Panday’s “Monday
18 morning quarterbacking.”

19
20 In summary, the best experts working with the best information available
21 provided opinions that advised the decision-making of FPL and the regulatory
22 agencies. OPC witness Panday’s critique of that decision-making benefits
23 from the luxury of hindsight gained by being able to survey the full body of

1 data collected for more than 45 years. His conclusions were not apparent to
2 FPL, the regulatory agencies or the authors of these many reports as the
3 events, data and analysis occurred.

4

5 Only recently has the requisite certainty about the need for corrective actions
6 evolved out of the extensive monitoring and technological analyses conducted
7 within the last several years. OPC witness Panday's conclusions do not
8 reflect what was known and knowable at the time of earlier decision-making.

9 **Q. Was FPL prudent in its selection and oversight of GeoTrans, later
10 TetraTech, for the monitoring, analysis, and reporting it provided?**

11 A. Yes. GeoTrans is well recognized in the fields of hydrogeology and geology,
12 and FPL has worked to ensure that FPL and its consultants were meeting the
13 expectations of the regulatory agencies. Moreover, aspects of the data
14 collection, analysis and formulation of alternative remediation strategies that
15 were performed by GeoTrans/Tetra Tech have also been conducted
16 contemporaneously by other experts in relation to the CCS.

17 **Q. Did FPL follow the guidance and requirements embodied in the permits
18 and agreements governing the operation and monitoring of the CCS?**

19 A. Yes. The original agreements provided specific direction, and were
20 supplemented as information was developed and analyzed in a publicly
21 accessible process. For example, the Fourth Supplemental Agreement
22 between FPL and the SFWMD governed the operation of the Cooling Canal
23 System from 1983 to 2009. The document includes a finding by the SFWMD

1 that "...the obligations undertaken by FPL and the CSFFCD in the original
2 Agreement and the supplemental agreements have been satisfactorily
3 performed to date." In conjunction with the FDEP Site Certification process,
4 the Fifth Supplemental Agreement was developed, including increased
5 monitoring and collection that would ultimately provide a sound basis upon
6 which to determine the full extent of impacts and actions to mitigate and
7 remediate those impacts.

8 **Q. Please respond to OPC witness Panday's claim on page 21 that FPL did**
9 **not provide required monitoring reports to the SFWMD in 2005, 2006,**
10 **and 2007.**

11 A. OPC witness Panday is searching for problems where none exist. Although
12 they were delayed, the monitoring reports for 2005, 2006 and 2007 were
13 ultimately provided to the SFWMD. After reviewing those reports in detail,
14 the SFWMD chose not to invoke consultation or otherwise direct that FPL
15 take additional actions. FPL's 2008 and 2009 monitoring reports were timely
16 filed and, as noted by OPC witness Panday (at page 21), the SFWMD
17 expressed a desire for additional data and analysis based on the information in
18 those reports. Ultimately, the SFWMD still required several years of
19 additional data before determining in 2013 to invoke consultation on
20 corrective actions.

21 **Q. Do you believe that FPL should have taken corrective actions on its own**
22 **initiative, beyond the regulatory requirements for monitoring and**
23 **operating the CCS?**

1 A. No, I don't think that it would have been reasonable for FPL to undertake
2 expensive corrective actions unilaterally, without a clear understanding of the
3 environmental impacts and regulatory approval or direction to do so. In the
4 early years of CCS operation, FPL and the involved agencies did not
5 determine that further actions were warranted. Once it was observed that
6 migration of hypersaline water was indicated, FPL and the agencies
7 determined that the most prudent course of action was to assess the issue
8 through more extensive data collection and analysis. Following the collection
9 and analysis of that information, remediation options were developed and
10 tested through the application of the most comprehensive groundwater model
11 developed for the area. All of these efforts took time and involved significant
12 costs.

13

14 Performing expensive environmental related activities beyond the
15 environmental compliance activities required by regulatory bodies without
16 understanding the cause and contribution is not something FPL believes is
17 prudent as a regular course of action, a view shared by our environmental
18 regulators. FPL prudently manages its environmental compliance
19 expenditures by working closely with regulatory agencies and developing
20 cost-effective responses to regulatory requirements. With respect to the CCS,
21 as I have previously noted, FPL has continuously worked with federal, state,
22 and local environmental regulatory agencies to monitor environmental

1 conditions in and around the CCS, and collaboratively determine appropriate
2 corrective or remedial activities.

3

4

SELECTION OF REMEDIAL ALTERNATIVE

5

6 **Q. Does your review of OPC witness Panday’s testimony indicate that he has**
7 **a strong grasp of the regulatory structure and requirements of the 2015**
8 **CA or the 2016 CO?**

9 A. No. His review and commentary do not appear to be aligned with the specific
10 objectives of the agreements and may explain why his review is critical of
11 FPL’s and the regulatory agencies’ collective judgment.

12

13 The review appears to be misdirected in three notable facets. First, OPC
14 witness Panday does not acknowledge the scope of the requirements in the
15 2015 CA and the 2016 CO, which direct FPL both to “abate” the source of the
16 hypersalinity through freshening of the CCS surface water and to “remediate”
17 the hypersaline plume through application of the Recovery Well System
18 (“RWS”). Second, his testimony is critical of the impact the RWS would
19 have on movement of the saltwater interface. He fails to appreciate that
20 neither the 2015 CA nor the 2016 CO addresses movement of the saltwater
21 interface; rather, they are directed at arresting and retracting the *hypersaline*
22 plume. Finally, his criticism does not acknowledge the value of moving

1 forward now with a functional project, which can always be refined later if
2 warranted by actual, operational data.

3 **Q. OPC witness Panday asserts that the RWS component of the approved**
4 **mitigation response will not be reasonably effective in retracting the**
5 **hypersaline plume. Do you agree?**

6 A. No. The RWS is designed based on a well understood remediation
7 methodology, and guided by a site specific advanced variable density solute
8 transport groundwater model developed for this purpose. FPL selected
9 corrective action Alternative 3D (which includes the RWS) only after
10 evaluating a number of credible alternatives providing a range of outcomes
11 and impacts. Environmental and practical constraints were considered, with
12 an overall desire to move forward and take action. FPL and the combined
13 reviewing agencies have assessed the RWS and concluded that it is a strong,
14 positive step forward in addressing the need to retract the hypersaline plume.
15 Moreover, the implementing direction from the regulatory agencies
16 anticipates the need to monitor the response of the plume to the RWS and
17 contemplates that the system may be modified to improve its effectiveness,
18 once actual performance data can be collected and integrated. This iterative
19 approach is a reasonable and appropriate compromise between the need to
20 begin corrective actions promptly and the desire to optimize system
21 performance over time.

22

1 In criticizing the planned use of the RWS, OPC witness Panday must also be
2 asserting that FPL should seek out and study additional, unspecified
3 alternatives to achieve the retraction of the hypersaline plume. This would
4 delay commencement of corrective action substantially. Thus, his position on
5 this point stands in stark and ironic contrast to his criticism that FPL failed to
6 take unilateral corrective actions much sooner, when they necessarily would
7 have been based on far less complete data and understanding of the CCS and
8 the surrounding hydrogeological conditions. It is difficult to reconcile the two
9 positions.

10

11 Moreover, OPC witness Panday's reticence to accept the corrective actions
12 that are embodied in the 2015 CA and 2016 CO appears to be based on the
13 false premise that a perfect solution can potentially be achieved at some future
14 point. This brings to mind the old adage that "the perfect is the enemy of the
15 good." In the practical world, FPL and the regulatory agencies have
16 determined that the RWS presents a logical and reasonable means of
17 addressing the hypersaline plume without further postponing meaningful
18 action.

19 **Q. Are FPL customers well served by undertaking the combined projects of**
20 **CCS freshening using the Floridan wells and remediating the hypersaline**
21 **plume using the RWS?**

22 A. Yes. The combined projects address an unintended consequence of the CCS
23 design and operation that evolved slowly, over many years. Once those

1 unintended consequences were definitively identified, the project design was
2 informed by extensive data collection, in-situ geologic sampling (core
3 borings) and a sophisticated variable density solute transport groundwater
4 model. The resulting project design addresses the 2015 CA and 2016 CO
5 directives using known methods and with the ability to monitor, measure and
6 adapt the implementation as further actual (not modeled) data is obtained.
7 This deliberate and highly structured approach offers the best path to quickly
8 begin addressing the major concerns.

9 **Q. Does this conclude your testimony?**

10 A. Yes.

1

2 BY MS. CANO:

3 Q Did you also sponsor an exhibit to that
4 rebuttal testimony?

5 A I did.

6 Q And that was Exhibit MWS-20?

7 A Correct.

8 MS. CANO: I would note for the record it's
9 been premarked for identification as Exhibit 47.

10 CHAIRMAN BROWN: Thank you.

11 BY MS. CANO:

12 Q Would you please provide a summary of your
13 rebuttal testimony to the Commission?

14 A I will. Good afternoon, Chairman,
15 Commissioners. My rebuttal testimony responds to two
16 allegations and the testimony of Public Counsel witness,
17 Sorab Panday. First, Witness Panday alleges that
18 reports indicated the need to take corrective actions as
19 early as 1978 and at least by 1992 to address westward
20 movement of the saltwater interface caused by the CCS.
21 While these allegations may seem plausible, with the
22 benefit of hindsight, they are at odds with the
23 valuations and the conclusions by the professional
24 consultants conducting the work at the time, as well as
25 those of the regulators charged overseeing the cooling

1 canal system. From the earliest days of the cooling
2 canal system, FPL has performed specific monitoring as
3 required by the relevant regulators to understand the
4 extent and movement of the saline groundwater. This
5 monitoring was performed to put both FPL and the
6 regulators in a good position to evaluate the impacts of
7 the CCS and assess whether there was a need to implement
8 further protective measures.

