						2
1		STATE OF FLORIDA	CUNFIDENTIAL	1	APPEARANCES:	
2	DIVISION	OF ADMINISTRATIVE HEARINGS		2	MATTHEW R. BERNIER, and DIANN	NE M. TRIPLETT,
3				3	ESQUIRES, 106 East College Avenue, Suit	e 800,
4	RE IN: FUEL AND P	URCHASED POWER		4	Tallahassee, Florida 32301-7740, appear	ing on behalf of
5	COST RECOVERY CLAU	SE WITH JANCE INCENTIVE		5	Duke Energy Florida, LLC : and DANIEL H	IERNANDEZ.
6	FACTOR,			6	ESOUTRE Shutts & Bowen Suite 300 430	2 West Boy Scout
7	Dotitionor			7	Bouleward Tampa EL 22607 appearing	on bobalf of Duko
0	Petitioner,	CACE NO. 10 (022		, ,	Boulevard, Tampa, FL 55607, appearing	on benail of buke
8	vs.	CASE NO. 19-6022		8	Energy.	
9	**,			9	J.R. KELLY, PUBLIC COUNSEL; C	CHARLES REHWINKEL,
10	Respondent.	/		10	DEPUTY PUBLIC COUNSEL; and THOMAS A. (T	ad) DAVID,
11				11	ESQUIRE, Office of Public Counsel, c/o	the Florida
12		VOLUME 1	1	12	Legislature, 111 W. Madison Street, Roo	om 812,
13		PAGES 1 - 156		13	Tallahassee, Florida 32399-1400, appear	ing on behalf of
14	PROCEEDINGS:	Administrative Hearing	1	14	the Citizens of the State of Florida.	
15	BEFORE:	Honorable Lawrence P. Stevenson		15	JON C. MOYLE, JR., ESQUIRE, a	and KAREN A.
16	DATE:	February 4, 2020	:	16	PUTNAL, ESQUIRE, Moyle Law Firm, P.A.,	118 North Gadsden
17	TIME:	Commenced: 8:55 A.M.	:	17	Street, Tallahassee, Florida 32301, app	pearing on behalf
18	LOCATION	Division of Administrative Hearings	1	18	of Florida Industrial Power Users Group	
19	boomion.	1230 Apalachee Parkway	=	19	JAMES WALTER BREW, ESQUIRE, S	Stone Law Firm,
20		Tallahassee, Florida	1	20	Eighth Floor, West Tower, 1025 Thomas J	Jefferson Street
21	REPORTED BY:	DEBRA R. KRICK	2	21	Northwest, Washington, DC 20007, appear	ing on behalf of
22		Notary Public in and for the	1	22	White Springs Agricultural Chemicals, F	PCS Phosphate.
23		State of Florida at Large	2	23	SUZANNE BROWNLESS, and BIANCA	A LHERISSON,
24		PREMIER REPORTING 114 W. 5TH AVENUE	2	24	ESQUIRES, FPSC General Counsel's Office	e, appearing on
25		TALLAHASSEE, FLORIDA (850) 894-0828		25	behalf of the Florida Public Service Co	mmission Staff;
114 W	5th Avenue, Tallahassee, El. 33	1303 promier repo	ting com 11	1.4 W	5th Avenue Tallahassae El 20203	premier reporting com
1	KEITH HETRICK GENE	RAL COUNSEL, DEPUTY GENERAL COUNSEL,	3	1	INDEX TO WITNESSES	4
1 2	KEITH HETRICK GENE Florida Public Ser	RAL COUNSEL, DEPUTY GENERAL COUNSEL, vice Commission, 2540 Shumard Oak	3	1 2	INDEX TO WITNESSES	4 PAGE
1 2 3	KEITH HETRICK GENE Florida Public Ser Boulevard, Tallaha	RAL COUNSEL, DEPUTY GENERAL COUNSEL, vice Commission, 2540 Shumard Oak ssee, Florida 32399-0850, adviser to	3	1 2 3	INDEX TO WITNESSES JEFF SWARTZ	4 PAGE
1 2 3 4	KEITH HETRICK GENE Florida Public Ser Boulevard, Tallaha the Florida Public	RAL COUNSEL, DEPUTY GENERAL COUNSEL, vice Commission, 2540 Shumard Oak ssee, Florida 32399-0850, adviser to	3	1 2 3 4	INDEX TO WITNESSES WITNESS JEFF SWARTZ Examination by Mr. Bernier Prefiled direct testimony inserted	4 PAGE 37 39
1 2 3 4 5	KEITH HETRICK GENE Florida Public Ser Boulevard, Tallaha the Florida Public	RAL COUNSEL, DEPUTY GENERAL COUNSEL, vice Commission, 2540 Shumard Oak ssee, Florida 32399-0850, adviser to service Commission.	3	1 2 3 4 5	INDEX TO WITNESSES WITNESS JEFF SWARTZ Examination by Mr. Bernier Prefiled direct testimony inserted Examination by Mr. Rehwinkel	4 PAGE 37 39 56
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1 2 3 4 5 6 7 8 9 10 11 12 13 14	KEITH HETRICK GENE Florida Public Ser Boulevard, Tallaha the Florida Public	RAL COUNSEL, DEPUTY GENERAL COUNSEL, vice Commission, 2540 Shumard Oak ssee, Florida 32399-0850, adviser to Service Commission.	3	1 2 3 4 5 6 7 8 9 10 11 12 13 14	INDEX TO WITNESSES WITNESS JEFF SWARTZ Examination by Mr. Bernier Prefiled direct testimony inserted Examination by Mr. Rehwinkel	4 PAGE 37 39 56
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1	INDEX TO EXHIBITS		PROCEEDINGS
2 N	NO. DESCRIPTION IDENTIFIED ADMITTED	2	THE COURT: We will go ahead and call the
3 1	114 Revised Comprehensive 11 11	3	hearing to order.
4 1	Exhibit List L15 RCA draft 35	4	We are here today in the case styled In Re:
5	116 3/18/2015 40-inch blade 35 telemetry	5	Fuel and Purchased Power Cost Recovery Clause with
6	-	6	Generating Performance Incentive Factor. It's DOAH
7		7	case number 19-6022. It's a Public Service
8		8	Commission case
9			Mu name is Laurence Stevenson . I am the
10 *	Why which a possible response	10	Administrative Law Indee accided to hear the case
*	'Uh-huh is a positive response	11	Administrative Law budge assigned to near the case.
10		10	And I guess at the outset, we should get
12		12	appearances entered. I am just going to go in the
13		13	order that's in our little we've got a little
14		14	cheat sheet here for how we are going to handle
15		15	this proceeding.
16		16	Representing Duke Energy.
17		17	MR. BERNIER: Good morning, Judge Stevenson,
18		18	Matt Bernier on behalf of Duke Energy.
19		19	MR. HERNANDEZ: Good morning, Your Honor.
20		20	Daniel Hernandez with Shutts & Bowen on behalf of
21		21	Duke Energy.
22		22	MR. BERNIER: And, Judge, I would also enter
23		23	an appearance for Dianne Triplett, who will be here
		24	shortly.
24		25	THE COURT: Okay. I have got her, so that's
24 25 114 W. 5th Premier Re	Avenue, Tallahassee, FL 32303 premier-reporting.com sporting (850) 894-0828 Reported by: Debbie Krick	 114 W. 5th A Premier Rep	Avenue, Tallahassee, FL 32303 premier-reporting.co porting (850) 894-0828 Reported by: Debbie Krid
24 25 114 W. 5th Premier Re	Avenue, Tallahassee, FL 32303 premier-reporting.com peporting (850) 894-0828 Reported by: Debbie Krick 7	114 W. 5th A Premier Rep	Avenue, Tallahassee, FL 32303 (850) 894-0828 premier-reporting.co Reported by: Debbie Krid 8 Power Users Group.
24 25 114 W. 5th Premier Re	Avenue, Tallahassee, FL 32303 premier-reporting.com Reporting (850) 894-0828 Reported by: Debble Krick 7 good. MR. HERNANDEZ: And, Your Honor, seated with	114 W. 5th A Premier Rep	Avenue, Tallahassee, FL 32303 premier-reporting.co porting (850) 894-0828 Reported by: Debbie Kris 8 Power Users Group. THE COURT: I am more comfortable saying that.
24 25 114 W. 5th Premier Re	Avenue, Tallahassee, FL 32303 premier-reporting.com Reported by: Debbie Krick 7 good. MR. HERNANDEZ: And, Your Honor, seated with us is Mr. Jeff Swartz. He's a representative of	114 W. 5th A Premier Reg	Avenue, Tallahassee, FL 32303 premier-reporting.co Reported by: Debbie Krid 8 Power Users Group. THE COURT: I am more comfortable saying that. MR. MOYLE: Right, and that's fine. Judge
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1	our General Counsel.	1 the cour	rt reporter can.
2	THE COURT: Okay. Very good.	2 COU	JRT REPORTER: I'll let you know.
3	And our next order of business I guess is to	3 тн	S COURT: Okay. The first break, I will go
4	close the hearing. I have to rely on counsel to be	4 talk to	somebody about it and see what we can do.
5	my police in this respect. I am assuming that, as	5 MR.	. DAVID: The switch was off.
6	of now, everyone is in the room belongs in the	6 THE	E COURT: Oh, is that it?
7	room, is that correct?	7 MR.	DAVID: Yeah.
8	MR. BERNIER: I believe that's correct, and I	8 THE	S COURT: There is a little green light that
9	have asked the counsel for the other	9 comes or	1.
10	representatives to let me know if somebody enters	10 MR.	. REHWINKEL: Thank you.
11	and they are a member of their party so we don't	11 THE	S COURT: Okay. Well, we've got exhibits.
12	have to disrupt anything.	12 Did we w	want to get the exhibits up here at this
13	THE COURT: Okay. That's fine.	13 time?	
14	MR. BERNIER: But if somebody does that we	14 MS.	BROWNLESS: Yes, Your Honor.
15	don't know, we will let you know.	15 As	you know, we've already stipulated to
16	THE COURT: That's fine. I guess I will give	16 exhibits	s on the comprehensive exhibit list, Exhibit
17	you a high sign if I see someone.	17 Nos. 1,	68 through 76, 80 through 82 and 100, and
18	Mr. Rehwinkel.	18 those ha	ave been previously provided to the Court
19	MR. REHWINKEL: Your Honor, I don't know if	19 and the	parties.
20	our microphones are working. The light is not	20 We	have other exhibits on the comprehensive
21	coming on.	21 exhibit	list that have been marked for
22	THE COURT: Gee. That's not in my bailiwick.	22 identifi	ication, and I believe the parties also
23	I mean, I can hear you fine.	23 think th	hat there is no need to authenticate those
24	MR. REHWINKEL: Okay.	24 document	s. Do I have that correct?
25	THE COURT: We are not I just don't know if	25 MR.	. HERNANDEZ: That is correct, Your Honor.
114 W. 5th Premier Re	Avenue, Tallahassee, FL 32303 premier-reporting.com porting (850) 894-0828 Reported by: Debbie Krick	114 W. 5th Avenue, Tallahasse Premier Reporting	e, FL 32303 premier-reporting.cc (850) 894-0828 Reported by: Debbie Kr
	11		12
1	MS. BROWNLESS: Okay. And so what we would	1 THE	2 COURT: do we have sort of agreement on
2	like to do at this time is hand out a revised	2 that?	

3	comprehensive exhibit list.
4	THE COURT: Okay.
5	MS. BROWNLESS: And at this time, we would
6	like that marked as Exhibit No. 114 and ask that it
7	be admitted into evidence.
8	THE COURT: Hearing no objections, we will
9	mark the exhibit the revised comprehensive
10	exhibit list as staff Commission staff Exhibit
11	114, and show it admitted.
12	(Whereupon, Exhibit No. 114 was marked for
13	identification and received into evidence.)
14	MS. BROWNLESS: Thank you, Your Honor.
15	THE COURT: And I think that takes care of all
16	of our business up to the opening statements.
17	I went through my usual list of questions that
18	I ask at the beginning of a hearing, and I know
19	this is not a conventional hearing. The only one
20	that I sort of want an answer to, I think I know
21	the answer to this, but I want it on the record is
22	who has the burden, and what is the burden in this
23	proceeding? I sort of assume it's probably Duke
24	Energy and it's probably by a preponderance, but
25	MR. BERNIER: Yes, sir.

2 that?	
3 MR. BERNIER: Yes, sir, we agree with both	h of
4 those.	
5 MR. REHWINKEL: Yes, sir.	
6 THE COURT: Okay. That takes care of any	
7 concerns that I had.	
8 And at this time, I guess we can move on t	to
9 opening statements. And was there agreement as	s to
10 who goes first? I am assuming it would be Duke	e.
11 MR. BERNIER: I think so. So I will go al	head.
12 Thank you. Good morning, again, Judge	
13 Stevenson. Matt Bernier for Duke Energy.	
14 The issues presented to you today can be	
15 boiled down to one overarching question, and is	s
16 that did Duke Energy prudently operate the Bart	tow
17 steam turbine? Now, the Public Service	
18 Commission's prudent standard asks did DEF act	as a
19 reasonable utility manager would given the	
20 information it knew or reasonably should have b	known
21 at the time it acted?	
22 And this is not a hindsight review, because	se
23 with the benefit of hindsight, most reasonable	
24 people can identify something that they would of	do
25 differently.	

	¹³			14
1	In this case, the preponderance of the	ודאוכ		last stage blades are also referred to as the LO
2	evidence shows that DEF acted prudently at all		2	blades. You will hear both, and we have an actual
3	times given the information DEF knew or should have		3	representation of the blade over there on the side
4	known, because DEF, at all times, operated the		4	of the courtroom for you so you can see it.
5	machine in compliance with the manufacturer's		5	THE COURT: Oh, okay. I walked right by it.
6	guidelines, which is the standard industry		6	MR. BERNIER: So that's what we will be
7	practice.		7	talking about today.
8	Now, Duke Energy purchased the Bartow combined		8	We also have a diagram that staff has provided
9	cycle steam turbine from Mitsubishi Power Systems.		9	of the operation and the actual steam turbine with
10	The steam turbine was designed for use by a third		10	CTs and everything that Mr. Swartz and maybe Mr.
11	party, but that project never came to fruition, and		11	Polich will be referring to.
12	the steam turbine was never delivered to the third		12	Now, DEF discovered the damage during an
13	party.		13	inspection as part of an unrelated outage and
14	Prior to the purchase, Mitsubishi was		14	consulted with Mitsubishi, which recommended
15	responsible for ensuring the turbine was compatible		15	replacing the LO blades on the turbine end of the
16	and acceptable for the use at Bartow. They were		16	steam turbine prior to restarting operations. The
17	also responsible for providing Duke Energy with the		17	damaged blades were replaced and the operating
18	operating parameters for the unit. DEF was		18	parameters were also adjusted by Mitsubishi,
19	responsible for operating the unit within those		19	resulting in the establishment for the first time
20	parameters, which it did.		20	of a new exhaust pressure limit on the intermediate
21	Notwithstanding DEF's compliance with the		21	pressure portion of the turbine.
22	operating guidelines, during a planned outage in		22	Now, during of this second period of
23	the spring of 2012, after approximately three years		23	operation and you are going to hear us referring
24	of operation, damage was discovered on the last		24	to different periods of operation, and those
25	stage of blades in the low-pressure turbine. The		25	periods are shown on Mr. Swartz's Exhibit JS-2,
Premier Re	porting (850) 894-0828 porting Reported by: Debbie Krick		Premier Repo	ting (850) 894-0828 Reported by: Debbie Krick
[15			16
1	it's No. 80 on the comprehensive exhibit list, and		1	during stable operations, and that was communicated
2	it's Duke Energy's root cause analysis. That		2	to Duke Energy around four months into Period 3.
3	breaks it down into the various periods you are		3	Again, notwithstanding DEF's compliance with
4	going to hear us discuss throughout this hearing.		4	these new operating parameters, including avoiding
5	During the second period of operation, DEF		5	operation in the newly-established avoidance zone,
6	complied with the modified operating parameters,		6	the new upgraded blades again suffered damage. For
7	but DEF wanted to return to the output from the		7	the first time, however, the damaged areas shifted
8	machine that it was previously able to provide when		8	from the mid-span snubbers, which I believe is
9	operated to its original higher specifications. To		9	
10			10	right in the middle of the blade, and shifted out
	be clear, beneficially extracting as much energy			right in the middle of the blade, and shifted out to what's called the Z-locks, which are at the end
11	be clear, beneficially extracting as much energy from the steam being produced by the combustion		11	right in the middle of the blade, and shifted out to what's called the Z-locks, which are at the end of the blade. And this led DEF to the conclusion
11 12	be clear, beneficially extracting as much energy from the steam being produced by the combustion turbines benefits Duke Energy's customers.		11 12	right in the middle of the blade, and shifted out to what's called the Z-locks, which are at the end of the blade. And this led DEF to the conclusion that the modifications simply shifted rather than
11 12 13	be clear, beneficially extracting as much energy from the steam being produced by the combustion turbines benefits Duke Energy's customers. Therefore, during Period 2, DEF contracted for		11 12 13	right in the middle of the blade, and shifted out to what's called the Z-locks, which are at the end of the blade. And this led DEF to the conclusion that the modifications simply shifted rather than corrected the blade issues.
11 12 13 14	be clear, beneficially extracting as much energy from the steam being produced by the combustion turbines benefits Duke Energy's customers. Therefore, during Period 2, DEF contracted for new heavy-duty blades that would allow the machine		11 12 13 14	right in the middle of the blade, and shifted out to what's called the Z-locks, which are at the end of the blade. And this led DEF to the conclusion that the modifications simply shifted rather than corrected the blade issues. This Period 3 experience led to further blade
11 12 13 14 15	be clear, beneficially extracting as much energy from the steam being produced by the combustion turbines benefits Duke Energy's customers. Therefore, during Period 2, DEF contracted for new heavy-duty blades that would allow the machine to produce additional megawatts. When the unit was		11 12 13 14 15	right in the middle of the blade, and shifted out to what's called the Z-locks, which are at the end of the blade. And this led DEF to the conclusion that the modifications simply shifted rather than corrected the blade issues. This Period 3 experience led to further blade modifications and reduced operating parameters in
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22 As a result of that testing, for the first $% \left({{{\left[{{{\left[{{{\left[{{{c_{{\rm{s}}}}} \right]}}} \right.}} \right]}} \right)$ 23 time, Mitsubishi created an avoidance zone, which 24 is a combination of steam pressure and condenser

25 pressures that should be avoided or minimized

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of action was to go back to the first iteration of

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At this point, DEF determined the best course

after approximately five months of operation.

	17		18
1	blades, which, coupled with further reduction in		in addition to cooperating with Mitsubishi on their
2	steam pressure, was thought to provide the best	2	various root cause analyses, which I think you will
3	chance of event-free operation while Duke Energy	3	hear about today, DEF was engaged in performing a
4	and Mitsubishi could more fully understand the	4	root cause analysis analyzing the information
5	cause of the damage. However, DEF's operators	5	gleaned from each of the different incidents.
6	detected an indication of blade damage in these	6	DEF's root cause analysis specifically
7	Period 5 blades after only approximately 1,500	7	considered six potential failure causes, three
8	hours of operation.	8	operational causes and three design causes.
9	Again, the blades were damaged even though the	9	Ultimately, DEF determined that none of the
10	unit was operated pursuant to the most conservative	10	reviewed causes in isolation or in combination
11	guidelines provided to date. Therefore, DEF	11	could explain the various blade episodes. Thus,
12	determined the prudent intermediate path forward	12	DEF was left with one conclusion: The blades' lack
13	was to replace the last-stage blades altogether	13	of adequate design margin did not allow the blades
14	with pressure plates. These plates allow steam to	14	to operate without incident at even the reduced
15	pass through the turbine but do not rotate and,	15	operating pressures recommended by the equipment
16	therefore, do not contribute to generating power	16	manufacturer.
17	resulting in a reduction in potential generating	17	Said differently, under normal operating
18	capacity. However, the pressure plates did allow	18	conditions within Mitsubishi's operating
19	for event-free operation for the benefit of Duke	19	guidelines, the blades were not designed to handle
20	Energy's customers.	20	the pressures found within the low pressure
21	It's also important to remember that DEF was	21	turbine. DEF had no way of knowing this
22	able to discover each instant of blade damage	22	information. It prudently relied on Mitsubishi and
23	instance, excuse me before catastrophic failure	23	operated the machine according to their
24	could occur.	24	instructions, as it would any other machine across
25	As this course of events was playing out, and	25	its fleet.
25 114 W. 5th / Premier Rep	As this course of events was playing out, and wenue, Tallahassee, FL 32303 (850) 894-0828 Reported by: Debbie Krid	25 114 W. 5th Premier Re	its fleet. Avenue, Tallahassee, FL 32303 porting (850) 894-0828 Reported by: Debbie Krick
25 114 W. 5th / Premier Rep	As this course of events was playing out, and venue, Tallahassee, FL 32303 (850) 894-0828 premier-reporting.com Reported by: Debbie Krick	25 114 W. 5th Premier Re	its fleet. Avenue, Tallahassee, FL 32303 (850) 894-0828 premier-reporting.com Reported by: Debbie Krick
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25 114 W. 5th / Premier Rep	As this course of events was playing out, and venue, Tallahassee, FL 32303 (850) 894-0828 remoinded by: Debbie Krick 19 Now, Public Counsel's witness, Mr. Polich, based on his review of documents, has determined	25 114 W. 5th Premier Re	its fleet. Avenue, Tallahassee, FL 32303 (850) 894-0828 Premier-reporting.com Reported by: Debbie Krick 20 experience and blade damage at lower operating pressures show that the original blade damage was
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21 Polich agrees, and the blades still suffered 22 damage, there must be a cause, and that cause

damage, there must be a cause, and that cause isthe lack of adequate design margin as DEF has

24 concluded.

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Now, not only does the later operating

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And Mr. Swartz will testify that the Bartow

plant was operated pursuant to industry standards

and in line with the best interest of customers.

The goal of plant operators is to maximize the

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output of generating units. This allows the

			22
1	utilities to avoid building additional generation		Energy now wants its customers to pay.
2	or operating less cost-effective units to meet	2	As you will see from the evidence, the
3	demand and, therefore, it saves customers money.	3	sequence that links the customers to these errors
4	Moreover, his testimony demonstrates that the steam	4	is tenuous, but the link between Duke Energy's
5	turbine was at all times operated by the guidelines	5	imprudent decisions and these errors is direct and
6	provided by Mitsubishi.	6	proximate. Further, we will show that Duke
7	In short, DEF operated the steam turbine	7	initially concluded that the damage was caused by
8	prudently from commissioning up until the	8	its operation of the plant.
9	February 2017 outage, and prudently installed	9	As an investor-owned utility in Florida, Duke
10	pressure plates in place of the malfunctioning	10	has a duty to make prudent and reasonable decisions
11	blades while a long-term solution could be devised,	11	in operating its generation facilities, and
12	tested and implemented. Therefore, DEF should be	12	regarding any items that add cost for customers.
13	permitted to recover its prudently incurred costs.	13	In this case, Duke had the resources and
14	And I apologize for taking so long, that's	14	information that should have informed them of the
15	more than I have ever said. Thank you.	15	proper operation of the Bartow plant. They knew or
16	THE COURT: I guess Office of Public Counsel	16	should have known that the way the Bartow plant was
17	goes next.	17	being operated was beyond the prudent operation of
18	MR. DAVID: Yes, sir. Good morning, Judge	18	that plant. Through the exercise of due diligence
19	Stevenson.	19	and prudence, Duke should have understood that the
20	My name is Tad David with the Office of Public	20	output was entirely too good to be true. Their
21	Counsel, and we represent the customers of Duke	21	imprudent operation directly damaged this plant and
22	Energy Florida. We are here to establish facts,	22	cost money.
23	facts that we contend showed Duke Energy made	23	In this case, we are asking that the fuel
24	foreseeable errors in the operation of its Bartow	24	clause recovery requested by Duke be reduced by an
25	plant, errors that cost money, money that Duke	25	amount equal to the additional fuel cost caused by
1		1	
	Duke's imprudent operation of the plant, additional		The evidence will snow that the problems, and
2	costs they are now trying to recover from	2	more importantly the costs at issue in this case
5	customers. These costs should not be paid by	5	cascade from buke's operation of the Bartow plant
4	Duke's customers.	4	in that initial period of operation from 2009 to
5	No documentation exists that showed shows the	5	zuiz. This was buke's fault.
0	manufacturer ever indicated that the steam turpine	0	The first evidence that Duke requested
	courd generally be operated to produce an output		Mitsubishi consent to run the plant above
8	above 420 megawatts during the initial period. The	0	420 megawatts was in July of 2012, after the damage
10	100 percente for any subscript of time and	9	had been discovered in the first period.
11	420 megawatts for any extended period of time. And	11	The reply to this request was basically, hold
10	the contract with Mitsubishi, who was manufacturer	11	on, you know, let's be careful. After the damage
12	of the steam turbine, did not contemplate it	12	was discovered in March of 2012, the steam turbine
1.0	operating above 420 megawatts of output.	13	never again consistently achieved 420 megawatts,
14	For the period of July 2009 through	14	except during very limited periods in a testing
10	repruary 2012, Duke operated the steam turbine	15	environment.
17	above 420 megawalls for a total of 2,972 hours,	10	Toton in 2012 Mitchieli indiana and
1.0	inclusion 0.4 house of the second second	1.7	Later in 2012, Mitsubishi indicated that they
18	including 2.4 hours above 450 megawatts, 1,555	17	Later in 2012, Mitsubishi indicated that they could do an analysis of the circumstances that
1.0	including 2.4 hours above 450 megawatts, 1,555 hours above 440 megawatts and 2,302 hours above 430	17 18	Later in 2012, Mitsubishi indicated that they could do an analysis of the circumstances that might allow the plant to produce to consistently
19	including 2.4 hours above 450 megawatts, 1,555 hours above 440 megawatts and 2,302 hours above 430 megawatts.	17 18 19	Later in 2012, Mitsubishi indicated that they could do an analysis of the circumstances that might allow the plant to produce to consistently produce 420 megawatts, but this analysis would cost
19 20 21	including 2.4 hours above 450 megawatts, 1,555 hours above 440 megawatts and 2,302 hours above 430 megawatts. As Mr. Bernier mentioned, in March of 2012,	17 18 19 20	Later in 2012, Mitsubishi indicated that they could do an analysis of the circumstances that might allow the plant to produce to consistently produce 420 megawatts, but this analysis would cost \$232,000 just to perform the analysis. There is no avidence that Duke commissioned Mitsubishi to
19 20 21 22	<pre>including 2.4 hours above 450 megawatts, 1,555 hours above 440 megawatts and 2,302 hours above 430 megawatts. As Mr. Bernier mentioned, in March of 2012, upon a routine inspection of the low pressure section of the steam turbing. Duke discovered that</pre>	17 18 19 20 21	Later in 2012, Mitsubishi indicated that they could do an analysis of the circumstances that might allow the plant to produce to consistently produce 420 megawatts, but this analysis would cost \$232,000 just to perform the analysis. There is no evidence that Duke commissioned Mitsubishi to perform this analysis

23	parts	of	the	turbir	ne were	e damage	ed.	Since	e that
24	time,	for	the	past	eight	years,	Duke	has	been

25 trying to fix this steam turbine.

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In March 2018, Duke completed a root cause

analysis of the problems experienced with the steam

turbine at the Bartow plant. This root cause

	25				26
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1	analysis was originally initiated to establish the			1	after they damaged the turbines to support the idea
2	cause of the damage discovered in during the			2	that similar but not identical situations did not
3	first period beginning, you know, in March of 2012.			3	damage the turbine during the initial period.
4	Drafts of this root cause analysis indicate			4	The evidence they will try to use, in fact,
5	that Duke engineers initially acknowledged that			5	shows that Duke decided it was easier to ask for
6	Duke contributed to the damage by introducing			6	forgiveness than permission to increase the output
7	excessive steam pressure into the low pressure			7	from the steam turbine and that Duke imprudently
8	section of the steam turbine.			8	operated the turbine in such a fashion that it was
9	Over time, Duke's root cause analysis drafters			9	damaged, potentially irreparably damaged.
10	softened the role that the excessive steam pressure			10	This case, as you have already heard, revolves
11	played in the damage and focused instead on the			11	around some technical subjects. We will discuss
12	blade design issues that followed the initial			12	succinctly as possible how this particular type of
13	damage and failures.		:	13	power plant works; how the operation of the plant
14	We do not know the reason behind all the		:	14	affects the components of the plant; and how the
15	subsequent edits or revisions, however, you know,			15	operation and the resulting breakdowns have
16	presumably not because the admitted information		1	16	increased the cost of operating the plant.
17	strengthens the argument that it was not the			17	Lastly, we will explain why it is appropriate
18	problems were not Duke's fault.			18	for only prudently and necessarily incurred fuel
19	The evidence will show that no similar			19	expenses to be recovered from ratepayers in the
20	Mitsubishi steam turbines with the same blades has		:	20	fuel clause.
21	had blade damage or failures like that experienced			21	We cannot forget, Duke bears the burden of
22	at the Bartow plant.		:	22	proof in this case to establish its entitlement to
23	Through Mr. Swartz's direct and rebuttal		:	23	the recovery of replacement power costs as
24	testimony, Duke will try to invert the cause and			24	prudently and necessarily incurred. We are
25	offect in this case. They will point to situations			25	certainly not here to suggest that Duke Energy or
	effect in this case. They will point to situations				cereating not nere to suggest that bake bliefy of
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 22
 share that with you to give you a little sense of

 23
 why I am here and who I represent.

 24
 I think that, as noted, the burden of proof,

25 obviously, is very important. I don't think there

114 W. 5th Avenue, Tallahassee, FL 32303 Premier Reporting (850) 894-0828 issues have been spun off for your consideration,

Duke -- the Commission has already ordered that

Duke recover, its a big number, 1.3 billion

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1	approximately for the record, 1,303,329,632		largely because largely because they can't identify
2	and that's in an order from the PSC. So what we	2	the problem that occurred.
3	are arguing about today is give or take	3	And Mitsubishi is saying, no, we think you
4	approximately one percent of monies that have	4	overran the plant at the beginning, that you put
5	already been ordered to be recovered by the	5	too much steam through it, and you all caused the
6	Commission.	6	problem.
7	And in terms of thinking about how to make the	7	So there is a lot of uncertainty there. These
8	opening point with you, you are going to hear a lot	8	are complicated machines. Overrunning it at the
9	of technical information today. But I think it's	9	beginning, does that have a downstream effect that
10	important to note that, you know, the ratepayers, I	10	these turbine kept breaking?
11	would draw an analogy of the ratepayers maybe to a	11	What we do know is that the turbines continued
12	homeowner who is going to get a new home built.	12	to break and not be operational. And the result
13	And the homeowner contracts with knowledgeable	13	was is that they had to go out and get extra power,
14	people, an architect and a general contractor to	14	and that's what we are arguing about today.
15	build a home. And if a construction defect occurs,	15	But I think it's important that the customers,
16	the homeowner is inclined to say, that's on you	16	you know, not bear this risk. I don't think Duke
17	all, because I don't have expertise in this. I	17	- can make prove the burden. And I am going to
18	relied on you. And I think that ratepayers are in	18	spend a little time asking about, well, how is it
19	a similar position.	19	between Mitsubishi and Duke? I mean, shouldn't you
20	It's a regulatory compact. These are	20	all figure out who is responsible for this?
21	monopolies, but the ratepayers surely don't have	21	And I think you will hear a little bit from
22	the expertise in these areas. And what you have	22	Duke's witness about, well, we really couldn't get
23	here is you have Duke kind of pointing the finger	23	them to assume risk because it's too great of a
24	at Mitsubishi and saying, well, we think it's a	24	risk for going out and buying power and you
25	design defect. And why do they say that? I mean,	25	know, but respectfully, we don't think that risk
	31		32
1			
	should fall on the ratepayers, particularly in this		And it's important to remember that when the
2	case, because we don't believe Duke can carry their	2	steam turbine is running, it always runs at 3,600
3	burden of proof.	3	RPM when it's connected to the grid. And so you
4	So thank you for the opportunity to share	4	are going to hear a lot about the five initial
5	those thoughts with you.	5	period that were studied in the root cause
6	THE COURT: All right. And PCS.	6	analysis. I just want to focus on the last one,
7	MR. BREW: Thank you, Judge Stevenson.		which occurred in February 2017, where a fragment
8	PCS Phosphate operates their phosphate mining	8	of one of the blades flew off at 3,600 RPM, which
9	operating in Hamilton County. It is by far one of	9	means that it was carrying a velocity roughly
10	the largest electric loads on the Duke Energy	10	comparable to a speeding bullet through the turbine
11	system, and so affordable power is crucial to their		until it hit something and caused some damage.
12	operations and fees, quote. That's why we are	12	
13			And that's what we are talking about in terms
14	here.	13	And that's what we are talking about in terms of replacement fuel is the downtime while they
	here. You will find that everyone at these tables	13	And that's what we are talking about in terms of replacement fuel is the downtime while they initially decided how to repair from that damage,
15	here. You will find that everyone at these tables will agree that in its roughly 11-year history, the	13 14 15	And that's what we are talking about in terms of replacement fuel is the downtime while they initially decided how to repair from that damage, where the decision was to take all the blades out,
15	here. You will find that everyone at these tables will agree that in its roughly 11-year history, the Bartow plant hasn't run as expected, that there are	13 14 15 16	And that's what we are talking about in terms of replacement fuel is the downtime while they initially decided how to repair from that damage, where the decision was to take all the blades out, all the zero level blades out and put in the
15 16 17	here. You will find that everyone at these tables will agree that in its roughly 11-year history, the Bartow plant hasn't run as expected, that there are a series of events all involving the last level of	13 14 15 16 17	And that's what we are talking about in terms of replacement fuel is the downtime while they initially decided how to repair from that damage, where the decision was to take all the blades out, all the zero level blades out and put in the pressure plate that Mr. Bernier talked about, which
15 16 17 18	here. You will find that everyone at these tables will agree that in its roughly 11-year history, the Bartow plant hasn't run as expected, that there are a series of events all involving the last level of blades, the L0 blades and the failures, and you	13 14 15 16 17 18	And that's what we are talking about in terms of replacement fuel is the downtime while they initially decided how to repair from that damage, where the decision was to take all the blades out, all the zero level blades out and put in the pressure plate that Mr. Bernier talked about, which downgraded the unit, so it was it lost about
15 16 17 18 19	here. You will find that everyone at these tables will agree that in its roughly 11-year history, the Bartow plant hasn't run as expected, that there are a series of events all involving the last level of blades, the L0 blades and the failures, and you will get a real education on that.	13 14 15 16 17 18 19	And that's what we are talking about in terms of replacement fuel is the downtime while they initially decided how to repair from that damage, where the decision was to take all the blades out, all the zero level blades out and put in the pressure plate that Mr. Bernier talked about, which downgraded the unit, so it was it lost about 10 percent of its production capacity that
15 16 17 18 19 20	here. You will find that everyone at these tables will agree that in its roughly 11-year history, the Bartow plant hasn't run as expected, that there are a series of events all involving the last level of blades, the LO blades and the failures, and you will get a real education on that. What we also agree on is that the manufacturer	13 14 15 16 17 18 19 20	And that's what we are talking about in terms of replacement fuel is the downtime while they initially decided how to repair from that damage, where the decision was to take all the blades out, all the zero level blades out and put in the pressure plate that Mr. Bernier talked about, which downgraded the unit, so it was it lost about 10 percent of its production capacity that consumers have had to deal with for almost three
15 16 17 18 19 20 21	here. You will find that everyone at these tables will agree that in its roughly 11-year history, the Bartow plant hasn't run as expected, that there are a series of events all involving the last level of blades, the LO blades and the failures, and you will get a real education on that. What we also agree on is that the manufacturer of the steam turbine, Mitsubishi, has no prior	13 14 15 16 17 18 19 20 21	And that's what we are talking about in terms of replacement fuel is the downtime while they initially decided how to repair from that damage, where the decision was to take all the blades out, all the zero level blades out and put in the pressure plate that Mr. Bernier talked about, which downgraded the unit, so it was it lost about 10 percent of its production capacity that consumers have had to deal with for almost three years now.

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happened at Bartow; that Duke has no prior

the configuration of this plant.

experience operating a combined cycle facility in

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that we still don't know if the plant is fixed. We

addressed; that Duke and Mitsubishi worked together

still don't know if the real root cause has been

	33		
1	when they finally decided to focus on vibration		
2	levels to do some actual telemetry testing for		
3	vibration, and they are now insisting that their		
4	vibration monitoring be part of the new fix.		
5	So to our mind, Duke hasn't really established		
6	that it has still figured out how to repair the		
7	plant, but clearly the burden lies with them.		
8	Thank you.		
9	THE COURT: And the Commission.		
10	MS. BROWNLESS: We will waive opening		
11	statements. Thank you.		
12	THE COURT: I don't know whether you are here		
13	as a referee or what. Thank you.		
14	MR. REHWINKEL: Your Honor		
15	THE COURT: Yes, sir.		
16	MR. REHWINKEL: if I could interject. I		
17	have a housekeeping matter.		
18	We have a copy of the documents we were		
19	required to bring today. Would you like me to give		
20	you those now?		
21	THE COURT: Sure. That would be fine.		
22	MR. REHWINKEL: Okay. And I also wanted to		
23	mention that we've identified exhibits. There are		
24	two additional exhibits that we have distributed to		
25	all the parties that I would just ask at this		
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25	there a copy for the witness when they are up
24	MR. BERNIER: I have another question. Is
23	it's a skinny one.
22	it's the last one. It's the last document. No,
21	MR. REHWINKEL: It's in the other pouch, and
20	MS. BROWNLESS: And what is 116?
19	MR. REHWINKEL: Yes.
18	RCA draft exhibit is 115?
17	want to make sure I am doing this correctly. This
16	MS. BROWNLESS: Excuse me, Charles, I just
15	that then. I will give you your set.
14	MR. REHWINKEL: That way we won't have to do
13	for identification.)
12	(Whereupon, Exhibit Nos. 115 & 116 were marked
11	THE COURT: Identify as 115 and 116.
10	MR. BERNIER: Identify them for discussion.
9	THE COURT: Okay. We will just identify them.
8	right to object at that time.
7	that point. I don't know yet, so I will withhold
6	that are being asked, there may be objections at
5	being marked at this time. Based on the questions
4	MR. BERNIER: So we have no objection to this
3	envelope that says telemetry on it.
2	40-inch blade telemetry. And that's the other
1	which would be 116, and it would be March 18, 2015,

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1	time oftentimes at the Commission, when we have
2	cross-examination exhibits, we don't normally
3	pre-identify them, but I have done that.
4	One of them is an exhibit that is excerpts
5	from what would be Exhibits 102 and 103, and I have
6	talked to counsel for the company about that.
7	Everyone has it in the red folders that we've
8	distributed, and I would just ask if I could get
9	agreement that that would be admitted into the
10	record under the same conditions that the other
11	documents have and given a number?
12	MR. BERNIER: Which one was the excerpts from
13	102 and 103? Of this?
14	MR. REHWINKEL: It's in the first one. It's
15	got the tabs on it.
16	THE COURT: So you are saying, Mr. Rehwinkel,
17	you want these sort of pulled out and identified as
18	a separate exhibit?
19	MR. REHWINKEL: Yes, Your Honor. They don't
20	have a number at this time, but assuming that we
21	have no objection to it, I think it would be given
22	No. 115.
23	THE COURT: 115.
24	MR. REHWINKEL: It would be called draft
25	RCA draft exhibit. And then there is one other one
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25	Raise your right hand.
24	offered testimony, but I will swear you in.
23	THE COURT: Mr. Swartz. You have already
22	Mr. Jeff Swartz.
21	MR. BERNIER: Thank you. Duke Energy calls
20	preliminaries, I guess we are ready for Mr. Swartz.
19	THE COURT: If there is no other
18	MR. REHWINKEL: Okay.
17	okay.
16	THE COURT: That's fine. That's perfectly
15	we just got this taken care of.
14	schedule there, but I thought it would be better if
13	MR. REHWINKEL: I apologize for going off the
12	MS. BROWNLESS: Thank you for being patient.
11	MR. REHWINKEL: Yeah.
10	MS. BROWNLESS: Okay.
9	MR. HERNANDEZ: That's it.
8	MR. REHWINKEL: It has a cover on it.
7	MS. BROWNLESS: I'm sorry.
6	number on the top right-hand, so it's blank.
5	MR. HERNANDEZ: It does not have an exhibit
4	outside, Charles?
3	MS. BROWNLESS: What does it say on the
2	MR. REHWINKEL: I don't have one.
1	there?

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	1	Whereupon,			1	ask that Mr. Swartz's prefiled direct testimony,
4	2	JEFF SWARTZ			2	dated March 1, 2019, be entered into the record as
	3	was called as a witness, having been first duly sworn to			3	though read.
4	-	speak the truth, the whole truth, and nothing but the			4	THE COURT: Hearing no objections, we will
	5	truth, was examined and testified as follows:			5	show that done.
6	5	THE WITNESS: 1 do.			6	(Whereupon, prefiled direct testimony was
	/	THE COURT: Have a seat.			/	inserted.)
5	5	EXAMINATION			8	
-	9	BY MR. BERNIER:			9	
10	,	Q Mr. Swartz, could you please provide your name			10	
11	1	and job title for the record, please?			10	
12	2	A Jerr Swartz. 1 am the Vice-President of			12	
13	3	Generation for Duke Energy Florida.			13	
1.6	-	Q Thank you.			16	
10	-	And on or about March 1st, 2019, did you cause			10	
10	0	to be filed direct testimony in the 2019 fuel docket			17	
10	/	before the florida Public Service Commission?			10	
10	5				10	
13	9	Q And do you have a copy of that testimony with			19	
21	1	you today?			20	
21	L 2	A I do.			21	
22	2	today, would your appyon to the same questions here			22	
23	2	today, would your answers be the same?			23	
25	-	MP PEPNIEP. Judge at this time we would			25	
		M. Diwink. Stage, at this time, we would				
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		DEFORE THE FLORIDA NUM IS SERVICE COMMISSION			0	New Joseffer and and a leader of a first state of the
		DIDECT TESTIMONY OF		1	Q.	riease describe your educational background and professional experience.
		IEEEDEV SWADT7		2	л.	State Naval Academy in 1995. I have 17 years of power plant and production
		ON REHALF OF		3		experience in various managerial and executive positions within Duke Energy
				5		managing Eossil Steam Operations Combustion Turking Operations and Nuclear Plant
		DOCKET NO. 20190001-FI		6		Operations While at Duke Energy I have managed new unit projects from construction
		MARCH 1 2019		7		to operation and I have extensive contract negotiation and management experience
				8		Ny prior experience also includes nuclear engineering and operations experience in the
1	0.	By whom are you employed and in what capacity?		9		United States Navy and project management, engineering, supervisory and
2	A.	I am employed by Duke Energy Florida ("DEF" or the "Company") as Vice President		10		management experience with a pulp, paper and chemical manufacturing company.
3		– Generation.		11		
4				12	0.	What is the purpose of your testimony?
5	Q.	What are your responsibilities in that position?		13	A.	The purpose of my testimony is to provide the Commission with information related to
6	A.	As Vice President of DEF's Generation organization, my responsibilities include		14		the Bartow Steam Turbine (ST) forced outage that occurred from February 9, 2017
7		overall leadership and strategic direction of DEF's power generation fleet. My maior		15		through April 8, 2017, including background information on the event that led to the
8		duties and responsibilities include strategic and tactical planning to operate and		16		outage, an explanation of DEF's responsive actions, a presentation of DEF's root cause
9		maintain DEF's non-nuclear generation fleet; generation fleet project and additions		17		analysis and findings, and an explanation of DEF's reasonable and prudent restoration
10		recommendations; major maintenance programs; outage and project management;		18		actions.
11		retirement of generation facilities; asset allocation; workforce planning and staffing;		19		
12		organizational alignment and design; continuous business improvements; retention and		20	Q.	Please provide a summary of your testimony.