9 Until quite recently, that large body of data
10 did not leave the consultants, FPL, or any of other
11 relevant regulators to conclude that further measures
12 were warranted. OPC Witness Panday would discard the
13 conclusions provided in the three specific reports that
14 he cites and instead play the role of the regulator and
15 asserting the need for corrective action. Those reports
16 and their conclusions were provided to the appropriate
17 regulatory agencies and lead to no comment or direction
18 for further action on the part of FPL. Witness Panday
19 suggests that FPL should have taken action regardless,
20 but this is unreasonable and unrealistic. It is not
21 normal course of action, nor should it be, for FPL to
22 undertake expensive corrective actions unilaterally
23 without a clear understanding of the environmental
24 impacts and with no regulatory direction to do so.

25 My rebuttal also addresses Witness Panday's

1 criticism of the corrective actions that FPL is
2 undertaking at the CCS. In his criticism he engages
3 even more second-guessing of decisions that are properly
4 the environmental regulators' to make. Moreover, his
5 review and commentary do no appear even to be aligned
6 with the specific objectives of the regulatory orders
7 which may explain why his review is critical of the
8 regulatory agency's collective judgment.

9 Witness Panday's review appears to be
10 misdirected in three notable facts. First, he does not
11 acknowledge the scope of requirements in the 2015
12 consent agreement and the 2016 consent order, which
13 directed FPL to both abate the source of the
14 hypersalinity through freshening of the CCS surface
15 water and to remediate the hypersaline plume through
16 application of the recovery well system.

17 Second, he questions the impact of the
18 recovery well system would have on movement of the
19 saltwater interface, apparently failing to appreciate,
20 however, that neither of the 2015 consent agreement, nor
21 the 2015 consent order, addressed movement of the
22 saltwater interface. Rather, both documents are
23 directed at arresting and retracting the hypersaline
24 plume.

25 Finally, his criticism does not acknowledge

1 the importance of the implementing reasonable corrective
2 actions now based on the best information currently
3 available. The RWS employees well understood remedial
4 technology and was selected after evaluating a number of
5 credible alternatives. The relevant regulatory agencies
6 have reviewed and approved its design and construction
7 to expedite recovery of the hypersaline plume. In
8 criticizing the plan use of the RWS, Witness Panday
9 proceeds -- excuse me -- provides no alternatives and
10 seemingly asserts that FPL should seek out and study
11 additional unspecified alternatives to achieve the
12 retraction of the hypersaline plume. This would delay
13 corrective actions substantially. Thus, his position on
14 this point stands in stark and ironic contrast to his
15 criticism that FPL failed to take unilateral corrective
16 actions many years ago based on far-less competent
17 information. I find it impossible to reconcile those
18 two positions.

19 And that completes the summary of my rebuttal
20 testimony.

21 MS. CANO: FPL tenders the witness for
22 cross-exam.

23 CHAIRMAN BROWN: Thank you. Mr. Rehwinkel.

24 MR. REHWINKEL: Thank you, Madam Chairman.

25 Good evening, Mr. Sole.

1 THE WITNESS: Good evening, Mr. Rehwinkel.

2 MR. REHWINKEL: It seems like it's been a
3 year, but it's been a few hours.

4 Madam Chairman, I believe -- I think staff has
5 passed out a couple of exhibits.

6 CHAIRMAN BROWN: Yes. We have them here.

7 MS. CANO: I'm sorry. I don't believe we have
8 them yet.

9 CHAIRMAN BROWN: I'm sorry I thought it was
10 the pile of exhibits.

11 MR. REHWINKEL: And these can looked at by the
12 witness. They don't have to be turned upside down.

13 CHAIRMAN BROWN: Okay. I still have a pile of
14 exhibits that you didn't use from direct.

15 THE WITNESS: Sadly, I don't know where those
16 are on the desk. It kind of got --

17 MR. REHWINKEL: I don't think you need to
18 worry about those.

19 THE WITNESS: Okay.

20 MR. REHWINKEL: I'm going to ask you --

21 CHAIRMAN BROWN: Thank you, Mr. Rehwinkel, for
22 handing these out. So would you like to label them
23 now?

24 MR. REHWINKEL: Yes, Madam Chairman.

25 CHAIRMAN BROWN: We're at 81.

1 MR. REHWINKEL: Eighty-one would be the 1990
2 Dames and Moore excerpts.

3 CHAIRMAN BROWN: All right. We'll label it
4 that.

5 MR. REHWINKEL: It's Dames and Moore 1990
6 Appendix A.

7 CHAIRMAN BROWN: Okay. We'll label it that.

8 MR. REHWINKEL: Thank you. The second one is
9 really just for ease of reference. It's Panday
10 demonstratives four, five and six.

11 CHAIRMAN BROWN: Yeah, that's what we will
12 label it, as well. Eighty-two.

13 (Whereupon, Exhibit Nos. 81 - 82 were received
14 into evidence.)

15 MR. REHWINKEL: Thank you, Madam Chairman.

16 CHAIRMAN BROWN: You're welcome.

17 EXAMINATION

18 BY MR. REHWINKEL:

19 Q And, Mr. Sole, can I ask you to turn to page
20 three of your rebuttal testimony?

21 A I'm there.

22 Q Okay. On line three through line six you
23 state, OPC Witness Panday's testimony spends a
24 considerable amount of time discussing saline
25 groundwater and the saltwater interface generally and

1 inappropriately contributes all movement of the
2 saltwater interface to the CCS. Do you see that?

3 A I do.

4 Q So his testimony doesn't say those words like
5 that, do they?

6 A It is my interpretation of his testimony that
7 is what he is inferring.

8 Q Okay. Dr. Panday never states or alleges that
9 the CCS has been a major contributor to the movement of
10 saltwater interface, in those words, does he?

11 A Not in those exact words, but he does say it
12 is significant.

13 Q Okay. But you would agree that DEP said that
14 it's a major contributor to the movement of the
15 saltwater interface, it meaning the CCS. Wouldn't you
16 agree?

17 A I would agree.

18 Q Dr. Panday does not imply that any movement of
19 the saltwater interface is the result of hypersaline
20 water from the CCS into the Biscayne Aquifer, does he?

21 A Ask again.

22 Q Dr. Panday does not imply that any movement of
23 the saltwater interface is the result of hypersaline
24 water from the CCS -- let me strike that question.

25 You have referenced in your testimony on page

1 five, lines three -- and when I say your testimony, I'm
2 asking about your rebuttal.

3 A Yes, sir.

4 Q Page five, lines three through four, you
5 referenced independent investigators, is that correct?

6 A I do.

7 Q These independent investigations you're
8 referring to are actually the consultants FPL hired and
9 paid to give FPL opinions about saltwater intrusion
10 emanating from the CCS, right?

11 A That is correct.

12 Q Okay. So you would agree with me that they're
13 not really independent?

14 A Depends on your definition. They did not work
15 directly for Florida Power & Light. They're independent
16 consulting firm that we did hire to conduct the work to
17 monitor and analyze the data.

18 Q Okay. On page of six of your testimony, lines
19 one through four, on line two, specifically you use the
20 word massive, don't you, in a quote from Dames and Moore
21 1978, right?

22 A Yes.

23 Q Okay. And you don't really know what is meant
24 by Dames and Moore by the word massive, do you?

25 A I do not know how they define massive.

1 Q Regardless, didn't this absolute statement by
2 Dames and Moore turn out to be incorrect? Well, if that
3 purple stuff there is massive, it did, right?

4 A I understand the question, Mr. Rehwinkel. I
5 hesitate because at the time, based upon the conditions,
6 I'm not sure that it was incorrect. In light of
7 more-recent conditions undeniably -- or what we see is a
8 different outcome as compared to what was expected and
9 identified in 1978.

10 Q So is it your testimony that FPL relied on the
11 statement that you quote from Dames and Moore on your
12 lines one through four of page six in assuming that
13 there was not a massive build up of hypersaline water
14 outside of the CCS?

15 A At the time that this report was generated, it
16 was clear that the data being presented by the
17 consultant showed exactly what the concentration of salt
18 was and saline water and outside of the boundaries of
19 the cooling canal system and identified those
20 conditions, not only to FPL, but also to the then Flood
21 Control District and provided an analysis and
22 conclusions on that data. This was but one of the
23 conclusions that they provided.

24 They also provided the conclusions that I
25 spoke earlier of in my direct testimony, which positive

1 that the conditions at the cooling canal system were
2 basically moving the shore line from its previous
3 locations out to the western end of the cooling canal
4 system. These were the conclusions of the consultants
5 at the time and, yes, I believe FPL relied on the
6 information and the analysis provided by those
7 consultants, as did --

8 **Q Okay. Thank you. And I did tell you I wasn't**
9 **going to -- well, do you have the Dames and Moore report**
10 **that's Exhibit 70?**

11 A I do. It's somewhere up here. I have it
12 personally, too.

13 MR. REHWINKEL: Madam Chairman, I'm going to
14 ask a series of question from that document.

15 THE WITNESS: You're talking about the 1970 --

16 MR. REHWINKEL: Yes, sir.

17 THE WITNESS: Yes. Seventy-eight.

18 CHAIRMAN BROWN: Seventy-eight.

19 MR. REHWINKEL: I think it's 7-0.

20 CHAIRMAN BROWN: Exhibit No. 70. The report
21 is 78.

22 THE WITNESS: I have it.

23 BY MR. REHWINKEL:

24 **Q And when you locate it, turn to page 85, if**
25 **you wouldn't mind.**

1 A I'm there.

2 Q Okay. And would it be fair to say that with
3 respect to the concept of stabilization that the last
4 paragraph, those last two sentences on page 85, are
5 Dames and Moore's conclusion about stabilization
6 occurring and when it would occur?