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21 A.

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inclusion; succession planning; and oversight of hundreds of employees and hundreds

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of millions of dollars in assets and capital and operating budgets.

On February 9, 2017, the Bartow steam turbine was removed from service due to an

indication of a sodium leak into the steam water cycle. During this shutdown, DEF

discovered a failed LP turbine rupture disk. The disk had been breached by a foreign

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1		object that caused a hole in the rupture diaphragm. DEF performed an inspection of the
2		Bartow Steam Turbine ("ST") and discovered damage to the ST's L-0 blades (and
3		determined part of an L-0 blade ruptured the LP turbine rupture disk), resulting in a
4		forced outage to the ST that lasted until April 8, 2017 (while the ST was off-line, the
5		Bartow combustion turbines ("CTs") remained available to run in simple cycle mode).
6		DEF performed a Root Cause Analysis ("RCA") that determined the failure of the
7		Bartow ST's L-0 Blades was caused by events beyond DEF's control, and DEF could
8		not have reasonably prevented the failure from occurring. The results of DEF's RCA
9		were discussed in more detail in my March 1, 2018 testimony filed in Docket No.
10		20180001-EI, which I adopt and incorporate as if fully set forth herein. DEF's actions
11		prior to and in the wake of the blade failure were reasonable and prudent.
12		
13	Q.	Are you sponsoring any exhibits?
14	А.	Yes. I am sponsoring the DEF RCA Report, attached as Exhibit No (JS-1) to my
15		March 1, 2018 testimony filed in Docket No. 20180001-EI.
16		
17	Q:	Is the RCA considered confidential by the Company?
18	A:	Yes. Portions of the RCA's findings are considered proprietary and confidential by the
19		blades' manufacturer. In order to protect the OEM's rights, this information has been
20		treated by the Company as proprietary confidential business information and has not
21		been made publicly available. As part of the stipulation reached on Issue 1B in Docket
22		No. 20180001-EI, DEF committed to work with the OEM to revise the confidentiality
23		request; DEF intends to fully comply with that stipulation.

3

2 0. Please summarize the events leading up to the 2017 Bartow event. 3 Α. Bartow is a 4x1 Combined Cycle ("CC") Station with a ST manufactured by Mitsubishi Hitachi Power Systems ("MHPS"). The ST was purchased from a company л 5 that intended to use it for a 3x1 CC with a gross output of 420MW. The ST was never 6 delivered to that third party but instead remained with MHPS in a warehouse in Japan until DEF purchased the unit in 2006. 7 Before the ST was purchased, DEF contracted with MHPS to evaluate the ST design 8 9 conditions and to update heat balances for a 4x1 CC configuration. CC units blend 10 steam from the CTs as they start-up and/or shut-down with steam to the ST. These blending events result in brief periods of higher steam temperatures and flows into the 11 condenser below the ST L-0 blades, a common occurrence for CC units. 12 Since commissioning of the Bartow ST in 2009, there have been five (5) events 13 involving L-0 blade failures and/or replacements. The latest blade failure occurred 14 when a "loss of mass" event resulted in a blade fragment traveling through the Low-15 Pressure Turbine rupture disk diaphragm. 16 17 What actions did DEF take in response to the February 2017 failure? 18 0. The Company took three primary actions in the wake of the event: a root cause team 19 Α 20 was established to investigate the incident and prepare a root cause analysis; a 21 restoration team was formed to bring the unit back on-line; and a team was formed to

22 evaluate a long-term solution for Bartow.

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1	Q.	Please describe the process DEF followed to ascertain the root cause of the event.
2	Α.	DEF created a RCA Team consisting of internal experts to investigate and determine
3		the root cause of the event. The RCA Team consisted of seven individuals with
4		expertise in engineering, operations and process, and human performance.
5		
6		Following industry standard procedures, the RCA Team employed specific tools used
7		to determine potential root cause(s) including: interviews, event and causal factor
8		review ("E&CF"), flawed barrier analysis, change analysis, component analysis, visual
9		inspections of the equipment, photographs taken following the event, engineering
10		calculations and measurements, and detailed review of outage reports and maintenance
11		logs.
12		
13		DEF's findings are fully set forth in the RCA identified as Exhibit No(JS-1) to my
14		March 1, 2018 testimony in docket No. 20180001-EI and as summarized in my
15		testimony of that date. To avoid unnecessary repetition, those findings will not be
16		rehashed here.
17		
18	Q.	What restoration process did DEF follow to bring th
19		service?
20	А.	It's important to recall that the four Bartow CTs were able to continue operation in
21		simple cycle mode (i.e., without operation of the ST) notwithstanding the blade failure.
22		DEF worked with the OEM to identify and implement an interim solution that would
23		allow the ST to resume operation, ultimately resulting in the installation of a pressure

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plate in place of the L-0 blades on March 22, 2017. The plate allows the ST to operate

	increasing the energy output of Bartow above what was possible in simple cycle mode.
	As mentioned above, the ST returned to service on April 8, 2017.
Q.	Could DEF have reasonably prevented the event and the ensuing outage at
	Bartow?
А.	No, the outage was caused by circumstances beyond DEF's reasonable control, as

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- 8 demonstrated by the RCA. DEF was not at fault.
- 10 Q. Did DEF act reasonably and prudently to restore Bartow to service in a timely 11 fashion? 12 Α. Yes, DEF took reasonable and prudent steps to develop a restoration team and guiding 13 processes to restore the Bartow ST to service. The restoration team followed those processes and the unit was successfully brought back on line in a timely manner. 14 15 Did DEF's agreement with the OEM include a provision obligating for the OEM 16 0.
- 17
 to contribute funds towards replacement power costs in the event of an outage

 18
 caused by the OEM's product?

 19
 A.
 No; to the contrary, the agreement specifically disclaimed any liability for
- 20 consequential damages.
- Q. In your experience, do DEF's agreements with OEMs usually include a similar
 disclaimer of liability?

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1 1		00111	1	BY MR. BERNIER:	
1 A.	consequential damages (such as replacement power costs) given the uncertain and		2	Q Mr. Swartz, have you prepared a summary of	
2	potentially open-ended liability. To my knowledge this is the case throughout the		3	your direct testimony?	
4	industry		4	A I have.	
5	industry.		5	Q And could you provide that, please?	
6 O .	Have you or anyone under your supervision engaged in negotiations with a vendor		6	A Certainly.	
7	that was willing to accept consequential damages as part of a component part		7	Good morning, Judge Stevenson. Again, my name	
8	nurchase order?		8	is Jeff Swartz. I am the Vice-President of Generation	
9 A.	No, in DEF's experience, vendors do not offer to accept consequential damages as part		9	for Duke Energy Florida. I will say DEF in the future.	
10	of the terms and conditions of their agreements. Further, when DEF has indicated that		10	That meanings I have overall responsibility for DEF's	
11	such a provision would be a required part of the agreement, vendors have indicated		11	generation fleet.	
12	they would withdraw rather than agree to those terms. DEF simply has not found such		12	My direct testimony provides background	
13	a provision to be commercially available.		13	regarding the issues that have arisen over the past few	
14			14	years with the Bartow combined cycle plant steam	
15 Q.	Does that conclude your testimony?		15	turbine, an explanation of DEF's response to those	
16 A.	Yes.		16	issues, including a summary of DEF's actions to restore	
			17	the unit to service as quickly as possible. And finally	
			18	a presentation of DEF's root cause analysis.	
			19	In short, after analyzing data from each of	
			20	the blade failures that I will discuss in a moment, DEF	
			21	determined that the only causal factor that explains	
			22	each failure, and accounts for the different conditions	
			23	attended to each failure, is that the blades lack	
			24	sufficient design margin to effectively operate in the	
	7		25	Bartow steam turbine.	
	47			46	8
1	47 Bartow steam turbine was manufactured by		1	40 through the blades in the turbine sections, it spins the	8
1	47 Bartow steam turbine was manufactured by Mitsubishi Hitachi Power Systems. The combined cycle		1 2	40 through the blades in the turbine sections, it spins the blades which, in turn, spin the rotor. The rotor is	8
1 2 3	47 Bartow steam turbine was manufactured by Mitsubishi Hitachi Power Systems. The combined cycle was placed into service in the year 2009.		1 2 3	40 through the blades in the turbine sections, it spins the blades which, in turn, spin the rotor. The rotor is connected to a generator, and the generator is what	8
1 2 3 4	47 Bartow steam turbine was manufactured by Mitsubishi Hitachi Power Systems. The combined cycle was placed into service in the year 2009. And briefly some background. A combined cycle		1 2 3 4	through the blades in the turbine sections, it spins the blades which, in turn, spin the rotor. The rotor is connected to a generator, and the generator is what produces electricity.	8
1 2 3 4 5	47 Bartow steam turbine was manufactured by Mitsubishi Hitachi Power Systems. The combined cycle was placed into service in the year 2009. And briefly some background. A combined cycle power plant uses both gas and steam turbines together to		1 2 3 4 5	through the blades in the turbine sections, it spins the blades which, in turn, spin the rotor. The rotor is connected to a generator, and the generator is what produces electricity. At issue in this proceeding is the low	8
1 2 3 4 5 6	47 Bartow steam turbine was manufactured by Mitsubishi Hitachi Power Systems. The combined cycle was placed into service in the year 2009. And briefly some background. A combined cycle power plant uses both gas and steam turbines together to produce electricity. Combustion of natural gas in the		1 2 3 4 5 6	through the blades in the turbine sections, it spins the blades which, in turn, spin the rotor. The rotor is connected to a generator, and the generator is what produces electricity. At issue in this proceeding is the low pressure section, specifically the last stage of blades	8
1 2 3 4 5 6 7	47 Bartow steam turbine was manufactured by Mitsubishi Hitachi Power Systems. The combined cycle was placed into service in the year 2009. And briefly some background. A combined cycle power plant uses both gas and steam turbines together to produce electricity. Combustion of natural gas in the gas turbine turns a generator producing electricity, and		1 2 3 4 5 6 7	through the blades in the turbine sections, it spins the blades which, in turn, spin the rotor. The rotor is connected to a generator, and the generator is what produces electricity. At issue in this proceeding is the low pressure section, specifically the last stage of blades in the low pressure section. They are called the L0	8
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1 2 3 4 5 6 7 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25			1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25	through the blades in the turbine sections, it spins the blades which, in turn, spin the rotor. The rotor is connected to a generator, and the generator is what produces electricity. At issue in this proceeding is the low pressure section. They are called the IO blades. The low pressure turbine at Bartow is a dual-flow unit, meaning the steam is admitted in the middle of the turbine and then flows axially in opposite directions through rows of blade. So thus, there are two rows of LO blades, one at each end of the machine. And if I could, Your Honor, I think it if I could stand up at this point -:. THE WITNESS: and use some of these exhibits over here, it might be helpful. I think I i agoing to move of this out of the way so everybody can see. First, this is a overall plant. This is the fombined cycle plant. This is the gas turbine right here. The gas turbine can run on its own. Gas is admitted in the middle. The combustion process of gas and air, compressed air spins a rotor, turns this	8

			50
1	generator producing electricity.		exhausted into a condenser.
2	In simple cycle mode, the exhaust gases from	2	This, again, is rotating the shaft. This is
3	that combustion just flow up this stack to the	3	one common shaft that's bolted together here and
4	atmosphere. The beauty of combined cycle operation	4	bolted together here, and then the generator
5	is that we can take that energy that's in that heat	5	produces electricity.
6	and swing a damper and make the gases flow this way	6	And like I said, at issue in this proceeding
7	instead.	7	is the last stage of blades in this low pressure
8	All this represents what's called the heat	8	turbine. So it would be right here and right here,
9	recovery steam generator. It's a boiler. There is	9	the longest stage of blades. The blades get
10	water in tubes that heat, and these exhaust gases	10	successively longer as the steam flows through the
11	heat the water in the tubes, and then the water is	11	machine because the steam is losing energy as it
12	turned into steam. That steam then is then reused	12	travels through the machine. It's transferring
13	in the turbine generator unit. It's admitted into	13	energy to the blades making them rotate. The
14	the high pressure turbine, and then actually sent	14	blades have to be bigger and longer in order for
15	back to the heat recovery steam generator, reheated	15	the lower energy steam to have any effect. So the
16	to get more energy into the steam. If you raise	16	longest blades are the LO blades.
17	the temperature of the steam, it raises the energy	17	This is an actual L0 blade from the Bartow
18	level. It's then readmitted to the intermediate	18	combined cycle low pressure turbine. There is
19	pressure turbine But this is really one shaft	19	you can see it's curved. This is the blade itself
20	with blades connected to it	20	It's very heavy It's about 60 pounds A big
21	And then the exhaust from this intermediate	21	niece of metal
22	pressure turbine goes to the low pressure turbine	22	The issue that we've had is that the mid-span
22	and some steam from the heat recovery steam	23	there is competing called spublics. And at the
2.0	and some steam from the heat recovery steam	23	tin there is something called Shubbers. And at the
24	the middle flows in both directions and then is	29	These blades area it connected to one another
	51		
1			52
2	during when the turbine is stationary. When the	1	And I wanted to make that clear, because
3	during when the turbine is stationary. When the turbine starts spinning, and someone already said,	1 2	And I wanted to make that clear, because through proactive action, we were able to find that
	during when the turbine is stationary. When the turbine starts spinning, and someone already said, it spins at great speed, 3600 revolutions per	1 2 3	And I wanted to make that clear, because through proactive action, we were able to find that damage before the blade itself was damaged, which
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4 5	during when the turbine is stationary. When the turbine starts spinning, and someone already said, it spins at great speed, 3600 revolutions per minute, so 60 cycles per second. Think about that. It's spinning that rapidly,	1 2 3 4 5	And I wanted to make that clear, because through proactive action, we were able to find that damage before the blade itself was damaged, which could have been much more catastrophic. Thank you for allowing me to show that.
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[
1	guidelines provided by the manufacturer. Those	1	to be discovered even after the operating pressures			
2	guidelines are based on the manufacturer's	2	were curtailed, DEF determined that the ultimate			
3	calculations of permissible steam flows, pressures	3	causation had to be the blades' lack of sufficient			
4	and temperatures. With one exception in Period 3,	4	design margin.			
5	when new hardened blades were installed, each	5	With the discovery of the blade damage at the			
6	operating parameter modification lowered	6	end of Period 5, DEF determined that the most			
7	permissible pressures which resulted in a	7	prudent means of returning the steam turbine to			
8	corresponding reduction in electrical output from	8	service while a long-term solution to the blade			
9	the generator.	9	issues could be determined, designed and			
10	Notwithstanding DEF's adherence to these	10	implemented was to replace the last stage blades			
11	operating instructions, each period concluded with	11	with what are called pressure plates, as Mr.			
12	discovery of blade damage. Of particular	12	Bernier said.			
13	importance to DEF's root cause analysis was the	13	It's important to remember that while the unit			
14	experience of Period 5. The lessons learned from	14	was off-line and the pressure plates were being			
15	that period have significant importance because the	15	installed, the four combustion turbines continued			
16	blades used during that time were of the same	16	to operate in simple cycle mode and provide service			
17	design as the original iteration, and LO blade	17	to our customers.			
18	damage was discovered despite the unit being	18	For reference, a pressure plate is just what			
19	operated well below the originally provided	19	it sounds like, it's a non-rotating plate, as Mr.			
20	operating parameters.	20	Bernier mentioned. Instead of a blade reducing the			
21	Therefore, DEF's operation of the unit was not	21	pressure and the energy of the steam before it goes			
22	the cause of the iterative blade damage. As	22	into the condenser, there is holes drilled in the			
23	mentioned earlier, after analyzing the available	23	pressure plate which reduce the pressure so that			
24	data from each of the operational periods, and	24	the steam then doesn't damage the condenser. So it			
25	taking note of the fact that blade damage continued	25	takes that work out of the steam without the			
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25	EXAMINATION
24	MR. REHWINKEL: Yes.
23	of cross? Public Counsel is first?
22	THE COURT: Is there an agreement as to order
21	tender Mr. Swartz for cross-examination.
20	MR. BERNIER: Thank you, Judge. We will
19	Thank you.
18	I look forward to answering your questions.
17	prudently incurred replacement power costs.
16	and DEF should be permitted recovery of its
15	response to the February 2017 outage were prudent,
14	parameters, DEF's actions leading up to and in
13	operated the unit within the OEM's operating
12	design margin, and because DEF at all times
11	the blades in question did not have the necessary
10	Because DEF did not and could not know that
9	event-free for the past two-and-a-half years.
8	unit to return to service quickly and to operate
7	However, the pressure plate allowed for the
6	energy of the steam passing through it.
5	because the unit is not getting all the available
4	therefore, there is a decrease in efficiency
3	passing through it to produce electricity and,
2	So the pressure plate does not use the steam
1	benefit of making extra productive work, a product.

1	BY MR. REHWINKEL:
2	Q Good morning, Mr. Swartz.
3	A Good morning.
4	Q Can you tell me your full name, please?
5	A Jeffery Raymond Swartz.
6	Q Okay. And you are the Duke witness alone, who
7	alone is here to provide whatever evidence you feel is
8	most relevant to meet your burden to demonstrate that
9	Duke acted prudently in operating the Bartow steam
10	turbine; is that right?
11	A Yes, sir.
12	Q Would you also agree with me that JS-2 is the
13	principal piece of evidence that Duke submits as your
14	explanation of the cause of the failure of the various
15	sets of blades at the unit?
16	A Yes.
17	Q And just for the record, JS-2 was the same as
18	JS-1, it just has a different level of confidentiality,
19	right?
20	A Correct.
21	Q The RCA can you agree with me that if I ask
22	you about an RCA, it means a root cause analysis?
23	A Yes, that's correct.
24	Q Okay. And this RCA is the sum of the evidence
25	that you contend proves that Duke acted prudently at all
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1	times; is that right?	1		Q	Would you agree with me that a true RCA should
2	A Yes.	2	not	be a	n advocacy document that is biased in its scope
3	Q And, Mr. Swartz, isn't it also true that	3	or a	analy	sis?
4	sometime after March of 2012, Duke began, at least	4		A	Correct. It should dig into the issues and
5	informally, the process of determining a root cause of	5	unde	ersta	nd the lessons learned so we can improve.
6	the problems that you identified after the March 2012	6	That	t's t	he purpose.
7	discovery of the blade damage?	7		Q	Okay. The RCA should also not be designed to
8	A Yes, that's correct.	8	read	ch pr	edetermined or confirmatory conclusions, should
9	Q And am I correct in assuming that a root cause	9	it?		
10	analysis is important to any utility as a way of	10		A	Correct.
11	understanding their operations for and understanding and	11		Q	Would you agree with me that the final RCA
12	apply lessons learned and improving processes for safety	12	docu	ument	that was ultimately prepared was at least in
13	and efficiency purposes?	13	part	t don	e so with an eye toward making Duke's case to
14	A Yes. Absolutely.	14	the	Flor	ida Public Service Commission that you believed
15	Q And that RCA process is part of the Duke	15	you	were	not imprudent in the actions related to the
16	culture?	16	blad	de fa	ilures and the need to buy replacement power?
17	A It is.	17			MR. HERNANDEZ: Objection, compound.
18	$\ensuremath{\mathbb{Q}}$ Would you agree with me, to be effective, the	18			THE WITNESS: The root cause
19	RCA process must be objective and honest and designed	19			THE COURT: Hang on.
20	and executed to get to the truth, even if it's not a	20			THE WITNESS: Sorry.
21	flattering view of how the company conducted operations?	21			THE COURT: Yeah, could you break it down? It
22	A Yes.	22		was	two questions there.
23	Q Would you also agree with me that a true RCA	23			MR. REHWINKEL: Okay.
24	should not be an advocacy document, that it	24	BY 1	MR.R	EHWINKEL:
25	A Could you ask that again, please?	25		Q	Would you agree that the RCA was produced, at
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least in part, with an eye toward making your case to	1 the September 22nd, 2017, Mitsubishi RCA, that I will
the Public Service Commission?	2 specifically refer to that as Mitsubishi's RCA; you
A I would not think about it that way. The root	3 understand that?
cause was truly to dig into what happened, what can we	4 A I understand.
learn from that? How are we going to improve?	5 Q Okay. And when I ask you or when I say
There are many not many, but there are	6 Duke, can you agree with me that even though Duke's
times when we have root causes, or any causal analysis	7 merger with Progress Energy occurred in July of 2012,
when there is a likelihood that there might be legal	8 that any relevant actions or inactions that transpire
proceedings attached to it, and so we will make sure	9 or should have done so, under the control of Progress
that we follow certain guidelines from an	10 Energy Florida's management are the same as if those
attorney-client privilege standpoint, which we did in	11 things happened or didn't under Duke's management
this one because we thought that there could be, but it	12 control?
wasn't what you are suggesting. It was truly to get at	13 MR. HERNANDEZ: Objection, Judge, calls for
the issues and learn.	14 legal conclusion.
Q Okay. So is it also true that the RCA is your	15 THE COURT: I will overrule. I mean, if yo
final product of an inte well, let me ask you this:	16 know.
When I ask you about an RCA if I ask you about the	17 THE WITNESS: Could you ask that again,
RCA, or the Duke RCA, can you agree with me that we are	18 please?
talking about JS-2?	19 BY MR. REHWINKEL:
A Yes.	20 Q Let me ask it a different way.
Q Okay. So is it true that the RCA is your	21 Will you agree with me that Duke today, in
final product of an iterative and continuous root cause	22 this case, stands in the shoes of Progress Energy for
analysis process that dates back to 2012?	23 all relevant actions that occurred related to this
A Yes, that's correct.	24 Bartow steam unit?
Q And can we also agree that if I ask you about	25 A Yes.
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8 when there is a likelihood that there might be legal

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1	Q Can you tell me when you first had the			It's a significant issue. And so under my direction, we
2	responsibility of overseeing the Bartow plant?		2	started what became a very long root cause because we
3	A It was at the beginning of 2012, when I first		3	kept learning more as each iteration of failure
4	actually assumed the position I am still currently in.		4	occurred.
5	So just about eight years ago. Prior to that, I wasn't		5	Q Okay. Can we agree that when I make a
6	directly involved with the operation of the Bartow site.		6	reference to a period like 1, 2, 3, et cetera, that you
7	Q Okay. So when you said the beginning of 2012,		7	understand them to be many as they are defined in the
8	you mean you were a Progress Energy employee?		8	first two rows in Table A on page five of the Duke RCA?
9	A Yes, as a Progress Energy employee.		9	A Yes.
10	Q Okay. And tell me what your role was.		10	Q Okay. So you were with Duke and had executive
11	A In January of 2012, I became the vice we		11	oversight over the plant during Period 1, is that right;
12	made some organizational changes at the beginning of		12	during the very last few days of Period 1?
13	2012 while we were still Progress Energy in anticipation		13	A That's correct.
14	of the merger. So prior to that, I was in our nuclear		14	Q Okay. And I think you just said so, but I
15	generation group during the year 2011, but in		15	want to make sure I understand. You were the person
16	anticipation of the merger closing, we did some		16	responsible for initiating the RCA process that we are
17	reorganization, and I became the Vice-President of		17	talking about here today?
18	Generation for the Florida region		18	A That's correct.
19	Q Okay.		19	Q Okay. And would that also mean that you were
20	A the fossil generation and not nuclear.		20	the person most responsible for assigning the employees
21	Q Tell me when your first time was having a role		21	to conduct the RCA process?
22	or responsibility in the Bartow blade failure RCA		22	A I had an overview of that, and I could weigh
23	process?		23	in on the team makeup, yes.
24	A When we first found the issues in the spring		24	Q Okay. Now, I think you said in before to
25	of 2012, and we needed to know what the causes were.		25	me that for the RCA team that was for the RCA process
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	63
1	that was conducted after Period 5, you did assign the
2	members of the team that responsibility with you, is
3	that right?
4	A I didn't specifically assign the people. I
5	could have modified the group. I had input into the
6	team members. I don't remember specifically assigning
7	the individuals.
8	Q Well, let me ask it this way: Isn't it true
9	that the responsibility for assigning the members to the
10	team
11	A Yes, sir.
12	Q was yours?
13	A That's correct.
14	Q Okay. Was that true just after the March 2017
15	events, or all throughout this long RCA process?
16	A All throughout.
17	Q Okay. Now, I think in your testimony you
18	mentioned a long-term solution team, is that right?
19	A Yes.
20	Q And it's fair to say the long-term solution
21	team and the RCA team worked somewhat in concert through
22	the process, at least since Period 5; is that right?
23	A That's correct.
24	Q And would you have had the responsibility of
25	assigning the members to both the RCA and the long-term
L	

	64
1	colution tom?
	A les.
	Q Okay. Throughout the RCA process, going back
4	to 2012, would it be fair to say that you did review and
5	provide edits to some of the drafts in the process?
6	A I know I reviewed some. I don't recall if I
7	provided edits.
8	Q Okay. If I saw a draft that had the initials
9	JRS on either a comment or an edit, you are the only JRS
10	that would have been allowed to make edits to those
11	documents; is that right?
12	A I don't know if I am the only one, but it's
13	likely me, yes.
14	Q You didn't give me names of anybody in the
15	root cause team that had the initials JRS, right?
16	A Not that I recall.
17	Q Okay. Would it be fair to say that even
18	though the engineers that were primarily associated with
19	the RCA worked for what you called Duke's central
20	engineering, in this project, they had at least a dotted
21	line responsibility to you in the RCA process in that
22	you were the highest Florida Power generation executive
23	in charge of the Bartow project?
24	A Yes, that's fair.
25	$\ensuremath{\mathbb{Q}}$ $\ensuremath{}$ And you would agree with me that the draft

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	65
1	documents that were provided to the Public Counsel as a
2	result of late filed Exhibits 4, 5 and 6 of your
3	deposition constituted a part of the work product
4	supporting the document that is JS-2?
5	A I am not sure I understand your question.
6	Q Okay. Let me break it down.
7	You are aware that you that as at your
8	deposition in August 30th, the Public Counsel asked
9	for in various ways, we asked for the draft documents
10	that preceded the Duke RCA, is that right?
11	A Yes, sir.
12	Q Okay. Would you agree with me that those
13	draft documents, and the documents that we received in
14	Exhibits 4, 5 and 6 constitute, at least in part, the
15	work product that supported the RCA that you finally
16	produced?
17	A Yes.
18	MR. HERNANDEZ: Your Honor, could the witness
19	see the documents?
20	THE COURT: It might be helpful.
21	Do you have a clear recollection of what he is
22	referring to?
23	THE WITNESS: I don't. There were a lot of
24	documents involved with the root cause, so I don't
25	know that I have I know specifically.
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67

1	can mark that for him?
2	MR. REHWINKEL: Oh, yeah. It would be in
3	here.
4	MR. BERNIER: It would be right here.
5	MR. REHWINKEL: Yeah, this is 116.
6	MR. BERNIER: That way you don't have to mark
7	it later.
8	THE COURT: Let me see okay.
9	MR. BERNIER: Which ones should he be looking
10	at?
11	BY MR. REHWINKEL:
12	Q Oh, I am sorry. I thought you were reviewing.
13	Your counsel asked if you could look at the documents.
14	A Okay. So I have reviewed it. I am familiar
15	with what you
16	Q Okay. So the question I think you answered
17	it, but given that the objection came in, if I could
18	just make sure.
19	Those documents that you reviewed in Exhibits
20	102, 103, 104 and 115, with the understanding that 115 $$
21	is culled from 102 and 103, would you agree that they
22	constitute a part of the work product supporting the
23	Duke RCA?
24	A I would.
25	Q Okay. Would you also agree with me that the
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THE COURT: It might be helpful to put those	
in front of him.	
MR. REHWINKEL: Okay. I was asked to bring	
eight copies, and I have distributed all my eight	
copies, so I	
THE COURT: Let's see what I have up here.	
MR. REHWINKEL: The documents I am referring	
to are exhibit what we identified as Exhibit	
115.	
MS. BROWNLESS: Charles, you can have	
COURT REPORTER: You can use mine.	
MR. REHWINKEL: Okay. This will be the	
official copy.	
BY MR. REHWINKEL:	
Q If I may. So this is the summary of the	
synthesis.	
A This one here is?	
Q Yes, and then this is Exhibit 4, 5 and 6.	
MR. BERNIER: And those are marked, okay, in	
our version?	
MR. REHWINKEL: Yes.	
And just for the record, Exhibit 115 is a	
culling of the root cause drafts that were taken	
from Exhibits 4, 5 and 6.	
MR. BERNIER: Okay. Does he have 116 so we	
5th Avenue, Tallahassee, FL 32303 premier-reg	porting.c
	THE COURT: It might be helpful to put those in front of him. MR. REHWINKEL: Okay. I was asked to bring eight copies, and I have distributed all my eight copies, so I THE COURT: Let's see what I have up here. MR. REHWINKEL: The documents I am referring to are exhibit what we identified as Exhibit 115. MS. BROWNLESS: Charles, you can have COURT REPORTER: You can use mine. MR. REHWINKEL: Okay. This will be the official copy. BY MR. REHWINKEL: Q If I may. So this is the summary of the synthesis. A This one here is? Q Yes, and then this is Exhibit 4, 5 and 6. MR. BERNIER: And those are marked, okay, in our version? MR. REHWINKEL: Yes. And just for the record, Exhibit 115 is a culling of the root cause drafts that were taken from Exhibits 4, 5 and 6. MR. BERNIER: Okay. Does he have 116 so we

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68

1 do	cuments in those four exhibits, 102, 103, 104 and 115,
2 we	ere retained as a matter of company practice?
3	A I think that is our practice, yes.
4	Q Okay. Would you agree with me that an
5 er	gineer named Jake, Jacob or Jake English was
6 de	signated to be the primary author of the Duke RCA?
7	A I would.
8	Q Okay. Would you also agree with me that he
9 wa	s the primary custodian or keeper of the documents
10 th	at supported the RCA?
11	A Yes, I would.
12	Q Okay. Now Mr. English, you would consider him
13 al	so to have been the lead author of the RCA?
14	A Yes.
15	Q But that didn't mean that he made all the
16 ar	alytical decisions, is that correct?
17	A That's correct.
18	Q He would be sort of like the engineer with the
19 pe	n, is that fair?
20	A Well, Mr. English is more than that. He is
21	Q I don't mean he is the scribe. But he was the
22 or	e that was well, I will withdraw the question.
23	He was not the one making all the decisions.
24 He	was contributing to it, but somebody had to keep the
25 re	cord; is that right?
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	CC	;ϙΝϜ <mark>Ι</mark> DENTIA L
1	A He was one of multiple contributors, but he is	1 document actually is JS-2, and then I have put Documents
2	the one that was the main author.	2 2 through 18 in here, and I have extracted I have
3	Q Okay. Other engineers, including yourself,	3 included a screen shot at the back of this exhibit of
4	were contributors to the RCA, is that fair?	4 the Duke file names that we were provided
5	A Yes.	5 electronically, and I have extracted they say Bartow
6	Q Is it also true that non-engineers, including	6 RCA white paper, pretty much, but there are some
7	attorneys, reviewed drafts at some point throughout the	7 distinguishing features such as the date of the file or
8	process?	8 the author of it on this; do you see that?
9	A Yes.	9 A I do.
10	Q And RCA the Duke RCA was the only RCA,	10 Q But you would agree with me that I mean,
11	final RCA report that was produced throughout this whole	11 JS-2 is not a draft, it is the final document?
12	process, is that correct?	12 A Yes.
13	A It was the only Duke Energy product.	13 Q And if I could ask you to look back at
14	Q That's what I mean. It was on your side of	14 Document 18. And this handwriting up at the top of each
15	the fence, it was the only product that Duke finalized	15 document is mine. It's not Duke's.
16	in this I think you referred to it before as a big,	16 Would you agree with me that February 6th,
17	long root cause analysis, is that right?	17 2018 draft, it has a watermark of draft on it, but this
18	A Yes, that's accurate.	18 document is, in all respects, identical to the final
19	Q Okay. Do you have a copy of your JS-2 with	19 document; is that right?
20	vou?	20 A I would really have to do a page-by-page turn
21	A I do	21 to determine that
22	A lad.	
22	Q And we can do this. I am going to ask you	
23	questions from Exhibit 115, and just 1 should clarify	23 It is the same document? It's the same date.
24	something about 115, if you don't mind, Your Honor.	24 A It is the same date. I see that. So it's
25	There is a table of contents. And the first	25 likely the same document, yes.
25 114 W Premie	There is a table of contents. And the first 5 th Avenue, Tallahassee, FL 32303 ar Reporting (850) 894-0828 Reported by: Debbie Krick	om 114 W. 5th Avenue, Tallahassee, FL 32303 premier-reporting.com ick Premier Reporting (850) 894-0828 Reported by: Debbie Krick
25 114 W Premie	There is a table of contents. And the first . 5th Avenue, Tallahassee, FL 32303 er Reporting premier-reporting.com (850) 894-0828 premier-reporting.com Reported by: Debble Krick	om 114 W. 5th Avenue, Tallahassee, FL 32303 premier-reporting.com Reported by: Debbie Krick
25 114 W Premie	There is a table of contents. And the first . 5th Avenue, Tallahassee, FL 32303 er Reporting (850) 894-0828 Reported by: Debbie Krick	om 25 likely the same document, yes. 114 W. 5th Avenue, Tallahassee, FL 32303 premier-reporting.com Premier Reporting (850) 894-0828 Reported by: Debbie Krick
25 114 W Premie	There is a table of contents. And the first . 5th Avenue, Tallahassee, FL 32303 r Reporting (850) 894-0828 Premier-reporting.com Reported by: Debbie Krick 71	25 likely the same document, yes. om 114 W. 5th Avenue, Tallahassee, FL 32303 Premier Reporting premier-reporting.com Reported by: Debbie Krid
25 114 W Premie	There is a table of contents. And the first 2.5th Avenue, Tallahassee, FL 32303 er Reporting premier-reporting.com Reported by: Debble Krick 71 71 Q Okay. So maybe the easiest thing to do would	25 likely the same document, yes. 25 likely the same document, yes. 114 W. 5th Avenue, Tallahassee, FL 32303 Premier Reporting (850) 894-0828 Reported by: Debbie Krick 72 1 paragraph is just repeated under the word conclusion, is
25 114 W Premie	There is a table of contents. And the first 5 th Avenue, Tallahassee, FL 32303 er Reporting (850) 894-0828 Premier-reporting.com Reported by: Debbie Krick 71 Q Okay. So maybe the easiest thing to do would be just to ask questions about the RCA in this document,	25 likely the same document, yes. om 114 W. 5th Avenue, Tallahassee, FL 32303 premier-reporting.com Premier Reporting (850) 894-0828 Reported by: Debbie Krid 72 1 paragraph is just repeated under the word conclusion, is 2 that right?
25 114 W Premie	There is a table of contents. And the first . 5th Avenue, Tallahassee, FL 32303 (850) 894-0828 premier-reporting.com Reported by: Debbie Krick 71 Q Okay. So maybe the easiest thing to do would be just to ask questions about the RCA in this document, because I am going to attempt to ask you questions going	25 likely the same document, yes. 114 W. 5th Avenue, Tallahassee, FL 32303 Premier Reporting (850) 894-0828 Reported by: Debbie Krid 72 1 paragraph is just repeated under the word conclusion, is 2 that right? 3 A Yes, it is.
25 114 W Premie	There is a table of contents. And the first 2.5th Avenue, Tallahassee, FL 32303 (850) 894-0828 premier-reporting.com Reported by: Debbie Krick 71 Q Okay. So maybe the easiest thing to do would be just to ask questions about the RCA in this document, because I am going to attempt to ask you questions going back and forth between the final and some of the drafts.	25 likely the same document, yes. 25 likely the same document, yes. 114 W. 5th Avenue, Tallahassee, FL 32303 Premier Reporting (850) 894-0828 Reported by: Debbie Krid 72 1 paragraph is just repeated under the word conclusion, is 2 that right? 3 A Yes, it is. 4 Q Would you mind reading that aloud for the
25 114 W Premie 1 2 3 4 5	There is a table of contents. And the first 2.5th Avenue, Tallahassee, FL 32303 (850) 894-0828 Premier-reporting.com Reported by: Debble Krick 71 Q Okay. So maybe the easiest thing to do would be just to ask questions about the RCA in this document, because I am going to attempt to ask you questions going back and forth between the final and some of the drafts. So if I could take you to Document 1 and	25 likely the same document, yes. 114 W. 5th Avenue, Tallahassee, FL 32303 Premier Reporting (850) 894-0828 Reported by: Debbie Krid 72 1 paragraph is just repeated under the word conclusion, is 2 that right? 3 A Yes, it is. 4 Q Would you mind reading that aloud for the 5 record?
25 114 W Premie 1 2 3 4 5 6	There is a table of contents. And the first . 5th Avenue, Tallahassee, FL 32303 r Reporting (850) 894-0828 premier-reporting.com Reported by: Debbie Krick 71 Q Okay. So maybe the easiest thing to do would be just to ask questions about the RCA in this document, because I am going to attempt to ask you questions going back and forth between the final and some of the drafts. So if I could take you to Document 1 and one other thing, if you don't mind, as we work through	25 likely the same document, yes. 25 likely the same document, yes. 25 likely the same document, yes. 26 premier-reporting.con Premier Reported by: Debbie Krid 72 1 paragraph is just repeated under the word conclusion, is 2 that right? 3 A Yes, it is. 4 Q Would you mind reading that aloud for the 5 record? 6 A Based on its observations and study, Duke has
25 114 W Premie 1 2 3 4 5 6 7	There is a table of contents. And the first .5th Avenue, Tallahassee, FL 32303 (850) 894-0828 premier-reporting.com Reported by: Debbie Krick 71 Q Okay. So maybe the easiest thing to do would be just to ask questions about the RCA in this document, because I am going to attempt to ask you questions going back and forth between the final and some of the drafts. So if I could take you to Document 1 and one other thing, if you don't mind, as we work through this. In the bottom right-hand page of this Exhibit	25 likely the same document, yes. 25 likely the same document, yes. 25 likely the same document, yes. 26 premier-reporting.con Premier Reporting 27 27 2 paragraph is just repeated under the word conclusion, is 2 that right? 3 A Yes, it is. 4 Q Would you mind reading that aloud for the 5 record? 6 A Based on its observations and study, Duke has 7 been and remains of the opinion that the root cause of
25 114 W Premie 1 2 3 4 5 6 7 8	There is a table of contents. And the first 71 Q Okay. So maybe the easiest thing to do would be just to ask questions about the RCA in this document, because I am going to attempt to ask you questions going back and forth between the final and some of the drafts. So if I could take you to Document 1 and one other thing, if you don't mind, as we work through this. In the bottom right-hand page of this Exhibit 115, we have a Bates number OPCCR RCAEXH dash, and	25 likely the same document, yes. 25 likely the same document, yes. 114 W. 5th Avenue, Tallahassee, FL 32303 Premier Reporting Con Reported by: Debbie Krid 72 1 paragraph is just repeated under the word conclusion, is 2 that right? 3 A Yes, it is. 4 Q Would you mind reading that aloud for the 5 record? 6 A Based on its observations and study, Duke has 7 been and remains of the opinion that the root cause of 8 the failures in the steam turbine L0 40-inch blades is
25 114 W Premie 3 4 5 6 7 8 9	There is a table of contents. And the first 2.5th Avenue, Tallahassee, FL 32303 (850) 894-0828 (850) 894-0828 71 Q Okay. So maybe the easiest thing to do would be just to ask questions about the RCA in this document, because I am going to attempt to ask you questions going back and forth between the final and some of the drafts. So if I could take you to Document 1 and one other thing, if you don't mind, as we work through this. In the bottom right-hand page of this Exhibit 115, we have a Bates number OPCCR RCAEXH dash, and then have the numbers. And those numbers correspond on	25 likely the same document, yes. 114 W. 5th Avenue, Tallahassee, FL 32303 Premier Reporting 72 1 paragraph is just repeated under the word conclusion, is 2 that right? 3 A Yes, it is. 4 Q Would you mind reading that aloud for the 5 record? 6 A Based on its observations and study, Duke has 7 been and remains of the opinion that the root cause of 8 the failures in the steam turbine L0 40-inch blades is 9 the blade design, lack of blade design margin. That is
25 114 W Premie 1 2 3 4 5 6 7 8 9	There is a table of contents. And the first 2.5th Avenue, Tallahassee, FL 32303 (850) 894-0828 Premier-reporting.com Reported by: Debble Krick 71 Q Okay. So maybe the easiest thing to do would be just to ask questions about the RCA in this document, because I am going to attempt to ask you questions going back and forth between the final and some of the drafts. So if I could take you to Document 1 and one other thing, if you don't mind, as we work through this. In the bottom right-hand page of this Exhibit 115, we have a Bates number OPCCR RCAEXH dash, and then have the numbers. And those numbers correspond on the table of contents to the documents	25 likely the same document, yes. 114 W. 5th Avenue, Tallahassee, FL 32303 Premier Reporting Con Premier Reporting (850) 894-0828 1 paragraph is just repeated under the word conclusion, is 2 that right? 3 A Yes, it is. 4 Q Would you mind reading that aloud for the 5 record? 6 A Based on its observations and study, Duke has 7 been and remains of the opinion that the root cause of 8 the failures in the steam turbine L0 40-inch blades is 9 the blade design, lack of blade design margin. That is 10 to saw, under ownerted operating conditions at Barton's
25 114 W Premie 1 2 3 4 5 6 7 8 9 10	There is a table of contents. And the first Sth Avenue, Tallahassee, FL 32303 (850) 894-0828 Premier-reporting.com Reported by: Debble Krick 71 Q Okay. So maybe the easiest thing to do would be just to ask questions about the RCA in this document, because I am going to attempt to ask you questions going back and forth between the final and some of the drafts. So if I could take you to Document 1 and one other thing, if you don't mind, as we work through this. In the bottom right-hand page of this Exhibit 115, we have a Bates number OPCCR RCAEXH dash, and then have the numbers. And those numbers correspond on the table of contents to the documents.	25 likely the same document, yes. 114 W. 5th Avenue, Tallahassee, FL 32303 Premier Reporting (850) 894-0828 272 1 paragraph is just repeated under the word conclusion, is 2 that right? 3 A Yes, it is. 4 Q Would you mind reading that aloud for the 5 record? 6 A Based on its observations and study, Duke has 7 been and remains of the opinion that the root cause of 8 the failures in the steam turbine L0 40-inch blades is 9 the blade design, lack of blade design margin. That is 10 to say, under expected operating conditions at Bartow's
25 114 W Premie 1 2 3 4 5 6 7 8 9 10 11	There is a table of contents. And the first There is a table of contents. And the first There is a table of contents. And the first There is a table of contents. And the first premier-reporting.com Reported by: Debbie Krick 71 Q Okay. So maybe the easiest thing to do would be just to ask questions about the RCA in this document, because I am going to attempt to ask you questions going back and forth between the final and some of the drafts. So if I could take you to Document 1 and one other thing, if you don't mind, as we work through this. In the bottom right-hand page of this Exhibit 115, we have a Bates number OPCCR RCAEXH dash, and then have the numbers. And those numbers correspond on the table of contents to the documents. The Bates numbers in the upper right-hand	25 likely the same document, yes. 114 W. 5th Avenue, Tallahassee, FL 32303 Premier Reporting Con Premier Reporting (850) 894-0828 1 paragraph is just repeated under the word conclusion, is 2 that right? 3 A Yes, it is. 4 Q Would you mind reading that aloud for the 5 record? 6 A Based on its observations and study, Duke has 7 been and remains of the opinion that the root cause of 8 the failures in the steam turbine L0 40-inch blades is 9 the blade design, lack of blade design margin. That is 10 to say, under expected operating conditions at Bartow's 11 4-on-1 combined cycle unit, the MHPS blades are 10 erektestickle and the steam turbine L0 40-inch blades is
25 114 W Premie 1 2 3 4 5 6 7 8 9 10 11 12	There is a table of contents. And the first There is a table of contents. And the first There is a table of contents. And the first There is a table of contents. And the first premier-reporting.com Reported by: Debbie Krick 71 Q Okay. So maybe the easiest thing to do would be just to ask questions about the RCA in this document, because I am going to attempt to ask you questions going back and forth between the final and some of the drafts. So if I could take you to Document 1 and one other thing, if you don't mind, as we work through this. In the bottom right-hand page of this Exhibit 115, we have a Bates number OPCCR RCAEXH dash, and then have the numbers. And those numbers correspond on the table of contents to the documents. The Bates numbers in the upper right-hand corner are Bates numbers that we gave the late filed	25 likely the same document, yes. 114 W. 5th Avenue, Tallahassee, FL 32303 Premier Reporting Con Premier Reporting (850) 894-0828 1 paragraph is just repeated under the word conclusion, is 2 that right? 3 A Yes, it is. 4 Q Would you mind reading that aloud for the 5 record? 6 A Based on its observations and study, Duke has 7 been and remains of the opinion that the root cause of 8 the failures in the steam turbine L0 40-inch blades is 9 the blade design, lack of blade design margin. That is 10 to say, under expected operating conditions at Bartow's 11 4-on-1 combined cycle unit, the MHPS blades are 12 substantially more fragile than similar 40-inch blades
25 114 W Premie 1 2 3 4 5 6 7 8 9 10 11 12 13	There is a table of contents. And the first There is a table of contents. And the first There is a table of contents. And the first There is a table of contents. And the first Premier-reporting com Reported by: Debbie Krick (850) 894-0828 Premier-reporting com Reported by: Debbie Krick 71 Q Okay. So maybe the easiest thing to do would be just to ask questions about the RCA in this document, because I am going to attempt to ask you questions going back and forth between the final and some of the drafts. So if I could take you to Document 1 and one other thing, if you don't mind, as we work through this. In the bottom right-hand page of this Exhibit 115, we have a Bates number OPCCR RCAEXH dash, and then have the numbers. And those numbers correspond on the table of contents to the documents. The Bates numbers in the upper right-hand corner are Bates numbers that we gave the late filed Exhibits 4, 5 and 6 because they came to us un-Bates, do	25 likely the same document, yes. 114 W. 5th Avenue, Tallahassee, FL 32303 Premier Reporting Con Premier Reporting Con Reported by: Debbie Krid 1 paragraph is just repeated under the word conclusion, is 2 that right? 3 A Yes, it is. 4 Q Would you mind reading that aloud for the 5 record? 6 A Based on its observations and study, Duke has 7 been and remains of the opinion that the root cause of 8 the failures in the steam turbine L0 40-inch blades is 9 the blade design, lack of blade design margin. That is 10 to say, under expected operating conditions at Bartow's 11 4-on-1 combined cycle unit, the MHPS blades are 12 substantially more fragile than similar 40-inch blades 13 both in Duke's combined cycle fleet and elsewhere in the
25 114 WPremie 1 2 3 4 5 6 7 8 9 10 11 12 13 14	There is a table of contents. And the first TSth Avenue, Tallahassee, FL 32303 r Reporting (850) 894-0828 reported by: Debble Krick 71 Q Okay. So maybe the easiest thing to do would be just to ask questions about the RCA in this document, because I am going to attempt to ask you questions going back and forth between the final and some of the drafts. So if I could take you to Document 1 and one other thing, if you don't mind, as we work through this. In the bottom right-hand page of this Exhibit 115, we have a Bates number OPCCR RCAEXH dash, and then have the numbers. And those numbers correspond on the table of contents to the documents. The Bates numbers in the upper right-hand corner are Bates numbers that we gave the late filed Exhibits 4, 5 and 6 because they came to us un-Bates, do you understand that?	25 likely the same document, yes. 114.W.5th Avenue, Tallahassee, FL 32303 (850) 894-0828 Premier-reporting con Premier Reporting 12 (850) 894-0828 Reported by: Debbie Krid 1 paragraph is just repeated under the word conclusion, is 2 that right? 3 A Yes, it is. 4 Q Would you mind reading that aloud for the 5 record? 6 A Based on its observations and study, Duke has 7 been and remains of the opinion that the root cause of 8 the failures in the steam turbine L0 40-inch blades is 9 the blade design, lack of blade design margin. That is 10 to say, under expected operating conditions at Bartow's 11 4-on-1 combined cycle unit, the MHPS blades are 12 substantially more fragile than similar 40-inch blades 13 both in Duke's combined cycle fleet and elsewhere in the 14 industry.
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22 $\$ the second full paragraph, starting with the word 23 "based" is the ultimate conclusion of this RCA?