7 A Yes.

8 Q Dames and Moore says by the mid-1980's to
9 mid-1990's, the chlorinity level should stabilize and
10 the wedge should extend inland on an order of a mile
11 farther and with little change in vertical movement.

12 A That is correct.

13 Q And the dates that they're referring to --
14 well, first of all, that turned out to be wrong, didn't
15 it?

16 A For ease I'm going to say yes, but I'm also
17 going to give it a little context. Yes. However, the
18 data that was available at this time and the data
19 available between that time and 19 -- excuse me -- 2010
20 was not substantive in light of the reduced monitoring
21 that was occurring. So it's unclear the extent that
22 migration occurred in those interim years. We now have
23 a, I would call it, a robust handle on the extent of
24 salinity today.

25 Q Okay. Thank you. The statement I read --

1 well, those years in that statement on page 85 come from
2 the table 6.2 on page 71, right?

3 A Yes.

4 Q Okay. And those show several dates in the
5 linear column dating from 1980 or ranging from 1980 to
6 1995, is that right? As far as stabilization at certain
7 well locations.

8 A That's correct.

9 Q Okay. And then there is an exponential
10 column, as well, that ranges from 1980 to 1987, is that
11 right?

12 A Agreed.

13 COMMISSIONER POLMANN: I'm sorry, Mr.

14 Rehwinkel, what page were you just on?

15 MR. REHWINKEL: This is on page 71,

16 Commissioner.

17 COMMISSIONER POLMANN: Thank you.

18 BY MR. REHWINKEL:

19 Q I think in this same section, if I can get you
20 to turn back to page 69 and 70.

21 A I'm there.

22 Q In some of the support analysis for the
23 concept of stabilization and the timing is based in the
24 section 6.3 entitled time of stabilization. Do you see
25 that?

1 A I do.

2 Q And Dames and Moore postulates here, or says
3 with fairly absolute terms I believe, that 23 parts per
4 thousand is the maximum chloride concentration you can
5 expect in any saltwater wedge. They say irregardless,
6 but I would say regardless of the position of the time
7 of stabilization of the wedge, right?

8 A That's what is read here -- written here.

9 Q Okay. And that turned out not to be true
10 either, did it, 23 parts per thousand was well below --

11 A That is correct.

12 Q Okay.

13 A That it is not true.

14 Q Okay. Chlorinity levels in the vicinity of
15 the CCS and the CCS itself have ranged from double to
16 even triple this number, correct? It's 23?

17 A Yes. Generally. A little less than triple.
18 Yes.

19 Q Okay. And the freshening that you proposed is
20 supposed to lower the salinity in and under the CCS from
21 the current -- is it in the 55 to 60 range?

22 A No, it's currently roughly 42.

23 Q Okay.

24 A PSU at this time. Maybe 43 in that range.

25 Q Have you presented any testimony that shows

1 that FPL followed through to see if the stabilization
2 that is advised will occur, by Dames and Moore in 1978,
3 had indeed occurred by 1983 or 1995 or 1990 or '93 or
4 '95?

5 A I'm trying to recall going through the reports
6 in 1990 and 1992, which I don't have those full reports;
7 I only have the excerpts with me, whether there was
8 specific statements on the extent of stabilization. To
9 answer your question as it relates to 1987, I do not
10 know.

11 Q Okay. Dames and Moore, even though they got
12 the prediction about stabilization occurring and
13 occurring within certain time frames, they presented you
14 with a backup plan, though, which was to advise you in
15 1978 to collect data and analyze long-term trends from
16 the beginning of the operation of the CCS, correct?

17 A I believe that is correct, yes.

18 Q Okay. And I think we visited this page
19 before, but let's go to 100 and 101, or somewhere in
20 this area. I think we're at 105.

21 A I think it's 105, but carry on.

22 Q So here in section 8.4.2 long-term trends,
23 Dames and Moore is advising you to collect data from a
24 greater area and present it from the beginning of the
25 CCS operation, is that right?

1 A Let me read this again, please.

2 Q Please. Yes.

3 A Yes.

4 Q In fact, we can see on page 100 under the
5 long-term trends heading, the first sentence says,
6 reports on monitoring progress should henceforth present
7 graphs of data summaries from the start of the
8 monitoring program through the current results. Did I
9 read that right?

10 A You did read that right.

11 Q Okay. And in later years, Dames and Moore did
12 present graphs of trends, did they not?

13 A They did.

14 Q And they emphasize presenting the data from
15 the start of the program, which I think they mean
16 operation of the CCS, is that right?

17 A I believe that's the interpretation, yes.

18 Q Okay. If you could look at Exhibit 82, which
19 are some -- I think these are called time series
20 graphs -- time history plots of water levels,
21 temperature and estimated chloride content.

22 A I believe I'm on the right one. Yes, sir.

23 Q Okay. And the first page of this shows that
24 it is an excerpt from the 1990 Dames and Moore report?

25 A Correct.

1 Q Okay. And the first time series plot, which
2 is from some time, I guess, in the vicinity of 1990
3 time-wise. I think it's on two pages.

4 A It is. They range. It starts in -- the first
5 one that I'm on, Mr. Rehwinkel, starts from 1974 and
6 goes to 1982. The next page goes from 1982 to 1990.

7 Q Okay. So this is the kind of data that Dames
8 and Moore said that you should collect in 1978, is that
9 right?

10 A Correct.

11 Q Okay. And if I look in the bottom of the
12 three time series plots, this has temperature and
13 chlorinity, right?

14 A It is difficult to discern for sure, but I
15 believe that it is both temperature and chlorinity,
16 correct, and a specific well.

17 Q Right. And the L3 well, is that the -- is
18 along the L31 canal, somewhere in that --

19 A The L3 well is generally adjacent to the
20 cooling canal system.

21 Q Okay. And if I look on the second page, I can
22 see -- and it looks like the line without the dots on it
23 where the box is is the chlorinity readings, correct?

24 A That is correct.

25 Q Okay. And it would be fair to say, would it

1 not, that readings that are the top of or outside the
2 graph are hypersaline -- show hypersalinity, did it not?

3 A Stand by. I'm trying to make sure I have the
4 range. And admittedly, unless I get a magnifying glass,
5 I'm not sure I'm going to be able to.

6 Q Do you have Dr. Panday's testimony?

7 A I do. It is in chlorinity -- I've got it now.
8 I just need to verify what it's based upon. It is in
9 chlorinity, and I believe the top of the range is at
10 22,000 parts per thousand.

11 Q So that would be --

12 A Twenty-two parts.

13 Q That would be above hypersaline?

14 A As we have defined it at 19,000, yes.

15 Q So would it be fair to say that in 1990 this
16 doesn't show stabilization occurring at this area, does
17 it?

18 A At the L3 you continue to see -- and it's
19 important to go back. Stand by. You can see excursions
20 above the 19,000 as early as 1978 and it's maintaining
21 that with variation, assumedly associated with weather
22 throughout that, that time period, to include the
23 interesting variation of a significant decrease in
24 chlorinity and the 1985 to 1996 time frame when it went
25 from roughly 24,000 down to, it appears to be, 12,000.

1 So significant variation throughout.

2 Q Dames and Moore advised you to focus on
3 long-term trends, not individual years, right?

4 A I would agree with that.

5 Q And to the extent there's a trend shown on --
6 at this well area for this period of 1976 to 1990, and
7 the trend is up to and exceeding hypersalinity, correct?

8 A Yes.

9 Q If we looked at the L5 well.

10 A I'm there.

11 Q We see generally the same thing. We see that
12 dip. Is that in 1985, '86 time frame?

13 A Stand by. Yes, it is.

14 Q But, again, we see a long-term trend similar
15 to that of the L3 well, correct?

16 A We do.

17 Q I've passed out -- well, Exhibit 82 is just
18 excerpts from Dr. Panday's demonstrative. This is four,
19 five and six. And would you accept that these are
20 accurate excerpts from his exhibits?

21 A Yes, I would have to accept.

22 Q I just thought it would be easier to look at
23 it like this.

24 A I appreciate it.

25 Q The first two pages of this exhibit are about

1 the same L3 well that we looked at. Dr. Panday put
2 some -- I think this was for purpose of clarification.
3 He put his own editorials on here that showed chlorinity
4 and depths of the well and times. Do you see those?

5 A I do.

6 Q And you don't disagree with the way he's
7 presented this?

8 A I generally do not disagree with this.

9 Q Okay. And this talks about a well that's
10 outside of the CCS, right?

11 A This is the L3 well. If we're on -- if I'm on
12 the same page you are, which is immediately adjacent but
13 outside of the boundaries of the CCS.

14 Q Okay. And then the next two pages contain
15 other trend data in different formats that are for
16 salinities inside the CCS. Would you agree with that,
17 mister -- maybe it's Dr. Chin from 2016 -- and the
18 response to the Public Service Commission staff that is
19 summarized in the table from 1980 to 2016?

20 A I am familiar with both of these documents,
21 yes.

22 Q And both of these also show trend data that
23 would reflect hypersalinity, is that correct?

24 A That's correct.

25 Q Okay. And demonstrative five shows that -- it

1 looks like if this is -- we see salinity 0-00. So this
2 is a PSU measure, right?

3 A That is in practical salinity units, correct.

4 Q Okay. So we see on here that not maybe in
5 the -- if the second line is 1970 -- let's see -- '73 --
6 '74. Sometime between August of '73 and May of '76
7 the -- well, I don't know what the -- sometime between
8 August of '73 and May of '76 the water in the CCS became
9 hypersaline and except for a time in November of '81, it
10 probably stayed above hypersalinity for the rest of this
11 time period, which is to September 2014, is that fair?

12 A I think that's a fair progression. And just
13 to try to be responsive to Commissioner Polmann, this
14 also shows that ratcheting effect we spoke about earlier
15 where you see the increases during drought, some
16 stabilization, but a continuing trend of increase.

17 Q Okay. And likewise -- and for Dr. Chin, or
18 Mr. Chin, he did not work for FPL preparing this, right?

19 A He did not. This was independent.

20 Q Okay. Well, for him to present this data from
21 inside the CCS, it would have had to come from FPL,
22 correct?

23 A I do not recall the source of this data that
24 Dr. Chin used. I'm confident that we have presented
25 this data to the Water Management District and I'm sure

1 that was his source, but I cannot assert affirmatively
2 the source of his information without going back to his
3 report and identifying the sources.

4 Q Okay. But you wouldn't allow for this, what,
5 I don't know, 30-something-year period, people to go in
6 and sample your water? This is you doing this or your
7 contractors, right?

8 A Well, the Water Management District has always
9 had the authority to come on property and sample, but --

10 Q But if they were sampling and collecting data,
11 they would have shared with you, right?

12 A It is possible that they would not share it
13 with us, but I believe they would, yes.

14 Q Okay. And, of course, your data that Dr. Chin
15 used, you would have been aware of this data for this
16 time period, right?

17 A I'm now struggling with understanding the
18 question. Just try again.

19 Q Here's my question --

20 A Make it simple and I'll try to be clear.

21 Q The data in this that is represented by these
22 blue dots are data that FPL would have, without a doubt,
23 had in their possession and been aware of for this
24 entire time period, correct?

25 A If I understand the question, did FPL -- yes,

1 I think that is the answer. FPL would have been aware
2 of this data if I finally understand the question.

3 Q Yeah, I apologize for being -- it's getting
4 late so I'm trying to hustle along so my brain won't
5 shut down too soon.

6 CHAIRMAN BROWN: We'll get you food soon.

7 BY MR. REHWINKEL:

8 Q And just finally on demonstrative six, with
9 respect to this exhibit, this is data that you can
10 definitely vouch for because you provided this data to
11 the Public Service Commission staff, right?

12 A That is correct.

13 Q And for you to provide this data to them, you
14 would have had to have it in your possession at the time
15 that it was collected over these years, correct?

16 A That is correct.

17 Q Okay. I think you indicated earlier that FPL
18 hired Dames and Moore to perform the analyses they did,
19 right?

20 A That is correct.

21 Q And we asked for Dames and Moore reports and
22 we got 78, 90 and 92. Are there other Dames and Moore
23 reports for these periods or are these the only ones
24 that survived?

25 A To my knowledge, these are the only reports

1 that survived.

2 **Q Okay. So when did Dames and Moore stop**
3 **working for FPL?**

4 A I want to say upon execution of the fifth
5 supplemental agreement when there was a transition from
6 the monitoring that has been accomplished since the 1983
7 fourth supplemental agreement up until now the new
8 monitoring, the expanded monitoring that was initiated
9 under the fifth supplement agreement with the Water
10 Management District, which was 2010.

11 **Q Okay. So the reports that Golder provided,**
12 **were they different from the Dames and Moore?**

13 A They were different from the Dames and Moore,
14 yes.

15 **Q Okay. So you had Golder and Dames and Moore**
16 **reports?**

17 A Correct.

18 **Q Now, the Dames and Moore reports, and whatever**
19 **costs you were incurring to collect data, do the**
20 **analysis by any consultants, whether it was Dames and**
21 **Moore or Golder, from the time period of the beginning**
22 **of the CCS through 2010, it's fair to say that FPL's**
23 **customers paid for all of that collection of data**
24 **through their rates, right?**

25 A I believe that this would be something

1 included in the base rates.

2 Q Okay. And FPL selected Dames and Moore, not
3 the customers, right?

4 A That is correct.

5 Q Okay. Do you agree with the statement that
6 had FPL undertaking corrective measures to address the
7 growing salinity problem before -- pick a year, 2009 --
8 that the OPC would have objected to spending money on
9 those measures?

10 A I would anticipate that unless FPL could
11 affirmatively demonstrate a need for corrective action,
12 or FPL demonstrate direction from an appropriate
13 environmental regulatory agency, there would be
14 significant question about FPL taking on expensive or
15 costly corrective actions without some basis for doing
16 so.

17 Under this condition, and I think I need to be
18 clear, under this condition there was no basis to do so.
19 Again, while there is, as you pointed out in your
20 exhibit, there is increasing salinity in the wells
21 immediately adjacent to the cooling canal system. This
22 was an already saltwater intruded environment. This is
23 not fresh water environment being adversely impacted by
24 the operation of the cooling canal system. The Water
25 Management District directed no activity and saltwater

1 going into an existing saltwater environment, based upon
2 this data, does not impose harm. So what would the
3 basis be to take corrective action?

4 **Q Well, wasn't the data we looked at in 82**
5 **showing trends of hypersalinity?**

6 A Hypersalinity in an already-existing -- yes.
7 Sorry. Yes. Hypersalinity in an already-existing
8 saltwater-intruded environment does not incur harm.

9 **Q Okay. But Dames and Moore told you things**
10 **were going to stabilize and you could clearly see in**
11 **that data they weren't, couldn't you?**

12 A In the 1992 report, which I have an excerpt
13 of, I believe the summary showed that the significant --
14 they had some excursions in 1990, but they actually saw
15 recovery because they had normal weather, or rainy
16 season, they saw some decreases in salinity, which in
17 the 1992 time frame the conclusion of the author of that
18 report inferred that they're seeing stabilization in
19 1992.

20 **Q Well, we saw in the L5 and L3 trend lines we**
21 **saw some dips in salinity in the 1985 time frame,**
22 **correct?**

23 A That is correct, yes.

24 **Q And you would probably assume that would be**
25 **due to rainier than normal weather?**

1 A I would presume that, yes, sir. And, in fact,
2 I believe the top graphic shows the water levels at the
3 facilities, and you can see the levels being generally
4 high in that condition.

5 Q Okay. But that's really one year, maybe two
6 years, right?

7 A That is correct.

8 Q Okay. And one year doesn't make a trend, does
9 it?

10 A No, absolutely not. Again -- but the analysis
11 performed in 1992 and provided by the same consultant
12 that this was from, looked at the data and concluded
13 that there was recovery or there was some reduction in
14 salinity and inferred that there was not an adverse
15 impact.

16 Q Okay. That was the same Dames and Moore,
17 right?

18 A Yes, sir, it was.

19 Q They were evaluating their own work from 1978,
20 weren't they?

21 A They were evaluating, and I assume -- well,
22 not assume. I looked at it. They evaluated the data
23 set as a whole.

24 Q Okay. But 1992 is just two years removed from
25 1990 and one year of good weather or rainy weather

1 wouldn't necessarily again indicate a trend, would it?

2 A Say that again. I'm sorry, Mr. Rehwinkel.

3 Q One year or two years of new data in a trend
4 line would not necessarily indicate that the trend had
5 reversed and salinity -- hypersalinity measurements were
6 going down, would it?

7 A I would agree with the simple term, one or two
8 years of data do not necessarily infer a trend.

9 Q Okay. When you say that you assume the Public
10 Counsel would have objected if you'd have taken
11 corrective measures without a regulatory mandate, isn't
12 that Monday morning quarterbacking and speculation on
13 your part?

14 A It is a presumption on my part and I
15 acknowledge that. I presumed that there would be
16 opposition to FPL taking action without an established
17 environmental basis or regulatory direction to do so.

18 Q Well, you don't have any evidence that the
19 Public Counsel would have objected under those
20 circumstances that never even happened anyway, do you?

21 A I do not have any evidence.

22 Q Okay. And isn't it really true that in
23 environmental cost recovery process regarding
24 environmental projects, that the Public Counsel does not
25 object, in the main, to most of your projects, isn't

1 **that correct?**

2 A I believe that's true because most of our
3 projects -- or all of our projects that we propose are
4 prudent and based upon an environmental need to do so,
5 as well as an environmental regulatory direction or
6 requirement to conduct. In the case that I'm making
7 this presumption, it is on the basis that there is not
8 an environmental need to do so and there is no
9 environmental regulatory agency directed us to do so.

10 **Q Do you have any projects in resent history**
11 **where there was not an industry-wide or statewide**
12 **mandate in the form of a regulation that you came in and**
13 **asked for a cost recovery for?**

14 A Not that we came in and asked for a cost
15 recovery for -- well, my experience is limited,
16 admittedly, but to my knowledge, no, not that we came
17 and asked for cost recovery for.