24 A Yes, it is.

25 Q And if we look on page 15 of the RCA, that

114 W. 5th Avenue, Tallahassee, FL 32303 Premier Reporting (850) 894-0828 25 BY MR. REHWINKEL:

manufacturer.

THE COURT: Okay.

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THE WITNESS: It does. Original equipment

	73			74
1	Q So in this RCA document, with this conclusion,			Period 1 was actually February 28th at 2:00 a.m. in
2	Duke lays all the blame on Mitsubishi and assigns none		2	2012?
3	of the blame to itself for the way the legacy Progress		3	A Subject to check, yes. That sounds like when
4	organization operated the plant in the first period; is		4	we would start an outage. Typically, we start when
5	that right?		5	customer demand is low, and it was a planned scheduled
6	A I think it's very clear we believe that the		6	outage we started at nighttime.
7	lack of blade design and the lack of margin in the		7	Q So isn't it Duke's position today that the
8	blades is the root cause of all the failures of the		8	company did nothing wrong in the way it operated the
9	blades.		9	steam turbine during the first period?
10	Q Okay. Now, we discussed the period naming		10	A It is.
11	convention a few minutes ago. Under that Period 1 would		11	Q Is it also true that you have effectively
12	generally be from June of 2009 to March of 2012, is that		12	asserted that even if you somehow operated the plant
13	right?		13	improperly with excess steam flow and high back-end
14	A Yes, sir. That's correct.		14	loading on new L0 blades that you only did so because
15	Q Okay.		15	you were just not aware that you were doing anything
16	A And there is an easy reference for that on		16	wrong?
17	page five		17	A We operated according to the parameters
18	Q Right.		18	provided by the original equipment manufacturer, so $\texttt{I'm}$
19	A Table A.		19	are not sure it seemed like there was two
20	Q Would it be most accurate to say that the		20	different a statement and a question there.
21	beginning of commercial operation of the Bartow plant		21	MR. BERNIER: I am sorry, Charles, are you
22	and the steam turbine was approximately June 1st, 2009?		22	referencing anywhere in his testimony?
23	A I don't know if it was June 1st, but I know it		23	MR. REHWINKEL: I am asking about what his
24	was the months of June.		24	root cause analysis shows and doesn't show, so
25	Q Okay. And is it further true that the end of		25	BY MR. REHWINKEL:
114 W Premie	/. 5th Avenue, Tallahassee, FL 32303 premier-reporting.com er Reporting (850) 894-0828 Reported by: Debbie Krick	1 <	114 W. Premier	5th Avenue, Tallahassee, FL 32303 premier-reporting.co r Reporting (850) 894-0828 Reported by: Debbie Kric
	75	,		76
1	Q So does the conclusion that you just read from		1	objecting on the basis of vague. I don't know what
2	your RCA mean that Duke's position is that Duke did not		2	excessive means.
3	operate the steam turbine improperly in Period 1 by		3	THE COURT: Maybe we should be more specific.
4	introducing excessive steam flow in the low pressure		4	MR. REHWINKEL: Okay.
5	turbine and imposing high back-end loading on the LO		5	BY MR. REHWINKEL:
6	blades, and thus, Duke's operation of the steam turbine		6	Q Well, in the root cause analysis process,
7	was not and could not have been a root cause of the		7	didn't Duke engineers decide agree that excessive
8	blade failures in Periods 1 through 5?		8	steam flow was introduced into the low pressure turbine?
9	A It does.		9	A Could you point that out to me?
10	Q Is another way of putting that that the RCA		10	Q Okay. Do you have exhibit okay, let's go
11	conclusion means that it is Duke's position that even if		11	to let's just look at let's just look if you
12	Duke did run the unit improperly in Period 1 by		12	could turn to page 75, which is Exhibit 9.
13	introducing excessive steam flow into the low pressure		13	A In Tab 9 in Exhibit 115?
14	turbine and imposing high back-end loading on LO blades		14	Q I apologize. Yeah. Tab 9, yes.

- 15 that it did not know that it was doing so, and thus, any 16 harm caused was not its fault? 17 A It's our position that we ran it in accordance
- 18 with the operating parameters that were provided.
- 19 Q Well, isn't it true that Duke put excessive
 20 steam into the low pressure turbine during Period 1?
 21 A It is not true.
- A It is not true.
 Q Isn't it true that excessive steam and high
 back-end loading on L0 blades caused damage to those
 blades?

MR. HERNANDEZ: Objection, Judge. I am

N 5th Avenue Tallahassee El 20203 -------

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75.

Yes.

Okay, I am there.

And I am sorry, could you say the page again?

And would you agree with me that the file name

for this document is October 5, 2017, and it says PBC

says -- would you agree with me that it says: After

months of study, Duke Engineering believes the following

to be the most significant contributing factors towards

(850) 894-0828

And if you look halfway down the page, it

comments? That will be Paul Crimi, C-R-I-M-I?

		DENTIAL
1	root cause of the history of Bartow Unit 4S LO events,	1 A It is.
2	and the first put bullet is low pressure LP turbine	2 Q And Duke Engineering used the term "excessive
3	excessive steam flow?	<pre>3 steam flow", right?</pre>
4	A Yes, I see that.	4 A They did use that term.
5	Q Okay. So the Duke Engineering folks that were	5 Q Okay. So they had an idea that there was too
6	drafting these documents accepted at this point in time	6 much steam being introduced into the low pressure
7	that there was excessive steam flow introduced in the	7 turbine, right?
8	low pressure turbine, isn't that correct?	8 A I think they had an idea that that could have
9	A I do not believe that to be the case, no.	9 been that is a potential cause.
10	This is a working document that these are this is a	10 Q Okay .
11	list of bullet points of things that could have caused	11 A That to be really clear, Mitsubishi's
12	the root cause, things that needed to be investigated or	12 conclusion at that point in time was that there was
13	analyzed more.	13 excessive steam flow to the low pressure turbine. That
14	So low pressure turbine excessive steam flow	14 fact that Mitsubishi believed that couldn't be ignored,
15	is one of multiple items. Thermal distress at the LP	15 and so that was investigated and analyzed very
16	turbine exhaust. Pressure pulses during hood or curtain	16 significantly throughout the course of the long root
17	spray operations Shroud fratting fatigue found through	17 cause Illimately it's not the root cause
1.9	zono analysis. Loss of damponing blade fitment those	19 O That turn over a comple of pages to page 77
10	are all potential causes	10 x cust turn over a couple of pages to page //
12	are arr putential causes.	20 guestion and let to take you will let to take
20	In fact, it fooks to me like the team Was	20 question and let me take you Well, let me ask you
21	zeroing in on the more likely causes that needed more	21 this: Mitsubishi said that you were putting too much
22	analysis, but this is not a final document, so I would	22 steam in the low pressure turbine in Period 1, right?
23	not agree with your statement.	23 A Correct.
2.4	Q Well, Duke Engineering wrote this statement,	24 Q Okay. Is high back-end loading, is that the
∠4	that a summer dealth it o	25 same as excessive steam flow?
25 25 114 W. Premier	Sth Avenue, Tallahassee, FL 32303 Reporting (850) 894-0828 Reported by: Debbie Krick	L 114 W. 5th Avenue, Tallahassee, FL 32303 Premier Reporting (850) 894-0828 Reported by: Debbie Kri
2 4 2 5 114 W. Premier	Enat's correct, Ish't It? Sth Avenue, Tallahassee, FL 32303 Reporting (850) 894-0828 Reported by: Debbie Krick	114 W. 5th Avenue, Tallahassee, FL 32303 Premier Reporting 80 1 with an adequate margin for the application at the
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	81	ΝΤΙΔΙ		82
1	wasn't exceeding any flow limit. It was higher than	1	combined cycle plants by the amount that the generator	r
2	their experience, and that made them concerned. And so	2	can produce. The amount that the generator can produc	ce
3	they concluded that there was too much steam flow that	3	is dependent on many factors that are separate,	
4	caused that higher loading on the back-end blade.	4	actually. There is many factors that are part of the	
5	Q Well, specifically Mitsubishi said that	5	steam turbine output, but there is other factors that	
6	running the unit above 420 caused excessive steam to	6	are in play as far as what a generator could produce.	
7	impact the LO blades, and that caused damage, isn't that	7	So there is really in technical terms,	
8	correct? That's exactly what they said.	8	Mitsubishi wasn't saying you exceeded 420, that was it	t.
9	A Not really. The there is something we	9	It was always all about the pounds per hour per square	e
10	really need to talk about here.	10	foot of steam flow impinging that last stage blade.	
11	So the 420 megawatts is the product of the	11	Q Do you have a copy of Exhibit 116 in front o	of
12	generator. And as we have discussed, the electrical	12	you?	
13	generator is coupled to the steam turbine. When you	13	A I know I do somewhere. Yes, I do.	
14	talk about a steam turbine, you talk about parameters	14	Q Okay. And this is are you familiar with	
15	like pressures, flows, temperatures.	15	this document?	
16	The steam turbine is what is then spinning the	16	A Yes.	
17	rotor. The rotor is connected to the generator. The	17	0 Okav. And it's dated March 18, 2015, and it	t
18	generator produces megawatts, or more precisely	18	savs, Duke Energy Bartow Report of Telemetry Test for	
19	kilovolt-amperes, which then, in order to talk about the	19	40-inch L0. right?	
20	entire unit, it's very common in the industry. We	20	A Correct.	
21	produce megawatts. We produce kilovolt-amperes. So	21	0 And if we turn to slide No. 4. This is what	ŧ
22	it's common throughout industry to talk in terms of the	22	Mitsubishi savs in the last bullet point: Mitsubishi	-
2.3	product that you are making to get a relative feel of	23	estimated the cause of cracking was overloading of LP	
2.4	the size of the unit.	24	section based on 450-megawatt operation, which is over	r
25	So many times, people talk about sizes of	25	the design point of 420 megawatts, correct?	
			· · · · · · · · · · · · · · · · · · ·	
	83			84
1	83 A Yes, that's what it says.	1	street that you had to deal with that would have made	84
1 2	83 A Yes, that's what it says. Q And that's what Mitsubishi said pretty much	1 2	street that you had to deal with that would have made the document long. This was a significant central	84
1 2 3	A Yes, that's what it says. Q And that's what Mitsubishi said pretty much consistently throughout with respect to Period 1, right?	1 2 3	street that you had to deal with that would have made the document long. This was a significant central contention of Mitsubishi, correct?	84
1 2 3 4	A Yes, that's what it says. Q And that's what Mitsubishi said pretty much consistently throughout with respect to Period 1, right? A They did. They were technical discussions,	1 2 3 4	street that you had to deal with that would have made the document long. This was a significant central contention of Mitsubishi, correct? A Correct.	84
1 2 3 4 5	A Yes, that's what it says. Q And that's what Mitsubishi said pretty much consistently throughout with respect to Period 1, right? A They did. They were technical discussions, and I can point to other documents where they really	1 2 3 4 5	<pre>street that you had to deal with that would have made the document long. This was a significant central contention of Mitsubishi, correct?</pre>	84
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1 2 3 4 5 6 7	A Yes, that's what it says. Q And that's what Mitsubishi said pretty much consistently throughout with respect to Period 1, right? A They did. They were technical discussions, and I can point to other documents where they really talked about the steam flow, in particular the steam flow per surface area impacting the last stage blade.	1 2 3 4 5 6 7	<pre>street that you had to deal with that would have made the document long. This was a significant central contention of Mitsubishi, correct? A Correct. Q This being the excessive steam flow and loading on the blades. A At this point in time. Remember, this is</pre>	84
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82

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1	A Starting with, Duke also studied?		repetitive testing, you would be able to test out
2	Q I am sorry, starting with the second to the	2	whether conclusions were valid or invalid.
3	last paragraph.	3	Obviously, we couldn't do that. We are
4	A Duke Engineering?	4	looking at data. We are looking at combinations of
5	Q Yes.	5	variables at specific points in time without the ability
6	A Duke Engineering concluded that there was no	6	to change those. And that's what this paragraph is
7	correlation between any one of the above-listed factors	7	saying.
8	in the five failure periods. Notably, Duke was only	8	Q Well, let's go back to Document 9. It was
9	able to study each factor independently based on	9	written down in this document, and would you agree with
10	available data. In the absence of one, blade telemetry,	10	me and we can go through many of these documents and
11	two, duplication of the factors in various combinations,	11	see that this language, after months of study Duke
12	and three, operation in varying but normal conditions,	12	Engineering believes
13	it is not possible to study how each factor relates to	13	A I am sorry, which page are you on?
14	and interacts with any other factor, if at all.	14	Q I apologize. I am back on page 75.
15	Q So doesn't that say that with respect to the	15	A 75. Okay, thank you.
16	early contentions that were even included in Duke	16	Q This after months of student, Duke
17	Engineering's drafts about excessive steam flow and high	17	Engineering believes the following to be the most
18	back-end loading on the LO blades, that you were unable	18	significant contributing factors towards root cause of
19	to study it, and thus, you could not make a correlation	19	the history of Bartow Unit 4S LO event. That language
20	and include it as an RCA conclusion; is that right?	20	is replete throughout these drafts, would you agree with
21	A I don't believe that's what that is saying at	21	that?
22	all, actually. I think what this is saying is the root	22	A $\ $ I would have to look at all the drafts.
23	cause analysis is looking at things that happened in	23	Q Okay. So let's turn to page 123, which is
24	hindsight. If you had the ability to vary some	24	Document 13, and we see halfway down the page there,
25	variables and keep some others constant and do	25	same with the same bullet point, low pressure LP
114 W Premie	5th Avenue, Tallahassee, FL 32303 premier-reporting.com r Reporting (850) 894-0828 Reported by: Debbie Krick	114 W. S Premier	Sth Avenue, Tallahassee, FL 32303 premier-reporting.com Reporting (850) 894-0828 Reported by: Debbie Krict
	87		88
1	turbine excessive steam flow?	1	the words are the same here, right?
2	⊾ t do	2	

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3	Q And then we could go to and that was dated
4	October 12th, 2017, and you accept my representation
5	that that's what the file name said?
6	A I do.
7	Q Okay. And then we see on 137, which is
8	this is a document that appears to be dated the same
9	day, but it has a different set of initials, BWM, is
10	that Ben Meissner?
11	A Likely it is Ben Meissner, yes.
12	Q He is your Charlotte-based steam turbine
13	expert, right?
14	A He is one of our subject-matter experts,
15	right.
16	Q Now, this document purports to be his edits to
17	the RCA draft, right, if the file name is correct?
18	A That's what it appears to be, yes.
19	Q And this has the same I mean, there are
20	some edits here, but there is no edits to this this
21	thing we are talking about, this comparable sentence,
22	right?
23	A That's correct.
24	Q And then we go to Document 15, it's just dated
25	10/13/17. It doesn't identify who, but there is no
111 \	5th Avenue, Tollohassee, EL 32303

2 А They are. Okay. And then if we go to Document 16, this 3 Q 4 is dated 10/17/2017, we see the same verbiage, right? I am sorry, which page? 5 A Q I apologize, page 165. This is Document 16. 6 А I seem to be missing that page from my copy. 7 8 That tab 16 starts, unfortunately, with page 167. MR. BERNIER: I will show him mine, Charles. 9 10 THE COURT: I'll check mine. To cut to the 11 chase, this is 165. 12 THE WITNESS: Yes, it says the same thing. 13 MR. REHWINKEL: Okay. Thank you. THE WITNESS: Thank you, Your Honor. 14 15 BY MR. REHWINKEL: 16 Q All right. And then we have a differently 17 styled, but on Tab 17 at 179, we see the same language; is that right? 18 19 A Yes. 20 Q Now, if you turn over to Tab 18, this is the RCA draft that we agree that, in all likelihood, is 21 22 identical to the final, right? 23 A Yes. 24 Q That sentence, that phrase falls out. It's 25 not in the corresponding portion of the RCA; is that 114 W. 5th Avenue, Tallahassee, FL 32303 Premier Reporting premier-reporting.com Reported by: Debbie Krick (850) 894-0828