18 **Q Now, just because a project doesn't qualify**
19 **for ECRC cost recovery, it doesn't follow that you**
20 **cannot still recover those costs through traditional**
21 **base rate recovery, right?**

22 A That is correct.

23 **Q Okay.**

24 A Still subject to the terms of prudence even in
25 a base rate proceeding, the action will still need to be

1 prudent in order for FPL to seek recovery whether it's
2 in base rates or ECRC. So the premise of my statement,
3 Mr. Rehwinkel, and then I'll try to make it one more
4 time just to be clear, it's not on the basis that it's
5 an environmental action, it's on the basis that it's
6 either prudent or not prudent and with no environmental
7 basis to take action, or no environmental regulatory
8 agency direction to take action. I don't see how either
9 the PSC or the Public Counsel would support FPL moving
10 forward without these bases because it would defy the
11 prudence.

12 Q Let me ask you a question about that. In
13 2013, FPL sought recovery of a pever (sic) project
14 through the ECRC, isn't that correct?

15 A I do that recall that, yes.

16 Q Yes. And you would also agree that Office of
17 Public Counsel and FIPUG and some others objected to
18 that recovery through the ECRC, right?

19 A I do recall that, as well.

20 Q And you would also agree with me, would you
21 not, that in 2016 FPL brought pretty much the same
22 project back in slightly different form and got -- well,
23 the Public Counsel entered into a settlement that we're
24 on the same side as FPL with respect to the to
25 recoverability of that project, wouldn't you agree?

1 A I do agree with that.

2 **Q So it was the clause, whether the clause**
3 **mechanism was appropriate, not the project itself, that**
4 **caused the Public Counsel to get involved, right?**

5 A It was always my understanding under the 2013
6 proposal, yes.

7 **Q But you would also agree that the project you**
8 **ultimately brought, and are recovering costs for, was**
9 **not environmentally required, right? Ultimately?**

10 A Ultimately I believe that to be the case, but
11 I would have to go through the facts again, Mr.
12 Rehwinkel. It's been a while since I've looked at that.

13 **Q Well, there were certain ozone regulations, I**
14 **believe, that you thought were going to occur and never**
15 **did occur?**

16 A That's the part that I'm -- I would have to
17 retest my memory a little bit.

18 **Q Okay. So who holds the company accountable**
19 **for lapses in judgment or being asleep at the switch in**
20 **operating facilities like the CCS?**

21 MS. CANO: Objection, argumentative.

22 CHAIRMAN BROWN: Mr. Rehwinkel, do you want to
23 rephrase it?

24 BY MR. REHWINKEL:

25 **Q Well, how are the shareholders of FPL held**

1 **accountable when management makes mistakes?**

2 A FPL is under obligation to meet environmental
3 regulatory requirements both under the obligations of
4 state, local and federal agencies. Those requirements
5 are part of its obligations to its customers to achieve
6 the environmental outcomes expected. In situations
7 under certain circumstance if, as you put it, a mistake
8 is made that is dependent upon the circumstances of that
9 mistake.

10 **Q Is it your testimony FPL never makes mistakes?**

11 A I absolutely -- no, that is not my testimony.

12 **Q Okay. And so if FPL makes mistakes, it's up
13 to the Commission to decide who should pay for fixing
14 those mistakes. Would you agree with that?**

15 A I believe -- well, I don't want to speak on
16 behalf of the Commission and what its obligations are.
17 One, I'm not qualified to do so, so I'll stay there.

18 **Q Isn't it true that over the time -- well, let
19 me just ask you this: Did FPL hire somebody from the
20 Water Management District named Scott Burns?**

21 A We did.

22 **Q Okay. Was Scott Burns tasked with working
23 with the Water Management District to get relief from
24 monitoring requirements?**

25 A He was not. I don't recall that, at least.

1 **Q Mr. Sole, you can't show me any affirmative**
2 **statements that were made by any regulatory agencies**
3 **after the filing of the 1992 Dames and Moore report**
4 **where any of those agencies indicated that the FPL's**
5 **operation of the CCS was not contributing to the**
6 **movement of the saline wedge, can you?**

7 A No, I cannot, and nor is that an established
8 criteria in the agreement that we operated under with
9 the Water Management District under the fourth
10 supplemental agreement.

11 **Q You would agree with me that no regulator**
12 **affirmatively and expressly said that it agreed with the**
13 **conclusions in the 1978, 1990 and 1992 Dames and Moore**
14 **reports, did they?**

15 A Not specifically, but if you go to the 1983
16 fourth supplemental agreement, and that's my Exhibit
17 MWS-20, which again this is 1983 subsequent to the 1978
18 report that you reference, it clearly articulates on the
19 first page -- it's the third whereas clause -- whereas
20 the obligations undertaken by the FPL and the Central
21 and South Florida Flood Control District in the original
22 agreement and the supplemental agreements have been
23 satisfactorily performed to date in construction of the
24 cooling canal system is complete.

25 **Q Okay. So even if that does address the 1978**

1 report indirectly, it has no bearing whatsoever on the
2 '90 and '92 reports, does it, that sentence you just
3 wrote -- read?

4 A As a matter of time, that is correct.

5 Q Okay. Well, they don't have any soothsayers
6 and crystal balls down there, do they, at the --

7 A Not to my knowledge.

8 Q Okay. Let's look at page five, lines 19
9 through 21.

10 A Of?

11 Q Of your rebuttal.

12 A Thank you. Line 19 through 21. I'm there.

13 Q Your basis for the statement here in your
14 testimony is that you conclude that because no
15 enforcement action or consultation was -- no enforcement
16 action was brought or consultation was requested, is
17 that fair?

18 A Yes. And it's also based upon the premise of
19 what the fourth supplemental agreement required. The
20 fourth supplemental agreement required as a result --
21 and we talked about this in my direct testimony -- the
22 original agreement identified that the then-flood
23 control district would establish a threshold level to
24 determine whether or not the objectives of the agreement
25 had been met.

1 Unfortunately, no such threshold level was
2 established. The requirements that FPL were to operate
3 were under a narrative standard that merely has said,
4 generally, in the sole judgment of the district if there
5 is an obligation to change things, we can ask FPL to
6 change things. That was the standard; and that is the
7 standard that we operate under from 1983 until later
8 when the fifth supplement agreement was adopted in 2009.

9 **Q Would you agree with me that for that period**
10 **you just mentioned, that the regulators, especially the**
11 **district, were dependent upon monitoring information**
12 **that was submitted by Florida Power & Light?**
13 **Information including data.**

14 A I understand the question. I think the
15 general answer is, yes. While they had the ability to
16 collect their own data, I agree with you that they were
17 dependent upon FPL to provide them that data, yes.

18 **Q Okay.**

19 **CHAIRMAN BROWN: Mr. Rehwinkel, I hate to stop**
20 **you here.**

21 MR. REHWINKEL: This is a good spot to stop.

22 CHAIRMAN BROWN: It is a good spot?

23 MR. REHWINKEL: I have probably, depending on
24 the answers, probably another 30 minutes.

25 CHAIRMAN BROWN: Yeah, I think this is --

1 folks are probably getting hungry about now. So it
2 is just ten minutes shy of 7:00. Why don't we take
3 an hour-and-change dinner break and come back here
4 at 8:00. Does that sound good to everybody?

5 MR. REHWINKEL: Yes. And I will commit to you
6 that I will see if I can thin out the weeds here.
7 We will be in recess until 8:00. Have a good
8 dinner.

9 (Brief dinner recess.)

10 CHAIRMAN BROWN: All right. Good evening,
11 everyone. I hope -- good evening, everyone. Thank
12 you. All right. I hope everyone had a fantastic
13 dinner break. Looks like there's lots of coffee
14 going on. So you all are anticipating, I imagine,
15 getting through it tonight. Is that what the
16 coffee indicates? I like to hear that. Not that
17 there's any pressure from the bench, of course.
18 Can't hear you. It's off the record.

19 All right. We are back on the record right
20 now and the time is 8:00 and Mr. Rehwinkel was in
21 the process of cross-examining the rebuttal
22 witness, Mr. Sole. And so, with that, unless there
23 are any preliminary matters, let's begin.

24 MR. REHWINKEL: Thank you Madam Chairman, I
25 played tic-tac-toe at dinner and I made a lot more

1 X's, one. So hopefully we can make this relatively
2 quick.

3 CHAIRMAN BROWN: Good.

4 BY MR. REHWINKEL:

5 Q Mr. Sole -- now I have to find where I started
6 playing tic-tac-toe. Okay.

7 In your testimony, your rebuttal, at page
8 eight. If you could turn to the Q & A that begins on
9 line eight, please.

10 A I'm there.

11 Q Okay. Isn't it true, Mr. Sole, that you do
12 not have any personal knowledge about the circumstances
13 surrounding the filing of the 2005, '06 and '07 reports
14 referred to?

15 A Other than that they were finally submitted in
16 2008, that is correct.

17 Q And when you say ultimately provided, I think
18 is that your term?

19 A Correct.

20 Q To the district. That means that you first
21 filed them then sometime in 2008?

22 A It was early 2008 depending upon which report,
23 yes.

24 Q And you cannot also testify personally -- with
25 personal knowledge about why these reports were filed

1 late by FPL, can you?

2 A That is true.

3 Q And you can also not testify to this
4 Commission that the district ever asked you for the
5 reports during the period that they were late, can you?

6 A My review, I can never ascertain whether the
7 district did or did not ask for the reports.

8 Q Okay. And you can also likewise not testify
9 that in the face of the district not receiving the
10 reports from FPL for those three years, when they were
11 due, that the district was nevertheless monitoring the
12 CCS, can you?

13 A Give me the time frame again, please, sir.

14 Q Well, during the period that the reports were
15 late.

16 A I apologize. Thank you. I have no knowledge
17 specifically of district's action at that time.

18 Q Okay. But my question to you was you cannot
19 testify that they were nevertheless monitoring the CCS,
20 even though they didn't have these reports, can you?

21 A I have no knowledge.

22 Q Okay. Isn't it true that FPL realized that
23 they better file these reports that were late because
24 they knew they would be needed during the evaluation of
25 the uprate certification that was pending around 2008?

1 A My review concluded no such determination.

2 Q Okay. Did your review determine that that was
3 not the case?

4 A No, it did not.

5 Q Okay. Isn't it true that in that time frame,
6 maybe in 2008 or earlier, that the district had
7 expressed growing concerns to FPL about salinity caused
8 by the CCS?

9 A If you infer the 2008 time frame, I would
10 argue, yes, the district did begin to raise concerns
11 about the salinity and the CCS on or about 2008.

12 Q Isn't it true that the fact of these reports
13 being late or missing for three years is good evidence
14 that the district wasn't really closely monitoring this
15 CCS or your operation of it?

16 A I cannot testify to that one way or the other.

17 Q Okay. And isn't it true -- if I ask you to
18 look at your testimony on page eight, line 13.

19 A I'm there.

20 Q Actually, 13 and 14, that you cannot testify
21 with personal knowledge that the district did, in fact,
22 review the eventually-filed reports "in detail" as you
23 state?

24 A I disagree. I believe I can testify to that
25 based upon correspondence from the district.

1 **Q What correspondence is that?**

2 A In April of 2009, April 2, 2009, the district
3 confirmed receipt of the reports provided. Went through
4 significant review and detail of the review as to the
5 numerous questions of FPL as it relates to the content
6 of the reports and determining and questioning
7 information. And FPL later provided them answers in
8 July of 2009 based upon their detailed questions.

9 **Q Is that new information that you've gained**
10 **since I just took your deposition, since October 9th?**

11 A Yes. It's not new information to me. It was
12 just the detail I could not recall during the deposition
13 and I did not have the letters in front of me. As I
14 recall during deposition, I referenced that the basis of
15 my statement of detail report is, I believe there was a
16 meeting held between the Water Management District and
17 FPL, in response to the reports that were provided. I
18 did recall a meeting, I just didn't have the letters in
19 front of me and could not recall the specifics of the
20 letters in front of me until after the deposition.

21 **Q Okay. So when I asked you what personal**
22 **knowledge you have, that they reviewed them in detail,**
23 **you agree with me you said none, right?**

24 A I disagree. I believe -- and I can get my
25 deposition out.

1 **Q If you would.**

2 MR. REHWINKEL: Madam Chairman, I don't have
3 extra copies, but Mr. Sole has a copy and I'm sure
4 his counsel does.

5 CHAIRMAN BROWN: Are you in the position where
6 you would like to move that as an exhibit?

7 MR. REHWINKEL: No, ma'am. I just --

8 CHAIRMAN BROWN: Just for cross-examination?

9 MR. REHWINKEL: Possible impeachment question.

10 THE WITNESS: I can tell you affirmatively,
11 having reviewed the deposition recently, that in my
12 deposition response I was very clear that I recall
13 there was a meeting. I don't recall the
14 correspondence at this sitting. I can find that
15 somewhere in the depo if you like, but I'm very
16 confident in that response.

17 BY MR. REHWINKEL:

18 **Q Okay. Let me direct you on page 84.**

19 A Of?

20 **Q Of your deposition.**

21 A Excellent. Thank you. That's very helpful.

22 **Q Well, this is for my question and then --**

23 CHAIRMAN BROWN: And so, Mr. Rehwinkel, can I
24 interrupt you? We don't have that in the record
25 right now, so that puts us in a hard position to

1 follow you.

2 MR. REHWINKEL: Well I have one Q & A --

3 CHAIRMAN BROWN: I know what you're trying to
4 do.

5 MR. REHWINKEL: -- to ask and -- I mean, I
6 think my obligation is to provide the witness and
7 his attorney a copy of the deposition. I think I
8 can do this without --

9 CHAIRMAN BROWN: Let's try it.

10 MR. REHWINKEL: Okay. Thank you.

11 BY MR. REHWINKEL:

12 Q Page 84 of your deposition, line nine through
13 11.

14 A I see that.

15 Q You see that. And would you agree with me
16 when I asked you the question, what personal knowledge
17 do you have that they reviewed them in detail, that you
18 answered none?

19 A I see that. I also see starting on lines 23 I
20 assert that my answer to your question: I'm trying to
21 recall and I can't put my finger on it. A discussion
22 that I had that asserted after reports were submitted
23 there was a meeting, but I have to be honest, I don't
24 have that information right at my fingertips, so I want
25 to hold and either verify that such a meeting took place

1 with the Water Management District after those reports
2 were submitted and a discussion was held or not, but I
3 do believe that is the basis of the statement, but I
4 can't testify exactly when or admittedly for sure tell
5 you that it occurred. I do believe that there was a
6 subsequent meeting with the Water Management District
7 after the reports were filed to discuss the results.

8 **Q Okay. Thank you. I accept your explanation.**
9 **Thank you.**

10 **Would you agree with me that the district did**
11 **not make an affirmative statement that they chose not to**
12 **invoke consultation or otherwise directed FPL take**
13 **additional action as you testified to in that same Q &**
14 **A?**

15 **A** I would agree that the district took no action
16 other than meeting with FPL as to the contents of the
17 reports in 2009, that is correct.

18 **Q But the district didn't make a statement in**
19 **writing to you that they were choosing not to invoke**
20 **consultation or otherwise direct that FPL take**
21 **additional action, did they?**

22 **A** No, they did not, nor did they make a
23 statement in writing invoking consultation.

24 **Q Page nine of your testimony, please, lines**
25 **three through six.**

1 A I'm there.

2 Q Okay. Here you say in the early years of CCS
3 operation, FPL and the involved agencies did not
4 determine that further actions were warranted. Once it
5 was observed that the migration of hypersaline water was
6 indicated, FPL and the agencies determined that the most
7 prudent course of action was to assess the issue through
8 more extensive data collection analysis. Do you see
9 that?

10 A I do.

11 Q And when was that once that you referred to on
12 line five? What exactly time was that?

13 A I believe that was in 2009. Well, let me
14 correct myself. It was in 2009.

15 Q Is it your testimony -- well, strike that.
16 Turning to page ten of your testimony.

17 A Yes, sir.

18 Q Isn't it true that with reference to your
19 statement on lines 9 and 11 -- actually, 9 through 11,
20 that Dr. Panday does not anywhere in his testimony
21 criticize the regulatory agency's collective judgment,
22 does he?

23 A Again, I think as I responded in deposition,
24 the issue was that Dr. Panday criticized the use of the
25 recovery well system as a remedial strategy, when it was

1 the collective judgment of both the Department of
2 Environmental Protection, as well as Miami-Dade County
3 DERM, that a recovery well system was needed.

4 Q Okay. When you say collective judgment, they
5 didn't get together and make a joint statement. You're
6 just saying there was two consent documents, a consent
7 agreement and consent order?

8 A That is correct, Mr. Rehwinkel.

9 Q Okay. And when the consent order with DEP and
10 the consent order with Miami-Dade were entered into,
11 they only had a freshening and RWS concept and no
12 specific plans before them, right?

13 A I struggle with the -- yes. But, admittedly,
14 I struggle with the word, concept. It was more than
15 just a concept. It was an identified remedial strategy
16 that FPL was to intake -- to undertake and then there
17 was the need to subsequently detail the design and
18 modeling to support the specific design, but, again, I
19 think I pointed this out. The word concept is a little
20 loose for me.

21 Q Okay. So they didn't have specific plans to
22 approve at the time they signed the agreement and order,
23 consent agreement and consent order, right?

24 A That is correct. An engineering design system
25 was not established at that time.

1 **Q** And no agency, whether it be the county, the
2 **district or the DEP, has affirmatively said that they**
3 **know the remedial well system and the freshening will**
4 **work as you propose, have they?**

5 A The word that they use, I don't recall seeing
6 in a correspondence. Undeniably, Miami-Dade County DERM
7 has specifically approved the recovery well system and
8 the remedial action strategy or plan -- excuse me --
9 that FPL moved forward with. The Water Management
10 District also approved the regulatory and permitting
11 associated with the project and DEP has approved that,
12 as well.

13 **Q** But from the regulator's standpoint, and I'm
14 **including the district, the county and DEP, the onus is**
15 **completely on FPL to correct the problem as laid out in**
16 **those consent documents, correct?**

17 A I believe that to be correct. The onus is on
18 FPL to achieve success, but then no different than my
19 experience in reviewing other remedial strategies in my
20 time at DEP. It is not by far a simple good luck, do
21 what you want to do and it's up to you to succeed.
22 There is a significant review by the agencies to
23 determine whether or not the remedial strategy would be
24 successful, and in this case there was a very robust
25 review by Miami-Dade in consultation with the Water

1 Management District.

2 Q This was not a situation where they issued any
3 document that said that's going to work, go ahead and do
4 it. They approved it because it met their requirements,
5 correct? It meaning both RWS and the freshening.