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1	right?			Q	Now, in the root cause, it's called Table A,
2	A That's correct.		2	on page f	ive, right?
3	Q Okay. So between October 2017, assuming this		3	A	It looks to be very similar to, if not
4	file date is correct, and February 6, 2018, we have no		4	identical	, to Table A, yes.
5	draft documents, but that falls out that meaning the		5	Q	Right. They are not identical.
6	statement that Duke Engineering believes the following		6	A	Okay.
7	to be the most significant contributing factors toward		7	Q	This table Appendix A and Table A appear to
8	blade failure, et cetera, that concept is not in the		8	be hav	e common genealogy in this process, right?
9	filing document; is that right?		9	A	Yes.
10	A It is. I think you are making an assumption		10	Q	All right. So I don't understand now your
11	that each of these documents you are referring to are		11	assertion	that documents 2 through 17 are not drafts of
12	drafts of the final root cause, and I don't believe that		12	the final	RCA?
13	to be the case. Now, I don't know again, I don't		13	A	I what I am saying is I don't know if they
14	know all the details of what the root cause team was		14	are or no	t, but to me, it does not appear that they are.
15	doing during the long period of time they were working,		15	There are	so many differences between 2 through 17. And
16	but if you examine what you are showing here in all of		16	then when	you compare it to how the root cause on Tab 18
17	these Tabs 9 through 17 and compare it to 18, there are		17	reads, th	ere are many, many differences.
18	many differences between all those working documents and		18		I would classify all these documents as
19	the final root cause analysis, and you just happen to be		19	working p	apers that summarize what the root cause team
20	pointing to one of many, many differences between		20	is doing;	what they are finding; what they are
21	working copies and the final root cause document.		21	analyzing	, but it's not a draft of the root cause, in my
22	Q Okay. Well, let's look at page 188, which is		22	opinion.	
23	in Document 17, and this it says Appendix A, Bartow		23	Q	Well, let's go back to Document 3, and it's
2.4	LO Event Summary, right?		24	dated	it's on page 23.
1			25	A	Okay.
25	A IT GOES.		114 W	5th Avenue, Talla	hassee El 32303 premier-reporting
25 114 W. Premie	A IT does. 5th Avenue, Tallahassee, FL 32303 Reporting (850) 894-0828 Reported by: Debbie Kric	m ж	114 W. Premier	5th Avenue, Talla Reporting	hassee, FL 32303 premier-reporting (850) 894-0828 Reported by: Debbie
25 114 W. Premie	A IT GOES. 5th Avenue, Tallahassee, FL 32303 Reporting (850) 894-0828 91 Q It's dated June 26th, 2017, do you see that?	m **	114 W. Premier	5th Avenue, Talla Reporting	hassee, FL 32303 premier-reporting (850) 894-0828 Reported by: Debbie 92 I am familiar with the information. I don't
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[93		
1	A Yes.		
2	Q So this is this Ben, again, is probably		
3	Ben Meissner?		
4	A Yes, I agree.		
5	Q All right. And he wrote you a memo, I guess		
6	on March 29, we don't have it, but obviously there was		
7	something that probably explained what had happened from		
8	the steam turbine expert's point of view?		
9	MR. HERNANDEZ: Objection, Your Honor, calls		
10	for speculation.		1
11	THE COURT: To the extent you know,		1
12	Mr. Swartz, I mean, you can explain.		1
13	THE WITNESS: Yes, Your Honor.		1
14	I don't remember specifically what Ben		1
15	Meissner wrote, but it appears he wrote some an		1
16	email, a note, something pertaining to the steam		1
17	turbine, yes. It's not surprising. He is one of		1
18	our technical experts.		1
19	BY MR. REHWINKEL:		1
20	Q Right. So I don't know, and I can't represent		2
21	to you that the next page, which is 51, which is a		2
22	one-page document, that's dated 8/24/2017, is related or		2
23	not to this document. Would you know? This document		2
24	being page 49.		2
25	A If 51 is related to 49, is that what you are		2
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	95
1	having some statement on that subject.
2	Q Okay.
3	MR. BERNIER: Charles, I am sorry, could I ask
4	you what the first word before draft is up at the
5	top?
6	MR. REHWINKEL: It says "miscellaneous".
7	MR. BERNIER: Oh, thanks.
8	MR. REHWINKEL: I am sorry.
9	MR. BERNIER: That's okay.
10	MR. REHWINKEL: I think I had brackets around
11	it.
12	THE COURT: Would this be a good time to take
13	five?
14	MR. REHWINKEL: Yes.
15	THE COURT: We have been at it for a while and
16	give Mr. Swartz and everybody else a stretch.
17	(Brief recess.)
18	THE COURT: I think we can resume, Mr.
19	Rehwinkel.
20	MR. REHWINKEL: Thank you.
21	MR. BREW: Excuse me, Your Honor, before we
22	start, just to save time, I circulated copies of
23	the two exhibits that we may eventually get to.
24	All the parties should have it.
25	THE COURT: Okay. Very good. I have it.
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17	periods of operation, right?	
18	A That's what it says, yes.	
19	Q So it would be reasonable to assume these	
20	documents that were maintained by the company, that	
21	there was an instruction to evaluate this as a part of	
22	the root cause process, right?	
23	A Well, it looks to me like they were starting	
24	to build what would be in a final report out. And at	
25	that section, it appears that they were planning on	
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	96	
1	MR. BREW: And there is copies on the desk for	
2	the witness when he gets to it.	
3	COMMISSIONER GRAHAM: Thank you.	
4	MS. BROWNLESS: Excuse me, Mr. Brew. I don't	
5	see any exhibits. Oh, got it. Thank you, sir.	
6	THE COURT: All these red folders, they all	
7	look alike.	
8	MS. BROWNLESS: Yeah.	
9	BY MR. REHWINKEL:	
10	Q So, Mr. Swartz, are you saying that Duke did	
11	study the impact of high back-end loading on the LO	
12	blades, or did you say because of what happened with the	
13	blade failures in Periods 3, 4 and 5, you didn't study	
14	it, you just took it out of the RCA?	
15	A Well, I don't think I am saying either of	
16	those things. The loading is a calculated value. It's	
17	really based on Mitsubishi's experience with their	
18	fleet, and it's a parameter that Mitsubishi just uses to	
19	help look at what is the forces what are the forces	
20	on a turbine blade.	
21	You know, as far as studying that, again, with	
22	hindsight, you can only look at what happened. You	
23	can't run experiments to try to determine if you run a	
24	certain amount of steam flow, you will get a certain	
25	response. In fact, you may not want to run that. So,	
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1	asking?
2	Q Yeah, I don't know if it is. I'm telling you
3	I put together stray documents that were in the same
4	area of the file.
5	A It appears to me that page 51 is actually some
6	notes from a meeting, a working meeting. And I do agree
7	with you that on 49, it looks like they are starting to
8	put together things that would go into how you might
9	want to format a root cause so that it would be clear
10	and understandable.
11	Q Okay. So going back to page 49, it says: LP
12	turbine back-end loading greater than 15,000 I forget
13	how to say that.
14	A Pounds per hour per square foot.
15	Q Okay. And does this talk about how this has
16	had an effect or not on the unit across the different
17	periods of operation, right?
18	A That's what it says, yes.
19	Q So it would be reasonable to assume these
20	documents that were maintained by the company, that
21	there was an instruction to evaluate this as a part of
22	the root cause process, right?
23	A Well, it looks to me like they were starting
24	to build what would be in a final report out. And at
25	that section, it appears that they were planning on

			30
1	you know, I don't think it's either of the choices you		attached to his testimony, it talks about how Mitsubishi
2	gave me.	2	is just uncertain of what will happen in that zone.
3	Q Well, did you study whether the introduction	3	So it's not known. I think that actually
4	of excessive steam flow into the low pressure turbine	4	lends credence to the fact that the lack of blade design
5	and the resulting imposition of high back-end loading on	5	margin is the root cause. It's uncertain. The margin
6	the L0 blades was not a significant contributing factor	6	is not built in, and when you look at what happened over
7	to the root cause of the LO blade failures?	7	each successive period of time, even with lower
8	A I believe that was considered as I mean,	8	operating pressures and again, the pressures are what
9	it's obvious in all these documents that the root cause	9	dictates the flow through the turbine. Higher pressure,
10	team considered that as a potential cause. The steam	10	you are going to get more flow through the turbine.
11	flow what's the exact wording? Let me read it	11	As we went from Period 1 through Period 5, it
12	exactly here. Excessive steam flow.	12	wasn't successively lower, because Period 3 we actually
13	The turbine parameters, the operating	13	raised the pressure at first in order to do some
14	parameters are pressures and temperatures. And	14	testing. But then during that testing, we realized we
15	pressures really are what dictate the flow.	15	had something called an avoidance zone and we had
16	What we are saying is that we did operate in	16	which we had to avoid during operation, but we put
17	accordance with the design pressures of the unit.	17	specific pressure limits in place to make sure that we
18	Mitsubishi is saying that they are not disputing that,	18	didn't have vibration on the last stage blades.
19	actually. What Mitsubishi is saying is that operating	19	And that's really the issue. Whether it's
20	at those pressures ends up having a higher pounds per	20	steam flow, whether it's hardening on blade on the
21	hour per foot square of loading on the back end on the	21	snubber or the tip, the shroud; whether it's blade
22	LO blade than what they are used to, and that that's	22	fitment. It may be too loose. That means that there is
23	unknown to them. It's uncertain.	23	not enough there is too much tolerance, perhaps,
24	In fact, there is certain documents. In fact,	24	between the snubbers and the Z-locks. All those things
25	if you look at RAP-6, and even in Mr. Pollock's exhibit	25	lead to vibration or flutter in the blades, which then
	99		100
1	99 could cause a failure. And that's what we are trying to		100 Q Mitsubishi doesn't agree that they had an
1 2	99 could cause a failure. And that's what we are trying to avoid. In fact, we did avoid that.		100 Q Mitsubishi doesn't agree that they had an inadequately designed blade that caused the vibration,
1 2 3	99 could cause a failure. And that's what we are trying to avoid. In fact, we did avoid that. Again, I can't emphasize this enough. We		2 Mitsubishi doesn't agree that they had an inadequately designed blade that caused the vibration, do they?
1 2 3 4	99 could cause a failure. And that's what we are trying to avoid. In fact, we did avoid that. Again, I can't emphasize this enough. We found proactively four times that there were issues with	1 2 3 4	Q Mitsubishi doesn't agree that they had an inadequately designed blade that caused the vibration, do they? A They are in agreement that high that
1 2 3 4 5	99 could cause a failure. And that's what we are trying to avoid. In fact, we did avoid that. Again, I can't emphasize this enough. We found proactively four times that there were issues with the snubbers and with the Z-locks, and we were able to	1 2 3 4 5	Q Mitsubishi doesn't agree that they had an inadequately designed blade that caused the vibration, do they? A They are in agreement that high that flutter, vibration, was the cause of blade failures in
1 2 3 4 5 6	99 could cause a failure. And that's what we are trying to avoid. In fact, we did avoid that. Again, I can't emphasize this enough. We found proactively four times that there were issues with the snubbers and with the Z-locks, and we were able to take the unit out of service, continue operating for our	1 2 3 4 5 6	Q Mitsubishi doesn't agree that they had an inadequately designed blade that caused the vibration, do they? A They are in agreement that high that flutter, vibration, was the cause of blade failures in each of the five periods.
1 2 3 4 5 6 7	99 could cause a failure. And that's what we are trying to avoid. In fact, we did avoid that. Again, I can't emphasize this enough. We found proactively four times that there were issues with the snubbers and with the Z-locks, and we were able to take the unit out of service, continue operating for our customers with the combustion turbine generators, but we	1 2 3 4 5 6 7	Q Mitsubishi doesn't agree that they had an inadequately designed blade that caused the vibration, do they? A They are in agreement that high that flutter, vibration, was the cause of blade failures in each of the five periods. Now, I think it's a debate whether or not the
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1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23	<page-header><page-header></page-header></page-header>
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	¹⁰¹ C(102
1	THE WITNESS: So again, we have some other		1	changes would be helpful to prevent future failures
2	folks in here, too, but the type of the blade is		2	of either the shroud, the Z-locks or the snubbers.
3	the curvature of the blade, and it's really talking		3	BY MR. REHWINKEL:
4	about this blade itself, which is the structure you		4	Q The snubber was in exactly the same spot on
5	are trying to protect. You don't want that to come		5	the Period 5 blade as in Period 1?
6	apart. You don't want it to crack. All of our		6	A Yes, it was.
7	- issues were either with this snubber at the		7	O Do you know whether the manufacturing was
8	mid-span, or with this shroud at the tip.		8	exactly the same from the Period 1 blades that were made
9	But Type 1 blades have a certain geometry of		9	sometime before 2008 and the Period 5 blades that were
10	the blade and a certain manufacturer Ture 3		10	made in 20122
11	hlades are different. I don't know the specific		11	Made in 2012.
1.2	The part of turbing anginger, but the survey is		12	weil, when you buy the manufacturing, what do
1.2	different The thickness might be different. It's		12	you now do you define that:
1.0	different. The chickness might be different. It's		14	Q well, now they are made, who they were made
14	a different style of plade.		14	by, and the materials in them, were they exactly the
15	When we went back to Type I blades at the end		15	same?
16	in Period 5, it's the exact same blade. It's the		16	A I know the materials are exactly the same. I
17	same snubber, and it's the same Z-lock with one		17	know that they are Mitsubishi blades, so we are really
18	small change. There was a change in the geometry,		18	relying on Mitsubishi. They are a certain definition.
19	just a softening of the edges, so to speak, to		19	They are Type 1 blades, so for what I know, yes, they
20	prevent some potential stress riser spots on the		20	are the same blades.
21	Z-lock and on the snubber. And that was the only		21	Q But you don't have any personal knowledge that
22	difference.		22	they were that the manufacturing process was exactly
23	Both Mitsubishi and Duke Energy concluded that		23	the same, do you?
24	based on all of the different data that they saw		24	A Not any personal knowledge, no.
25	from other periods, that those small geometry		25	Q Okay. And did you have any evidence that they
	103	,		104
1	103 were exactly the same? Did you go back and compare the		1	104 BY MR. REHWINKEL:
1 2	103 were exactly the same? Did you go back and compare the manufacturing process in Period 1 blades and Period 5		1 2	104 BY MR. REHWINKEL: Q Do you understand that?
1 2 3	103 were exactly the same? Did you go back and compare the manufacturing process in Period 1 blades and Period 5 blades?		1 2 3	104 BY MR. REHWINKEL: Q Do you understand that? A I do. And to answer, we did not make any
1 2 3 4	103 were exactly the same? Did you go back and compare the manufacturing process in Period 1 blades and Period 5 blades? A Not to my knowledge.		1 2 3 4	104 BY MR. REHWINKEL: Q Do you understand that? A I do. And to answer, we did not make any others changes, and I think I can explain.
1 2 3 4 5	<pre>103 were exactly the same? Did you go back and compare the manufacturing process in Period 1 blades and Period 5 blades? A Not to my knowledge. Q Okay. When at any point during this L0</pre>		1 2 3 4 5	104 BY MR. REHWINKEL: Q Do you understand that? A I do. And to answer, we did not make any others changes, and I think I can explain. So this is the actual low pressure turbine at
1 2 3 4 5 6	<pre>103 were exactly the same? Did you go back and compare the manufacturing process in Period 1 blades and Period 5 blades? A Not to my knowledge. Q Okay. When at any point during this L0 blade event process, did Duke ever change any of the</pre>		1 2 3 4 5 6	104 BY MR. REHWINKEL: Q Do you understand that? A I do. And to answer, we did not make any others changes, and I think I can explain. So this is the actual low pressure turbine at Bartow. Again, the steam goes in the middle and travels
1 2 3 4 5 6 7	<pre>103 were exactly the same? Did you go back and compare the manufacturing process in Period 1 blades and Period 5 blades?</pre>		1 2 3 4 5 6 7	104 BY MR. REHWINKEL: Q Do you understand that? A I do. And to answer, we did not make any others changes, and I think I can explain. So this is the actual low pressure turbine at Bartow. Again, the steam goes in the middle and travels axially in both directions. You can see the blades get
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1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16	<pre>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>></pre>		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16	<pre>104 EY MR. REHWINKEL: D Do you understand that? A I do. And to answer, we did not make any others changes, and I think I can explain. So this is the actual low pressure turbine at Bartow. Again, the steam goes in the middle and travels axially in both directions. You can see the blades get bigger as the steam travels through the turbine because the steam is losing energy and it needs more surface area to spin the turbine. What you can't see in this picture is that there is fixed blades, called diaphragms, that fit in between each of these rows. So when you encase the turbine, those diaphragms are fitting in between. So as the steam travels through these nozzles, or blades, to spin the turbine, the diaphragms then redirect the steam</pre>
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1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18	verse exactly the same? Did you go back and compare the manufacturing process in Period 1 blades and Period 5 blades? A Not to my knowledge. Q Okay. When at any point during this LO blade event process, did Duke ever change any of the components in the low pressure turbine other than the LO blades? A Not to my knowledge, no. It wouldn't be surprising I mean, when you say any. There's many components inside a steam turbine, and every time you open it up, there is probably some sort of sealing surface that has to be changed. So I don't want to be wrong on a technicality, but actually, Mr. Bernier has a picture that might be really valuable if I could show it. Q Sure. Just to be clear, I am not asking you about whether there was any ordinary maintenance that 		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18	<pre>104 EY MR. REHWINKEL: D Do you understand that? EY MR. REHWINKEL: D Do you understand that? A I do. And to answer, we did not make any others changes, and I think I can explain. So this is the actual low pressure turbine at Bartow. Again, the steam goes in the middle and travels axially in both directions. You can see the blades get bigger as the steam travels through the turbine because the steam is losing energy and it needs more surface area to spin the turbine. What you can't see in this picture is that there is fixed blades, called diaphragms, that fit in between each of these rows. So when you encase the turbine, those diaphragms are fitting in between. So as the steam travels through these nozzles, or blades, to spin the turbine, the diaphragms then redirect the steam so that they impinge on just the right angle to get the most work out of these blades as they travel through.</pre>
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1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24			1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24	194 BY MR. REHWINKEL: Q Do you understand that? A I do. And to answer, we did not make any others changes, and I think I can explain. So this is the actual low pressure turbine at Bartow. Again, the steam goes in the middle and travels axially in both directions. You can see the blades get bigger as the steam travels through the turbine because the steam is losing energy and it needs more surface area to spin the turbine. What you can't see in this picture is that there is fixed blades, called diaphragms, that fit in between each of these rows. So when you encase the turbine, those diaphragms are fitting in between. So as the steam travels through these nozzles, or blades, to spin the turbine, the diaphragms then redirect the steam so that they impinge on just the right angle to get the most work out of these blades as they travel through. So they work in the second stage. Then they are redirected through diaphragms here, and then again redirected through the third stage. They are redirected into fixed blades here and redirected into the L0 stage. And I think it's pretty important to understand that each iteration we had, we were able to