6 A They approved -- yes. They approved it
7 because they met the requirements, but it also entailed
8 the review by professional engineers and hydrogeologists
9 looking at the model to discern the efficacy of the
10 proposal. So it's -- it candidly is more than what you
11 are positing as it relates to the agency review of a
12 remedial strategy. There is detailed review by
13 qualified engineers going through the anticipated
14 efficacy of the project, and if there are failed flaws,
15 they will bring them up.

16 Q Well, you have an obligation to bring up flaws
17 as well, do you not?

18 A I do.

19 Q Okay. So isn't it true that in this -- these
20 two collaborative documents, and I'm referring to this
21 consent agreement and consent order, FPL agreed with the
22 district to implement these plans that -- I'll stop
23 using the word mulligans, but they have several
24 opportunities for you to get it right. You don't have
25 to get it right the first time, right?

1 A That is correct, but, again, in any remedial
2 strategy, there is an expectation of some adaptation as
3 you move forward. That adaptation doesn't necessarily
4 mean there will be additional cost, but there may need
5 to be the need to increase the pumping in one area as
6 compared to another to ensure and improve the efficacy
7 of the project. That is a normal strategy that I've
8 seen time and time again in remedial strategies.

9 Q I think finally one last question or two,
10 based on -- depending on your answer, but you make
11 statements in both your direct and rebuttal that FPL has
12 complied with all permits, regulations and the like. Is
13 that right?

14 A I have made specific statements that FPL has
15 complied with the operational requirements of its
16 permits and agreements, yes.

17 Q So -- and you say that in your rebuttal
18 testimony, too? Without going and finding it.

19 A I do, yes.

20 Q Okay. And I could just -- would you agree
21 with me -- well, first of all, I think when I was asking
22 you questions in your deposition, you referred me to
23 the -- what's known as DEP enforcement manual.

24 A I did. I recall that.

25 Q So I did go and look at that, and I couldn't

1 find anything in here, in that document that said this
2 is an operational permit condition and these things
3 aren't and make a difference -- distinction in how you
4 handle enforcement measures based on that differential.

5 Am I -- did I miss something?

6 A It doesn't say specifically operational
7 requirements. No, you didn't miss it because I looked,
8 as well, because, like I said, it's been many years
9 since I've reviewed the DEP enforcement manual and it's
10 actually changed since I've reviewed it, but the reality
11 is it does go through the operational history of the
12 site, and taking into account the operational history as
13 you deal with enforcement matters. And, in this, the
14 operational history of the site was FPL was in full
15 compliance of its permits and agreements until such time
16 as the water quality exceedance was identified.

17 Q Okay. So you just didn't get that speeding
18 ticket, is what you're telling me?

19 A No, sir. That's not at all what I'm telling
20 you. And I have to respond by saying it's a very
21 serious issue. Unfortunately, as secretary at DEP, we
22 take seriously the need for folks to comply with their
23 obligations. When a facility owner operator complies
24 with his obligation, but harm occurs, nonetheless,
25 there's a very different view on that as compared to

1 when a facility owner operator does not comply with
2 their permits or is negligent in their behavior and harm
3 exists. That is normal enforcement and that is
4 something that is taken very seriously by the
5 department, or at least when I was there at the
6 department, and I believe they take that very seriously
7 now. So I push back a little bit on how you convey
8 that.

9 **Q That's fair for you to want to do that. I**
10 **understand. Are you familiar with what's known as DEP**
11 **9-23, settlement guidelines for civil and administrative**
12 **penalties?**

13 A Yes, sir.

14 MR. REHWINKEL: Okay. Madam Chairman, I have
15 two documents that I passed out earlier and I just
16 would like to identify these for the --

17 CHAIRMAN BROWN: Is it -- okay. Let's --

18 MR. REHWINKEL: The manual would be, I guess,
19 the next one.

20 CHAIRMAN BROWN: Which documents are they,
21 first?

22 MR. REHWINKEL: They are from the pile of Sole
23 exhibits that we passed out earlier, I believe, and
24 I just didn't inquire on direct about them.

25 CHAIRMAN BROWN: I know.

1 MR. REHWINKEL: Okay.

2 CHAIRMAN BROWN: So we are at 83.

3 MS. CANO: I'm sorry. There were new
4 documents passed out recently?

5 CHAIRMAN BROWN: No, previously on direct he
6 gave a pile of documents. I put them aside. I
7 believe those are the ones you're referring to, Mr.
8 Rehwinkel?

9 MR. REHWINKEL: Yes, ma'am. One says DEP
10 enforcement manual and description of changes to --

11 CHAIRMAN BROWN: I got it. I've got it. And
12 it's big -- it's a thick one?

13 MR. REHWINKEL: Yes. And the less thick one,
14 DEP civil penalty directive.

15 CHAIRMAN BROWN: We got it.

16 THE WITNESS: Sadly, Mr. Rehwinkel, while I'm
17 searching the world over, I'm not finding that
18 document in all of this.

19 CHAIRMAN BROWN: Do you have an extra copy?
20 It looks like JR is helping you.

21 MR. REHWINKEL: Okay. Mr. Kelly, has some
22 that he didn't write any -- he just wrote the
23 numbers on them.

24 THE WITNESS: That's okay. I'm familiar --

25 CHAIRMAN BROWN: Thank you, Mr. Kelly.

1 THE WITNESS: Thank you, Mr. Kelly.

2 MR. REHWINKEL: Does counsel have one?

3 CHAIRMAN BROWN: We have not numbered it yet,
4 just so you know. We are at 83, so which one --

5 MR. REHWINKEL: I would like the manual to be
6 83.

7 CHAIRMAN BROWN: All right. We're going to
8 title that DEP enforcement manual, 2015 through
9 2017. And then the next one, DEP civil penalty
10 directive is going to be the title of 84. Sound
11 good?

12 MR. REHWINKEL: Yes. Thank you.

13 (Whereupon, Exhibit Nos. 83 - 84 were received
14 into evidence.)

15 BY MR. REHWINKEL:

16 Q And I don't want to delve into these. I just
17 want them in the record. Mr. Sole has acknowledged that
18 they exist. I guess they would have some bearing on how
19 enforcement action is pursued. Both of these documents,
20 correct?

21 A Yes.

22 Q Okay. And just for the record, if you could
23 look at the very back I've -- on the website they have
24 the current manual and then they have something that it
25 says what they might have -- what areas they may change

1 us to in previous years.

2 A That is correct.

3 Q That's right. And so I've just attached 15,
4 16 and 17 to this. Is that fairly complete, from your
5 standpoint?

6 A Again, best of my knowledge, yes.

7 Q And nothing that's in these changes would be
8 something that you would all of a sudden, in the last
9 three years, find that there was an operational or
10 nonoperational permit sort of qualifier in here?

11 A Not to my knowledge, correct.

12 MR. REHWINKEL: All right. Madam Chairman,
13 those are all the questions I have.

14 CHAIRMAN BROWN: Okay.

15 MR. REHWINKEL: Thank you, Mr. Sole.

16 THE WITNESS: Thank you, Mr. Rehwinkel.

17 CHAIRMAN BROWN: Thank you. All right. Our
18 next up is FIPUG.

19 MR. MOYLE: Thank you.

20 EXAMINATION

21 BY MR. MOYLE:

22 Q Good evening, Mr. Sole.

23 A Good evening, Mr. Moyle.

24 Q Mr. Rehwinkel asked you a question about -- I
25 think he may have phrased it in a colloquial manner, but

1 essentially it's, you know, who holds FPL accountable,
2 and after a little back and forth I think he kind of
3 said, well, look, I'm not one to speak for the PSC. Do
4 you recall that?

5 A I generally recall that, yes, Mr. Moyle.

6 Q And you're not here before this Commission as
7 an expert in PSC matters, are you?

8 A That is correct.

9 Q Okay. Did you -- and you've looked at a lot
10 of documents, right? You've read a lot of documents. A
11 lot of your information comes from review of documents,
12 correct?

13 A In this case, it's a combination of personal
14 knowledge and review of the historical record, yes.

15 Q And I want to explore that a little bit more
16 in a minute, but with respect to -- and you were in the
17 room for opening statements, were you not?

18 A I was.

19 Q Okay. You're not aware of this Commission
20 ever permitting recovery under the environmental cost
21 recovery clause as a result of a violation of law, are
22 you?

23 A I have no recollection or information that
24 would support that, correct.

25 Q All right. Did you look for it or have others

1 look for that information?

2 A In this case, no, I didn't --

3 Q You've got a lot of resources.

4 A -- no, sir.

5 Q And I think you already covered with Mr.
6 Rehwinkel. You're aware there is an environmental cost
7 recovery clause, right?

8 A I am familiar. I've read the statute on
9 environmental cost recovery and am aware of it, yes.

10 Q And I just got you to admit you're not a PSC
11 expert, so I'm not going to go too far, but appreciate
12 you acknowledged that you could -- if this Commission
13 says this isn't really within the scope of the -- you
14 know, of the environmental cost recovery clause, you
15 could seek recovery under base rates, as well, right?

16 A I believe that to be true, yes.

17 Q Okay. So let's talk a little bit about your
18 personal knowledge, and tell me your understanding of
19 personal knowledge.

20 A Well, as a biologist my personal knowledge
21 would be I was involved in the conversation or was a
22 party to, and it was not third-party knowledge, it was
23 direct knowledge.

24 Q Okay. Well that -- for someone who didn't go
25 to law school, that's pretty consistent with, I think,

1 what they teach you in law school. So, for example, I
2 mean a lot of your testimony is not based on personal
3 knowledge. Like, the discussion you just had with Mr.
4 Rehwinkel on page nine, line five, when you -- he quoted
5 to you once it was observed that the migration of
6 hypersaline water was indicated, and it goes on. You
7 with me?

8 A I'm with you. Actually, in that case it is
9 personal knowledge, but go ahead.

10 Q Okay. Well, you answered to Mr. Rehwinkel
11 when he asked you what time frame that was that you --
12 he said, when is once, and you said 2009.

13 A Correct.

14 Q And you also, in your direct testimony, say
15 you started work for FPL in 2010?

16 A Correct.

17 Q So my assumption was, unless you were talking
18 about information you had when you were DEP secretary,
19 you didn't have personal knowledge?

20 A I am speaking about information I had when I
21 was DEP secretary.

22 Q Okay. So you were involved in this matter as
23 DEP secretary and when you got to FPL?

24 A That is correct.

25 Q Okay. Now, a lot of the old documents -- I

1 mean, I know where I was in, you know, the 1978 and
2 these things. You know, all those were acquired by
3 reading the documents, correct?

4 A That is correct. My rebuttal testimony is
5 basically in response to Dr. Sorab Panday's direct
6 testimony, which is also a review of the historical
7 record.

8 Q Right. And you understand his role is as an
9 expert hydrologist and he's provided opinion testimony
10 to the Commission, correct?

11 A There was a couple of things that I agree that
12 was Dr. Panday's testimony, but there were also many
13 areas of his testimony that significantly deviated from
14 hydrology and those are the positions that I believe my
15 rebuttal testimony tried to address. They do not talk
16 about his hydrogeological expertise. They talk about
17 his interpretations of the requirements and obligations
18 that are under, whether it's the consent agreement, the
19 consent order, whether it's under 62.520, Florida
20 Administrative Code, or finally whether it's under any
21 one of the Water Management District's agreements. That
22 is my intended scope on my rebuttal testimony.

23 Q Okay. And I'm sorry. I probably didn't ask a
24 clear question on that. I'm just drawing a distinction
25 in that you understand you're not here as an expert in

1 hydrology or anything like that, correct?

2 A No, my expert witness status is that of
3 Florida environmental regulation and policy.

4 Q Right. And that's based on your experience as
5 DEP secretary?

6 A I would agree with that, yes.

7 Q And you understand experts, they help the
8 trier of fact, the court, by offering opinion testimony?

9 A I understand that, yes.

10 Q Okay. And the way they get that opinion
11 testimony is they go and look at documents and records
12 and, you know, ask questions, ask lawyers to ask
13 questions in discovery and they gather a whole bunch of
14 information and look at it and then formulate an
15 opinion. Does that sound --

16 CHAIRMAN BROWN: Mr. Moyle, are you trying to
17 impeach the witness?

18 MR. MOYLE: No, I'm just trying to get -- ask
19 him if he understands that's what an expert witness
20 does.

21 CHAIRMAN BROWN: Okay.

22 THE WITNESS: I generally understand that's
23 the purpose of an expert witness or one of the
24 purposes of an expert witness. It's also to
25 identify their credentials and whatever they plan

1 to testify or intend to testify on.

2 BY MR. MOYLE:

3 Q Yeah. And where I'm going with this, Madam
4 Chairman -- and we can go to the line and page. But
5 you, you know, you are criticizing and I interpret it if
6 as, you know, Monday morning quarterbacking whereas I
7 think -- I mean, you've ventured that, right? You said,
8 well, he's a Monday morning quarterback.

9 A I did.

10 Q And I took that as not recognizing what a role
11 an expert plays, which is to go in and look at
12 information and then give the court or, you know, the
13 Commission an opinion. So you don't have any problems
14 with what he did in terms of gathering information and
15 looking at it in providing an opinion, do you?

16 A I do not.

17 Q There was one comment that Commissioner
18 Polmann pointed this out in the testimony, and I was
19 looking that your rebuttal. I know you've talked to Mr.
20 Rehwinkel, but on page 32 of the OPC expert, you know,
21 opinion, he says, "in any event the combined remedial
22 measures proposed by FPL, freshening and retraction
23 wells, do not retract either the saline plume that is
24 further west of the CCS with hypersaline portions,
25 immediately west of the CCS to the Turkey Point boundary

1 within the simulation period of ten years." And do you
2 take issue with that statement?

3 A I don't believe my rebuttal testimony
4 addressed that position.

5 Q Okay. And so I take it -- because I assume
6 when you prepared your rebuttal testimony you looked at
7 everything that the expert prepared and wrote, did you
8 not?

9 A I did.

10 Q And I assume you took issue -- when you took
11 issue with things that were material, you brought them
12 up in your rebuttal, correct?

13 MS. CANO: Objection. Mr. Moyle is completely
14 overlooking the fact that there are other rebuttal
15 witnesses in this case.

16 CHAIRMAN BROWN: Mr. Moyle.

17 MR. MOYLE: Well, I think I'm entitled to ask
18 him whether he looked at this and agreed --

19 CHAIRMAN BROWN: Can you restate the question?
20 I'm sorry. I was drinking my kombucha.

21 MR. MOYLE: Sure.

22 BY MR. MOYLE:

23 Q Do you have any reason to disagree with that
24 statement that we just read that was on page 32 of FPL's
25 experts?

1 A I do, but it was solely based upon
2 consultation with our expert as it relates to our
3 expert's review of that document and his opinion.

4 Q So you would just be parroting what someone
5 told you if I asked you the basis for your review,
6 correct?

7 A That's correct. I think we established early
8 on I'm not a hydrogeologist.

9 Q Okay. But you do have a lot of facts because
10 you're -- as secretary of DEP, you got involved with
11 this and now you're responsible for this Turkey Point
12 Cooling Canal System, as well, correct?

13 A That is one of my many responsibilities, yes.

14 Q Yeah, I didn't mean to suggest you didn't have
15 more on your plate. Help me, if you would, understand
16 because FIPUG -- and my members are concerned -- we just
17 finished a long, hard road with a nuclear power plant
18 that was over on the west coast and it took a long time
19 and there were some missteps and a lot of money and the
20 OPC expert says that he's not sure you're getting the
21 solution right, correct? You're aware that's what he
22 said?

23 A That's a very generic summation of the OPC
24 expert, but I'll go along with your line of rationale,
25 so, yes.

1 **Q** Okay. And let me ask you this: What you are
2 proposing with these recovery wells and the freshening,
3 can you tell the Commission and us the level of
4 confidence that you have in that plan, say in the one to
5 ten scale?

6 A I wouldn't give a numerical value to that.
7 However, I do have high confidence. As I testified
8 earlier, this is a remedial strategy that is a normal
9 strategy of recovery of groundwater, and in this case
10 disposal of that recovered groundwater. I've evaluated
11 the details of the plan and I have high confidence that
12 it will be successful to the extent that we will no
13 longer be causing harm to the environment.

14 **Q** You've given me the narrative response and I
15 was looking for the quantitative response.

16 A I understand and I said I would not provide a
17 quantitative response, I would provide a narrative
18 response. It's good that you got that.

19 **Q** So with respect to what the wells will be
20 doing, they're supposed to take the hypersaline and pull
21 it off the property where it is now and put it back onto
22 the FPL property. Is that it in a nutshell?

23 A No, sir. Let me briefly try to explain. So
24 the recovery wells have a dual function here. The
25 recovery wells will not only draw back the hypersaline

1 plume that has migrated beyond the boundary of the
2 cooling canal system, you can plainly see in the
3 demonstrative that OPC presented, but the recovery wells
4 will also form basically a hydraulic barrier for any
5 future hypersaline water from leaving the property.

6 As you recall at testimony previously, the
7 interceptor ditch was very effective at keeping saline
8 water from leaving the upper portions of the aquifer.
9 Unfortunately, the design limitation of the interceptor
10 ditch allowed hypersaline water to go in the deeper
11 portions of the aquifer. By installing the recovery
12 well system, you now have improved the site system
13 itself and now you have a complete hydraulic barrier,
14 both at the top portion of the aquifer, as well as the
15 bottom portion of the aquifer. So the cooling canals
16 can continue to provide their essential service to the
17 units at Turkey Point.

18 Does that -- oh, and you asked where is the
19 water going. The water -- when we withdraw the water,
20 the water is disposed of in an underground injection
21 control well, which is a well deep in the aquifer, what
22 we call the boulder zone, which a very transmissive and
23 existing hypersaline area. So that's where the water
24 will be disposed of.

25 **Q And we hope it stays down in that lower level**

1 **where it's disposed of in a UIC well.**

2 A UIC wells are commonplace, especially in south
3 Florida. It's not something that you see in a lot of
4 the north Florida areas, but it's a very transmissive
5 zone. Again, existing hypersaline is often the location
6 where wastewater treatment plants are disposing of
7 wastewater. And in this case it's not wastewater.
8 We're just putting saltwater down in a saltwater
9 environment, a hypersaline environment, I might add.

10 Q **Okay. And the question about pulling the**
11 **plume back, that's part of the plan, too, that it's**
12 **going to retract it back, back onto FPL's property, is**
13 **that right?**

14 A That's right, and that's the standard
15 remediation technology, or what I would say is the
16 routine remediation technology that is used.

17 (Transcript continues in sequence in Volume
18 6.)

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CERTIFICATE OF REPORTER

STATE OF FLORIDA)
COUNTY OF LEON)

I, DANA W. REEVES, Professional Court 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' attorney or counsel connected with the action, nor am I financially interested in the action.

DATED THIS 31st day of October, 2017.



DANA W. REEVES
NOTARY PUBLIC
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