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1	issues with the turbine. There were no other issues	1	Because we proactively worked to prevent a
2	with the diaphragms. It was only with the LO blades.	2	blade failure, we had opportunity to look at the whole
3	And it wasn't with the blade itself, it was with the	3	low pressure turbine multiple times over five years.
4	snubbers and the tips. And we took the blades out of	4	Every time you open up a turbine, turbine engineers were
5	service before there was damage to the blade, which	5	all looking at it, taking measurements, doing
6	would be much more significant and could cause damage to	6	nondestructive examination, making sure we don't have
7	the whole turbine if an LO blade failed.	7	any other issues.
8	It's such a massive weight going at such a	8	It was a concern. If we had issues in the
9	high speed, that if a blade itself failed, it would be	9	last stage of blade, maybe there is issues in other
10	catastrophic, and that's what we were trying to prevent,	10	stages, and so we did extensive examination, but we did
11	and we did prevent through this process.	11	not find any issues with any other stages or rows of
12	I think that's good for now.	12	blades.
13	Q So beyond inspection, you didn't do any study	13	Q And you didn't put that in the RCA, because
14	that determined that the upstream blades, or the nozzles	14	you didn't feel that needed to be in there, that you
15	or any other components in the low pressure turbine were	15	determined that the rest of the turbine was fine?
16	unaffected by the pressures that were imposed in Period	16	A I am not sure why we didn't decide to put that
17	1?	17	piece of information in, but it's very clear we had so
18	A Oh, I would say we have a great deal of	18	many opportunity for that inspection, and I know we did
19	information from these iterative inspections we did.	19	not have any other issues.
20	You know, it's unfortunate that we had do so many	20	Q So looking at page six of the RCA, do you see
21	inspections. The regular maintenance interval on a	21	a discussion under the heading "Operational Factors
22	turbine would be maybe 100,000 operating hours, or	22	Potentially Impacting MHPS Blades", and then it has a
23	80,000 operating hours. It would be measured in years	23	subheading, "Low Pressure (LP) turbine Excessive Steam
24	before you actually open up the casing of a turbine and	24	Flow - Running In The Avoidance Zone", right?
25	look at it.	25	A Yes.
			102
1	107 Q And these three paragraphs here are basically	1	108 what led Mitsubishi to conclude that, oh, it must be
1 2	Q And these three paragraphs here are basically how you disposed of the issue of excessive steam flow,	1 2	108 what led Mitsubishi to conclude that, oh, it must be that back-end loading. So that's the concern that's
1 2 3	Q And these three paragraphs here are basically how you disposed of the issue of excessive steam flow, is that fair?	1 2 3	108 what led Mitsubishi to conclude that, oh, it must be that back-end loading. So that's the concern that's stated.
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1	these hours and avoidance zone in Period 1 is they are	1 about, and so they said that's what they believed.
2	back-calculated. This thing called the avoidance zone	2 There was too much steam flow in the last stage.
3	didn't exist until after the telemetry testing was done	3 Q Mitsubishi didn't say that you operated in the
4	at the start of Period 3. And with the value gained	4 avoidance zone in Period 1, and that was the problem.
5	from that telemetry testing, which then derived this	5 That wasn't that was your that was a construct
6	avoidance zone, we said, well, why don't we look back at	6 that you put on your evaluation in Period 1, right?
7	the other operating periods and see where are we	7 A I am sorry, could you
8	operating in that avoidance zone during the other	8 0 Okay. Mitsubishi established the avoidance
9	neriods	9 zone from. was it Period 3 forward?
10	So it wasn't as if we were violating some kind	10 a Correct
11	of limit during Poriod 1. We back-calculated that we	
1.2	of fimit during ferfourt. We back calculated that we	12 . They established the envidence area for Denied
12	were in the avoidance zone for that many hours during	12 A They established the avoidance zone for Period
1.4		13 5 with the blade vibration monitoring system that was
14	Q Well, Mitsubishi never said that operating in	14 installed with those new blades in Period 3.
15	the avoidance zone in Period 1 was a problem. They said	15 Q So the avoidance zone was established for a
16	operating above 420 in Period 1 was a problem, didn't	<pre>16 prospective purpose, right, by Mitsubishi?</pre>
17	they?	17 A Correct.
18	A No. See, again, technically, this is 420	18 Q Okay .
19	is really a proxy for the 15,000 pounds per hour per	19 A It was well, let me make sure we
20	foot squared, or maybe even 17,000 pounds per hour per	20 understand.
21	foot squared, which is the calculated steam flow for the	21 So it was installed to make sure that we
22	surface area on the LO blade.	22 didn't have any more issues, so we created Mitsubishi
23	That was Mitsubishi's concern. It was not an	23 did testing, and we were able to gather data that showed
24	operating limit. It was beyond their experience. It	24 if you run in a combination of inlet pressures and
25	was an area of uncertainty and that they did not know	25 exhaust pressures in certain areas, the blades vibrate
		112
1	too much, and so you need to avoid operating in those	112 1 the steam turbine. So there is a correlation there, no
1 2	too much, and so you need to avoid operating in those operating conditions.	112 1 the steam turbine. So there is a correlation there, no 2 doubt, but you can't just use a megawatt output of the
1 2 3	too much, and so you need to avoid operating in those operating conditions. And then we received guidance from Mitsubishi.	112 1 the steam turbine. So there is a correlation there, no 2 doubt, but you can't just use a megawatt output of the 3 generator to talk about conditions in a steam turbine.
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1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22	<pre>too much, and so you need to avoid operating in those operating conditions. And then we received guidance from Mitsubishi. They said, don't operate in those avoidance zones. If you have to ramp up or down through those zones of operation, don't spend time in those zones. Get right out of them. That was the guidance issued to make sure we didn't have an issue from Period 3 on. We still had issues even though we avoided the avoidance zone in Periods 3, 4 and 5. Q Well, my question to you is that imposition of the avoidance zone was about going-forward operations, correct? A Oh, yes. Q Yes. A But I think the avoidance zone and the steam flow can't be separated. The avoidance zone is related to the steam flow, this pounds per hour per foot squared, and that's what is being talked about here in the root cause. Q By the same token, operating above 420 and steam flow can't be separated either can ther?</pre>	 the steam turbine. So there is a correlation there, no doubt, but you can't just use a megawatt output of the generator to talk about conditions in a steam turbine. Q There is a high correlation between the amount of steam flow that gets you to 420 and above, right? A There is. I think to try to really simplify, Mitsubishi is saying that the steam flow, the 420 and above would produce steam flow that would be beyond their operating experience in a zone that they were not certain of. Q Okay. In the RCA, would it be fair to say that your analysis did not look at whether steam flows for the approximately 3,000 hours you operated the steam turbine above 420 megawatts caused material lasting damage to the non-blade portion of the steam turbine, did you? A Are you looking at a specific part of the Q No. I am asking you if there is anything in your RCA where you studied the number of hours that you operated above 420 to determine whether it damage the low pressure turbine.
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1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25	 too much, and so you need to avoid operating in those operating conditions. And then we received guidance from Mitsubishi. They said, don't operate in those avoidance zones. If you have to ramp up or down through those zones of operation, don't spend time in those zones. Get right out of them. That was the guidance issued to make sure we didn't have an issue from Period 3 on. We still had issues even though we avoided the avoidance zone in Periods 3, 4 and 5. Q Well, my question to you is that imposition of the avoidance zone was about going-forward operations, correct? A Oh, yes. Q Yes. A But I think the avoidance zone and the steam flow can't be separated. The avoidance zone is related to the steam flow, this pounds per hour per foot squared, and that's what is being talked about here in the root cause. Q By the same token, operating above 420 and steam flow can't be separated either, can they? A They can be correlated. There are many different factors that determine what the generator can produce as oppound to the avoid the flow. The avoid the flow. The avoid to the flow. 	1 the steam turbine. So there is a correlation there, no 2 doubt, but you can't just use a megawatt output of the 3 generator to talk about conditions in a steam turbine. 4 Q There is a high correlation between the amount 5 of steam flow that gets you to 420 and above, right? 6 A There is. I think to try to really simplify, 7 Mitsubishi is saying that the steam flow, the 420 and 8 above would produce steam flow that would be beyond 9 their operating experience in a zone that they were not 10 certain of. 11 Q Okay. In the RCA, would it be fair to say 12 that your analysis did not look at whether steam flows 13 for the approximately 3,000 hours you operated the steam 14 turbine above 420 megawatts caused material lasting 15 damage to the non-blade portion of the steam turbine, 16 Q No. I am asking you if there is anything in 19 your RCA where you studied the number of hours that you 20 operated above 420 to determine whether it damaged the 10 wp ressure turbine. 12 MR. HERNANDEZ: Judge, I am goin
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 114 W.	<pre>too much, and so you need to avoid operating in those operating conditions. And then we received guidance from Mitsubishi. They said, don't operate in those avoidance zones. If you have to ramp up or down through those zones of operation, don't spend time in those zones. Get right out of them. That was the guidance issued to make sure we didn't have an issue from Period 3 on. We still had issues even though we avoided the avoidance zone in Periods 3, 4 and 5. Q Well, my question to you is that imposition of the avoidance zone was about going-forward operations, correct? A Oh, yes. Q Yes. A But I think the avoidance zone and the steam flow can't be separated. The avoidance zone is related to the steam flow, this pounds per hour per foot squared, and that's what is being talked about here in the root cause. Q By the same token, operating above 420 and steam flow can't be separated either, can they? A They can be correlated. There are many different factors that determine what the generator can produce as opposed to the pressures and the flows and in</pre>	 the steam turbine. So there is a correlation there, no doubt, but you can't just use a megawatt output of the generator to talk about conditions in a steam turbine. Q There is a high correlation between the amount of steam flow that gets you to 420 and above, right? A There is. I think to try to really simplify, Mitsubishi is saying that the steam flow, the 420 and above would produce steam flow that would be beyond their operating experience in a zone that they were not certain of. Q Okay. In the RCA, would it be fair to say that your analysis did not look at whether steam flows for the approximately 3,000 hours you operated the steam turbine above 420 megawatts caused material lasting damage to the non-blade portion of the steam turbine, did you? A Are you looking at a specific part of the Q No. I am asking you if there is anything in your RCA where you studied the number of hours that you operated above 420 to determine whether it damaged the low pressure turbine. MR. HERNANDEZ: Judge, I am going to object on vague because I am not sure I understand what the question is. MR. REHWINKEL: Your Honor, I am trying to

	113			114	
1	understand what the RCA did and didn't do. And my			I am sorry.	
2	question is: Did the RCA study the amount of hours		2	A Oh, I am sorry. I covered it with my	
3	above 420 to determine whether that had impacted		3	pictures. Okay, I have 105.	
4	the low pressure turbine? That's my question.		4	Q Now, would you agree with me that 105 is a	
5	A I think even better than just looking at		5	response to an OPC POD No. 31?	
6	hours and I don't know if that was a detail that the		6	A Yes.	
7	root cause team looked at or not. I suspect it was a		7	Q Okay. And it's Bates numbered in the lower	
8	detail that they looked at, but again, the root cause		8	right-hand corner, so I am just going to refer to the	
9	team had knowledge of in fact, firsthand knowledge		9	last four numbers there.	
10	for many of the team members of inspections that were		10	Could I ask you to well, first of all, look	
11	done at every iteration at the end of Period 1, at the		11	at Bates 6868. And given your tenure at Progress, you	
12	end of Period 2, at the end of Period 3, at the end of		12	are familiar with this kind of document, are you not?	
13	Period 4 and at the end of Period 5 to look at each		13	A Iam, yes.	
14	stage of blades in the low pressure turbine; to look at		14	Q Okay. This is what you do you meaning the	
15	each of the diaphragms in the low pressure turbine.		15	executives and operational folks do to go to the	
16	We had nondestructive examination conducted		16	Board to get approval to initiate a project?	
17	during those times to conclusively say that there was no		17	A Well, it may or may not be the Board, but it	
18	damage in the low pressure turbine other than the		18	is part of the project approval process. And based on	
19	snubbers and the shroud tips on the LO blades.		19	the dollar value, the total project cost, there are	
20	Q Do you have a copy of Exhibit 105 in front of		20	different levels of approval.	
21	you? It's revised DEF response to OPC FOD 31?		21	Q I said board, I meant senior executive team	
22	A I do not have 105.		22	A Yes.	
23	Q It should be in that package there.		23	Q is that right?	
24	A I have 102, 103, 104, 115 and 116.		24	A Yes.	
25	Q Oh, look to your left there, the red folders.		25	${\tt Q}$ So we see here on 6868 all the executives,	
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	115
1	like Jeff Lyash and Bill Johnson, et cetera, you see
2	their names and initials for approval, right?
3	A Yes, I do.
4	Q Okay. And if we go to 68 this is called a
5	business analysis package, right?
6	A Part of this is, yes.
7	Q Part of it, yes.
8	A Yes.
9	Q And the business analysis package says,
10	here's what we need to do for the benefit of the company
11	and its customers, and here's what it's going to do for
12	them, and here's what it's going to cost to do it in
13	very rough terms, is that fair?
14	A Yes, that's fair.
15	Q Okay. And the senior executives look at that
16	information and they give you a thumbs up or a thumbs
17	down, right?
18	A Yes.
19	Q Thumbs up is all these signatures and initials
20	here, right?
21	A That's accurate.
22	Q Okay. So when we look on 6875, which is just
23	a few pages in, we see that there was, I guess, an
24	analysis done for business as usual, and that was
25	basically the recommended case to build Bartow; is that
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1 right? If you look on the prior page. 2 А So we are looking at 6875? Q 74 and 75, I should say. 3 4 A Oh, 74 and 75. And so, yes, looking at the alternatives considered, I know -- I am familiar with 5 6 these documents, and there were multiple alternatives 7 considered. 8 Q Okay. And on 6875, in the, it looks like the 9 second full paragraph starting with the secondary 10 market; do you see that? 11 A Yes. 12 Q Okay. This is part of what was the chosen 13 solution, is that right? 14 Yes, it is. А 15 Okay. Can you read that paragraph for me 0 16 aloud? 17 A Sure. 18 A secondary market 400-megawatt steam turbine 19 was found. The use of this turbine was investigated and 20 $\,$ proved to be a very good fit for the 4 CT and 4 HRSG $\,$ 21 combinations. In fact, it provided more operating 22 flexibility (see operational analysis detail below). In addition, the uncertainty in project schedule and cost 23 24 was reduced. 25 Q Okay. So this is -- this document is what the

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	117				118
1	senior executives would have reviewed to give the			A	Right.
2	approvals that we see back on 6868?		2	Q	And that was kind of your authorization to
3	A It's a piece of that document, yes.		3	conclude	the contracting, I guess, for the Tenaska plant
4	Q Okay. All right. So there was an expectation		4	steam tu	rbine?
5	that at the time this was approved by executives, that		5	A	Yes.
6	you were getting a steam turbine that was 400 megawatts		6	Q	Okay. So in 2008, if this IPP is dated
7	in output, right?		7	these app	provals look like on page 6907 they are in March
8	A I would be very careful to characterize the		8	of 2008.	What's going on here?
9	actual capacity of any of the pieces of equipment based		9	A	Well, I am paging back towards the beginning
10	on this document. This is not a technical engineering		10	of the de	ocument. I am not familiar with and this is
11	document. It is a, like you said, a business analysis		11	a long t	ime ago before I was directly involved, of
12	package. It gives the relative size of part of the		12	course.	
13	equipment that's going to go into an approximate 1,200		13	Q	Okay. 6861 6881 is the beginning of that
14	megawatt 4-on-1 combined cycle.		14	IPP and h	pusiness analysis package, is that right?
15	Q Okay. Turn back to page 6911. This is page 3		15	A	Yes. Could you I am sorry, could you state
16	of 27 of an IPP, which is integrated project plan.		16	your que	stion again?
17	A Yes, that's correct.		17	Q	So if we look on page 6885, we see I think
18	Q Okay. And we see over here in 2008, what		18	they are	looking for an additional \$18 million of
19	would have been happening with the Bartow project where		19	funding?	
20	an IPP would be reviewed and approved?		20	A	On 6885?
21	A As far as what would be happening, could you		21	Q	Yes?
22	give me more specific		22		THE COURT: On the recommendation
23	Q Well, you saw the BAP was approved in 2006, so		23	BY MR. RI	CHWINKEL:
24	that meant you could go ahead and execute on whatever		24	Q	On the recommendation there.
25	contracts you had to do and spend the money, right?		25	A	I see that, yes. I see it. So that is likely
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	119
1	the purpose for this document
2	Q Okay. We
3	A you know, I don't know specifically, but
4	what I do know is that the project was commissioned in
5	June of '09, as we have previously discussed. It was
6	well underway from a construction standpoint when
7	this the date of this document. So it looks like
8	they were looking for some additional funding.
9	Q Okay. And on 6911, which is where I wanted to
10	ask you a question, we see Paul Crimi's name and his
11	signature and a date, right?
12	A Yes.
13	Q Does that mean he was would have been
14	involved in sort of the planning and implementation of
15	the Bartow repowering project?
16	MR. HERNANDEZ: Objection, Your Honor. I
17	think the witness is testifying he is not certain
18	about this document altogether. He is not certain
19	what's occurring here, and so there is a lack of a
20	predicate for this question.
21	MR. REHWINKEL: My question is to ask him
22	about Mr. Crimi, and I have a question later on
23	that will tie this later on, Your Honor.
24	THE COURT: Again, I will overrule to the
25	extent he can only answer what he knows. If he
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1 doesn't know, I think he is capable of saying that. THE WITNESS: Well, so if you look at the 2 signature blocks required here, it's -- this is a 3 4 big decision for the company. It's a lot of money being talked about, a lot of funding, and there is 5 6 a lot of executives listed here from multiple departments. It's not just the department involved 8 with the construction. It's not just the 9 department that would be involved with the 10 operation of the unit. 11 Mr. Crimi, at the time, was an executive with 12 a support services branch of the company, and so he 13 was one of the required signatures of many 14 executives. Since it was a large financial 15 decision, there had to be buy-in from an alignment 16 across the executive suite. 17 BY MR. REHWINKEL: 18 0 He was Executive Director of Power Generation 19 Services, is what it appears to say here? 20 A Yes. 21 Okay. So based on your knowledge of the Q 22 company at the time, would that have meant he would have had some operational responsibilities with respect to 23 24 the steam turbine and the Bartow repowering? 25 А Actually, no, it would not have. He was -- as 114 W. 5th Avenue, Tallahassee, FL 32303 Premier Reporting premier-reporting.com Reported by: Debbie Krick (850) 894-0828

118

	121			12	2
1	power generation services, that's technical expertise.			fact, a few dozen variables that can come into play to	
2	It's engineering. It's not the operation of the unit.		2	predict what the output of a unit will be.	
3	The operation would be some of the other signatures on		3	There is different operating pieces of	
4	this page.		4	equipment that might be operating or not operating.	
5	Q Well, obviously, it wasn't commissioned at		5	There is different atmostpheric conditions. The	
6	this time. I am talking about as far as implementing		6	temperature of the weather makes a difference. The	
7	the project, when I said operational.		7	temperature of the air makes a difference. The	
8	A Well, and again, as far as implementing the		8	temperature of the cooling water makes a difference.	
9	project, this looks like every executive in every		9	The temperature of the cooling substance which might be	
10	department in the company was part of the decision to		10	hydrogen in the case of a generator. All these things	
11	implement the project since it was such a big		11	are analyzed many different ways.	
12	investment.		12	So, for example, on the Bartow combined cycle	
13	Q So in 2006, you executed a contract to buy the		13	project, there were over 300 heat balance cases that	
14	steam turbine from Mitsubishi, right?		14	were developed. And it seems excessive, there is over	
15	A Subject to check, yeah. I don't remember if		15	300, but think about Bartow for a minute. It's a 4-on-1	
16	it was 2006.		16	combined cycle, so you might run a heat case that is	
17	Q But in 2006, Duke contracted with Mitsubishi,		17	with all four combustion turbines running and the steam	
18	as your documentation says, to perform heat balances,		18	turbine, so 4-on-1 operation, but without what are	
19	correct?		19	called duct burners running. And you might do that at	
20	A Yes.		20	32 degrees. You might do it at 72 degrees. You might	
21	Q And could you tell the judge what a heat		21	do it at 95 degrees ambient conditions.	
22	balance is and what its intended output is?		22	And then each one of those ambient air	
23	A Sure. Any big new project like a new power		23	conditions, you might do it at a different cooling water	
24	plant, you have to try to well, the engineering		24	temperature, because all those variables make an impact	
25	analysis includes looking at many, many variables, in		25	on what the engineering prediction is going to be on the	
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1	gross output of the power block.]	1	air and combustion gases that are turning the combustion	
2	So for Bartow, you would do it on 4-on-1,		2	turbines motor.	
3	3-on-1, 2-on-1, 1-on-1 configuration. You would do it		3	So you are putting some high pressure steam	
4	with duct burners, without duct burners in service,		4	into the combustion turbines to make it generate more	
5	which is a very significant part of the operation that I		5	megawatts. You are stealing a little bit of steam from	
6	haven't talked about yet.		6	the steam turbine to do that, so whenever you use power	
7	In the heat recovery steam generator, I		7	augmentation in the combustion turbines, you turn on	
8	mentioned how the exhaust steam or the exhaust gases,		8	your duct burners to get more steam from the HRSGs to	
9	rather, from the combustion turbines, rather than go out		9	put back in the steam turbine.	
10	in the atmosphere, which they would in simple cycle		10	THE COURT: Steam turbine, I got you.	
11	operation, they are captured and they heat water, but		11	THE WITNESS: So depending on what pieces of	
12	there is also capability built into these heat recovery		12	equipment are operating at Bartow, there is a great	
13	steam generators that they are called duct burners. The		13	variation in how many megawatts the site is going	
14	natural gas-fired burners will light fire literally in		14	to have as output. And so, like I said, over 300	
15	the duct to put more heat in addition to the exhaust		15	different heat balance cases were generated as part	
16	gases coming from the combustion turbine so that you can		16	of the project as engineering predictions on what	
17	generate turn more water into steam. Generate more		17	the result would be.	
18	steam from the HRSGs. So whether duct burners are on or		18	BY MR. REHWINKEL:	
19	off is a very significant variable.		19	Q So what is the primary output of a heat	
20	In addition, at the Bartow site, there is		20	balance? Isn't there, like, a bottom line that comes	
21	something called power augmentation in the combustion		21	out?	
22			22		
	turbines. And this gets pretty technical, but you can			A There is a lot of output. I don't know that I	
23	turbines. And this gets pretty technical, but you can actually extract part of the steam as it's going through		23	A There is a lot of output. I don't know that I can say there is a primary output.	
23 24	turbines. And this gets pretty technical, but you can actually extract part of the steam as it's going through the steam turbine before it reaches the condenser and		23 24	A There is a lot of output. I don't know that I can say there is a primary output. Q Okay. Well, let's do you have a copy of	
23 24 25	turbines. And this gets pretty technical, but you can actually extract part of the steam as it's going through the steam turbine before it reaches the condenser and then pipe it into the combustion turbines to augment the		23 24 25	A There is a lot of output. I don't know that I can say there is a primary output. Q Okay. Well, let's do you have a copy of Exhibit 108 in your red folder there?	

1	A Yes, I have 108.	1 the output of the heat balances, one of the pages of the
2	Q Now, this happens to be Mitsubishi's response	2 output of the heat balances that you just told the judge
3	to your RFP for the long-term solution, right, this	3 about?
4	document?	4 A It is, and it's also on 2438, the columns
5	A Yes.	5 follow down. There is so many variables involved.
6	Q Okay. But if we if I could get you to	6 Q Oh, yes.
7	turn, and I apologize I didn't Bates these, these Bates	7 A It's the same like, for instance, if you
8	numbers at 2437, they are real tiny. If you go to 2435,	8 look across the top of 2437, this looks like it's Case 1
9	you can see there is an electrical or there is a	9 through Case 15 of the heat balance, and there is still
10	diagram, and then after that, I want to ask you	10 more of Case 1 through Case 15 on 2438.
11	something about the heat balances that are behind that.	11 Q Well, go to 43, I think you will see at the
12	MR. HERNANDEZ: So you want 437?	12 bottom of that.
13	MR. REHWINKEL: Yeah, 437.	13 A And there is more on the page after that as
14	MR. BERNIER: It is small.	14 well.
15	MR. REHWINKEL: Yeah.	15 Q Yeah. Go to 2443?
16	BY MR. REHWINKEL:	16 A 2443.
17	Q Once you get into that area, you will see that	17 Q Yeah. Is that where this these the
18	there is an easier-to-read page 2 of 129, there is	18 cases are numbered across the top 1 through 15?
19	100	19 A Yes.
20	A I think I am there.	20 Q Okay. So these pages from 37 to 43, these
21	Q You found it?	21 are these all relate to the same
22	A Yeah.	22 A They do, yes.
23	Q Okay. And I apologize, I don't know why page	23 Q long columns, right?
24	1 of 129 is not here. Our the document is Bates	24 A Right.
25	numbered consecutively, but I want to ask you if 2437 is	25 Q Okay. And then we see on 44 there, there is a
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	127
1	whole new set of heat balances?
2	A Right, 16 through.
3	Q Okay. But let's go back to 37. And would it
4	be fair to say that these are operating permutations, is
5	that a fair way to say these are kind of postulated ways
6	you could operate the unit, 1-on-1, 3-on-1, 2-on-1?
7	A I would say they are predictions
8	Q Okay.
9	A based on varying different operating
10	parameters.
11	Q Okay.
12	A And having different pieces of equipment in
13	service or out of service.
14	Q Right, okay.
15	So when we look on in the bottom at the
16	top a little bit, say, the top third of the page, we see
17	on the left-hand side, run date, in the heading titles,
18	right?
19	A Yes.
20	Q And if we follow that all the way across, it
21	says 7 September, 2006?
22	A Yes, I see that.
23	${\tt Q} \qquad {\tt Okay}. \ \ {\tt So} \ {\tt are these the ones that were done by}$
24	Mitsubishi or by Bibb?
25	A I don't know, looking at them. I know let

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128 1 me look up at the title. These appear to be the ones 2 done by Bibb. Q Okay. Now, Bibb is an engineer, or an 3 4 engineering firm that you hired to run heat balances in 5 conjunction with Mitsubishi, so you knew what you were going to be getting out of this unit before you 6 finalized the purchase, right? 7 8 A Well, Bibb was a little bit more than that. 9 That's a piece of their scope. But Bibb was the 10 engineer on the project, so we -- we, Progress Energy at 11 the time, had a contract with a consortium that was Bibb 12 and TIC constructors that together acted as the engineer 13 procuring construct contractors for the entire project. 14 Both of them later merged and were bought by 15 Kiewit. If you know what Kiewit is, Kiewit was in the 16 business of doing EPC projects for companies. 17 So Bibb acted as the owner's engineer, but that's -- so what you just stated is a piece of the 18 19 service they supplied. 20 0 Okay. But it is true that Bibb was your 21 guy -- I don't know if it's a person or people -- that's 22 your guy that represents you and makes sure that the 23 heat balances are run correctly and that Mitsubishi 24 agrees with the heat balances, is that fair?

25 A I -- it's -- part of it I know is fair. I

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		_	
1	don't about the Mitsubishi agrees piece. I don't know	1	40
2	the ins and outs of how that's done in a large	2	tu
3	construction project.	3	te
4	Q Well okay.	4	
5	So Mitsubishi didn't Bibb work with	5	
6	Mitsubishi to run these heat balances?	6	th
7	A I am sure there had to have been	7	οu
8	collaboration.	8	
9	Q Okay. So let's look at above that run	9	or
10	date, we see somewhere up in the mix, more than halfway	10	mc
11	up, it says STG output, do you see that?	11	tŀ
12	A Yes, I do.	12	ef
13	Q All right. And then in bold all the way	13	
14	across the page, we see variations of megawatt outputs	14	ba
15	under these heat balances, right?	15	us
16	A Correct.	16	ex
17	Q All right. So these are it's bolded. This	17	
18	is a primary result that you are looking for out of the	18	
19	heat balances. It tells you what the bottom line is you	19	th
20	are going to get out of this, you expect to get out of	20	wa
21	this unit under these predictions or permutations,	21	
22	right?	22	wł
23	A It is one of many things that we are getting	23	W€
24	out of this, yes.	24	li
25	Q But like you told the executives when you said	25	
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131 heat balances was 389, and that was a certain configuration, correct? 2 3 А I believe that's correct, yes. And the other was 420, right? Δ 0 That's correct. 5 6 Now, a really important point here, you are picking one. Let's look again at how many pages of data 7 is in each one of these heat cases. It's multiple 8 pages, right? I won't count them, but at least five or 9 10 six pages. 11 One of these -- for example, one of these 12 variables is power factor. And I can't read it, I am 13 having a hard time reading it. I wish I could point to the row. If I could get a magnifying glass, I could 14 15 read it to you. But I have read through these before. 16 I have looked at all 300 plus of these P cases. 17 The power factor assumptions are really key, 18 because when you think about a generator, an electrical 19 generator, the power factor of the electrical system has 20 great bearing on what the generator is able to do. 21 So in each of these cases, there is an assumed 22 value-of-power factor. And so for the assumed 23 value-of-power factor in case number 48, which you are 24 referencing, which ended up 420 megawatts of the steam 25 turbine, it was at a power factor of .949. We don't run 114 W. 5th Avenue, Tallahassee, FL 32303 (850) 894-0828

0, that's kind of the bottom line when you get a steam rbine, is what are you going to be able to generate in erms of electricity to serve customers, right? Could you ask that again, I am sorry? А Yeah. When you are buying a steam turbine, 0 e bottom line is what kind of megawatts can you get t of it, right? That's one of the -- well, the efficiency is А e the Keys. In fact, I would say efficiency is even ore key in a big project like this, because ultimately e long-term cost to the customer comes down to how ficient are you converting fuel energy into a product. Right. So would you agree with me that heat 0 lances were run and certain cases were selected and ed for the contract that you determined -- that you ecuted with Mitsubishi? А Yes. There were two heat balances that were part of Q e contract guarantee that Mitsubishi said they were rranting the unit to put out? A That's correct. I have seen other documents ere two of these heat balance cases were chosen and ere included in the contract language relative to guidated damages. Okay. And one of the outputs -- one of the 0

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130

	132
1	at a power factor of .949. We run at a power factor
2	close to one, which we call unity.
3	And this might be a good time, Mr. Bernier has
4	a drawing, I could explain power factor, and I think
5	this is quite important.
6	MR. HERNANDEZ: May I approach?
7	THE COURT: Yes.
8	THE WITNESS: And again, this is just an
9	example of
10	MS. BROWNLESS: Mr. Swartz, I am sorry, when
11	you hold the paper up, I can't see.
12	THE WITNESS: I am sorry, I will stand up.
13	MS. BROWNLESS: Thank you.
14	THE WITNESS: There is so many variables, as
15	you see in all these pages, that go along with
16	these heat balance cases. All of them have an
17	impact on the capacity of what the unit is going to
18	run. So I am picking one that's called power
19	factor because I think it's pretty important.
20	Power factor is a measure of the efficiency of
21	how load current we produce load current from
22	our generator, megavolt-amperes, all right. How
23	efficiently can we make that I am not there yet.
24	This is a donkey pulling on a barge. I will get
25	there in a second. A efficiently we convert that
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	133			134
1	load current into voltage, into real power, rather,	CUNFIDENTIA	1	for this horse to pull this barge through the canal
2	is really important to us. It's really important		2	as efficiently as possible, the horse would have to
3	to all of our customers. We want to do that as		3	walk on water, right, and be directly in front of
4	efficiently as we can.		4	the barge. If you are directly in front of the
5	So we have there is a measurement called		5	barge pulling it, the horse is going to have to do
6	power factor that measures that efficiency. We		6	less work and it won't heat up as much to pull the
7	want to be as close to one as you possibly can be.		7	barge.
8	A 1.0 power factor means you are being as efficient		8	The greater the angle becomes this direction,
9	as you can converting load current into real work.		9	more of the work of the horse is pulling this way
10	In the real world, there are loads. There is		10	and less of it is pulling straight down the barge.
11	motors; motors at FIPUG; motors at PCS Phosphate		11	And so the greater this angle is, as the horse is
12	that are creating a drag on the system. They are		12	pulling the barge down the canal, the more
13	creating the system to do extra work.		13	overheated the horse might come because it's
14	But also in the real world, we have equipment		14	harder. It's harder work. The power factor is
15	that and that makes the power factor drop less		15	lower in that case.
16	than one to go down into maybe when I say		16	So the generator is the analogy is to the
17	less than one, I am talking decimal places. It		17	electrical generator. The generators are rated by
18	might go down to .9 or to .95. But we have things		18	power factor as part of the rating, and there is
19	on our electrical system that keep it up close to		19	curves and there is curves in a lot of this
20	one called capacitor banks that are in service all		20	information that we saw that you can see based on
21	the time, because we want to make that conversion		21	power factor how much a generator is capable of
22	as efficient as possible for the benefit of our		22	putting out.
23	customers.		23	And these heat balances, the power factor was
24	So to make it real simple, power factor is		24	assumed to be various numbers;9 was used in many
25	just like in this picture. A power factor of one,		25	of the examples of heat cases; .949 was used in the
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	135			136
1	one you are referring to. Our system runs between		1	expected the steam turbine to put out 420 megawatts at
2	.97 and .995 all the time. Our generator at Bartow		2	normal operations, right?
3	can do more than 420 megawatts because it's closer		3	A The expectation would be that the predicted
4	to walking straight ahead of the barge. The 420 is		4	heat case would be achieved.
5	at a power factor .949, which is not where we run.		5	So, again, let's be really clear. What
6	So the 420 megawatts doesn't apply to the		6	Mitsubishi and the project team used, they used heat
7	steam turbine. It's part of the generator, and our		7	case number 48, which used a power factor of .949. It
8	generator is capable of doing more than that		8	predicted a megawatt output of 420. They used that as
9	because our power factor runs closer to unity.		9	the minimum thing that Mitsubishi had to achieve in
10	I hope it made sense. It's an odd it's a		10	order to get full payment on the project. Anything
11	difficult-to-understand electrical concept.		11	below 420, there would have been liquidated damages that

11	0	difficult-to	-understand	electrical	concept.
12	BY MR	. REHWINKEL:			

 13
 Q
 So none of the P balances that are shown in

 14
 this exhibit, we call it 108, showed a expected output

 15
 above 420, maybe 420.2, but nothing up to 421 or above,

 16
 right?

17 A I didn't see -- they don't, but I also didn't 18 see any power factors above .949.

Q Okay. You would agree that the contract

20 contained expected megawatt output of 420 megawatts, 21 correct?

22 A At an assumed set of conditions, including23 power factor, that is correct.

24 Q So at the time you talked to senior executives

and contracted with Mitsubishi, both Mitsubishi and Duke

19

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get there.

Mitsubishi had to pay to Progress Energy.

produce more than 420 megawatts.

Yes, sir.

So the 420 was actually a contractual minimum

that had to be achieved. And again, it was at a lower

power factor than we actually run at. So everybody

Let me get organized here.

I do have 116. Page 21?

All right, I am there.

would have known that the steam turbine generator can

Do you have Exhibit 116 with you still?

I would ask you to turn to page 21 when you

Now, this is a Mitsubishi document. And do

12

13

14

15

16

17

18

19

20

21

2.2

23

24

1	you disagree that the Bartow steam turbine was designed
2	to operate at 420 megawatts, as the OEM says?
3	A I agree that there is a case with certain
4	variables, and you can see there is pages of variables
5	that go in. And if the variables are at those
6	particular numbers, then 420 is the predicted output.
7	And that was used as a contractual minimum that
8	Mitsubishi had to achieve.
9	Q Well, in the second bullet, it says a heat
10	balance diagram providing max operation, parenthesis,
11	420 megawatt, thermal conditions was provided as part of
12	the thermal kit. Do you disagree with that?
13	A That's what it says. And my interpretation of
14	that is the maximum the generator can put out at those
15	conditions at a power factor of .949 is 420 megawatts.
16	Q Okay. And then the next bullet there was
17	it says: During the performance test in 2009, using the
18	420-megawatt thermal conditions, the unit was able to
19	reach approximately 402 megawatts; is that right?
20	A That's correct.
21	Q And the performance test here was when you
22	were installing the unit. Sometime before you
23	commissioned it, you did a test to see whether it met
24	the contractual terms as far as that guarantee, right?
25	A That's correct.
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	139
1	A It is.
2	Q Okay. And if we go over to 12439, just for
3	the to follow up on your testimony about the power
4	factor. We see those this is what you were talking
5	about power factor is .9 and .949?
6	A It is. On that the table in 4.2, you can
7	see those in the third row down in each column.
8	Q Okay. And they also have condenser back
9	pressure assumptions that correlate to those outputs, is
10	that right?
11	A Yes.
12	Q So and we see that is it true that the
13	Case 28 was a 4-x-1 configuration, and Case 48 was a
14	3-x-1 configuration?
15	A Case 28, to my memory, was a 4-x-1 without
16	duct burners. And Case 48, to my memory, was a 3-on-1
17	with full duct burning.
18	Q Okay. Does this document here, or the heat
19	balances, or any other documentation that you can point
20	to demonstrate that Mitsubishi or Bibb told you that you
21	could get more than 420 megawatts of output from the
22	steam turbine?
23	A Well, I believe you can look at some of this
24	documentation and reach that conclusion, yes.
25	Q Because of the power factor?
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	138
	Q And is this factual?
2	A Yes.
3	Q All right. So let's go to Exhibit 109, which
4	is the contract. And I want to go to actually
5	attachment Appendix A.
6	A Appendix A?
7	Q Yes, sir. It starts at Bates 12419.?
8	MS. BROWNLESS: Excuse me, Charles. Just so I
9	understand, this is the page that says Contract No.
10	270810, Amendment 005?
11	MR. REHWINKEL: Yes.
12	MR. BERNIER: Mr. Swartz, I think it's after
13	the first divider sheet.
14	THE WITNESS: I found it. I am sorry. I just
15	found it.
16	BY MR. REHWINKEL:
17	Q All right. So you agree with me, this is part
18	of the contract for the steam turbine, right?
19	A I do.
20	Q Okay. And if I get you to go to Bates 12437.
21	This is 3.3 Basis for Guaranteed Performance, as a
22	header, when you get there.
23	A Okay, I am there.
24	Q Okay. Is this how the electrical output of
25	the turbine was calculated? Is this the formula?

1 A Yes.	
2 Q Okay. But did anybody tell you that it would	d
3 be perfectly normal to operate the unit above	
4 420 megawatts per as much as you wanted?	
5 A That's not a typical conversation. So the	
6 Bartow combined cycle, just like any other project, ye	ou
7 talk about what the capacity is you are going to get a	out
8 of the site. And in this case, I think some of the	
9 documents referred to a number maybe 1,278 or	
10 1,279 megawatts, something like that. But there are	
11 many, many variables that come into play as far as the	e
12 output of your machine. In the wintertime, when it's	
13 colder, when the cooling water temperature is lower, w	ve
14 can run with better condenser vacuums much more	
15 efficient.	
16 So to give you an example, our Duke Energy	
17 Florida fleet, in the summertime we can produce about	
18 10,000 megawatts of power. In the wintertime, we can	
19 produce about 11,000 megawatts of power. And the	
20 difference is the colder weather, the colder cooling	
21 water that helps the machines be more efficient in the	e
22 wintertime.	
23 So you have to make sure you are	
24 understanding. Every time you are talking about a	
25 rating of a piece of equipment, you have to understand	1

			192
1	all the other conditions that are part of that predicted	1	And there is one more thing I would like to
2	rating. And it would be a really bad thing to say you	2	say. So to answer your question directly, if you go to
3	have to adhere to this one case out of more than 300 and	3	page 12596 in this same document. It's way back there.
4	never exceed that because you would be leaving potential	4	It looks like this.
5	capacity on the table that could be used for the benefit	5	MS. BROWNLESS: What's the number again, sir?
6	of our customer.	6	THE WITNESS: In the lower right-hand corner,
7	So let's expand Bartow, the Bartow is a steam	7	it's 012596.
8	turbine. You know, Bartow is a 1270-megawatt site. The	8	So, Your Honor, are you there?
9	steam turbine is, you know, 400, 450 megawatts,	9	THE COURT: I am there.
10	somewhere in that range. But it's different in the	10	THE WITNESS: This is the capability curve of
11	summer than it is in the winter.	11	the generator for this project. And this is the
12	But if we were to apply, say, summer ratings,	12	page that shows that you can get more than
13	and then in the wintertime, when we need 11,000	13	420 megawatts if the power factor is greater than
14	megawatts to serve our customers, we would have to buy	14	.9.
15	expensive fuel, or we would have to put on less	15	And I know this is hard to read, but this line
16	efficient generating units to great expense for our	16	right here going up at a positive angle is a .9
17	customers.	17	power factor line. And you can see it intersects
18	So you have to understand all the variables	18	the generator capability curve. If you come down,
19	associated with a rating. Our job as operators is to	19	you see that's right at 420 megawatts.
20	make sure we stay within the operating parameters that	20	We run closer to unity, closer to one. And if
21	are given by our equipment manufacturers and get the	21	you go all the way across, that's almost
22	most out of our machines that we can without exceeding	22	470 megawatts. And if you look up at the very top
23	those parameters. And that's what every operator does.	23	of this piece of paper, you can see there is a
24	That's what every utility should be doing, and that's	24	rating up at the very top. It says 468000 kVA,
25	certainly what we did with Bartow.	25	that's kilovolt-amperes. That's the reactive power
	143		144
1	143 that this generator is capable of putting out.	1	144 parameter, but this gives you an idea of what the
1 2	143 that this generator is capable of putting out. Power factor is the kilowatts divided by the	1 2	144 parameter, but this gives you an idea of what the capability of the generator is.
1 2 3	143 that this generator is capable of putting out. Power factor is the kilowatts divided by the kilovolt-amperes.	1 2 3	144 parameter, but this gives you an idea of what the capability of the generator is. So we have a piece of equipment attached to
1 2 3 4	143 that this generator is capable of putting out. Power factor is the kilowatts divided by the kilovolt-amperes. So you can see the kilowatts is only 420.2	1 2 3 4	144 parameter, but this gives you an idea of what the capability of the generator is. So we have a piece of equipment attached to the steam turbine that's capable at the power factors we
1 2 3 4 5	143 that this generator is capable of putting out. Power factor is the kilowatts divided by the kilovolt-amperes. So you can see the kilowatts is only 420.2 421.2. It's 421,200 kilowatts. So it's 421.2	1 2 3 4 5	14 parameter, but this gives you an idea of what the capability of the generator is. So we have a piece of equipment attached to the steam turbine that's capable at the power factors we run of doing in excess of 460 megawatts. So as long as
1 2 3 4 5 6	<pre>143 that this generator is capable of putting out. Power factor is the kilowatts divided by the kilovolt-amperes. So you can see the kilowatts is only 420.2 421.2. It's 421,200 kilowatts. So it's 421.2 megawatts. But with a power factor closer to one,</pre>	1 2 3 4 5 6	144 parameter, but this gives you an idea of what the capability of the generator is. So we have a piece of equipment attached to the steam turbine that's capable at the power factors we run of doing in excess of 460 megawatts. So as long as we can stay within the operating parameters of the steam
1 2 3 4 5 6 7	<pre>143 that this generator is capable of putting out. Power factor is the kilowatts divided by the kilovolt-amperes. So you can see the kilowatts is only 420.2 421.2. It's 421,200 kilowatts. So it's 421.2 megawatts. But with a power factor closer to one, you can get closer to 468 megawatts out of this</pre>	1 2 3 4 5 6 7	144 parameter, but this gives you an idea of what the capability of the generator is. So we have a piece of equipment attached to the steam turbine that's capable at the power factors we run of doing in excess of 460 megawatts. So as long as we can stay within the operating parameters of the steam turbine, and those are pressures and temperatures, why
1 2 3 4 5 6 7 8	<pre>143 that this generator is capable of putting out. Power factor is the kilowatts divided by the kilovolt-amperes. So you can see the kilowatts is only 420.2 421.2. It's 421,200 kilowatts. So it's 421.2 megawatts. But with a power factor closer to one, you can get closer to 468 megawatts out of this steam turbine. That's what that information is</pre>	1 2 3 4 5 6 7 8	144 parameter, but this gives you an idea of what the capability of the generator is. So we have a piece of equipment attached to the steam turbine that's capable at the power factors we run of doing in excess of 460 megawatts. So as long as we can stay within the operating parameters of the steam turbine, and those are pressures and temperatures, why don't we try to get as much output from the generator as
1 2 3 4 5 6 7 8 9	<pre>143 that this generator is capable of putting out. Power factor is the kilowatts divided by the kilovolt-amperes. So you can see the kilowatts is only 420.2 421.2. It's 421,200 kilowatts. So it's 421.2 megawatts. But with a power factor closer to one, you can get closer to 468 megawatts out of this steam turbine. That's what that information is telling you. So in the same document, they are</pre>	1 2 3 4 5 6 7 8 9	parameter, but this gives you an idea of what the capability of the generator is. So we have a piece of equipment attached to the steam turbine that's capable at the power factors we run of doing in excess of 460 megawatts. So as long as we can stay within the operating parameters of the steam turbine, and those are pressures and temperatures, why don't we try to get as much output from the generator as we can.
1 2 3 4 5 6 7 8 9 10	<pre>143 that this generator is capable of putting out. Power factor is the kilowatts divided by the kilovolt-amperes. So you can see the kilowatts is only 420.2 421.2. It's 421,200 kilowatts. So it's 421.2 megawatts. But with a power factor closer to one, you can get closer to 468 megawatts out of this steam turbine. That's what that information is telling you. So in the same document, they are saying you can get greater than 420 megawatts.</pre>	1 2 3 4 5 6 7 8 9 10	144 parameter, but this gives you an idea of what the capability of the generator is. So we have a piece of equipment attached to the steam turbine that's capable at the power factors we run of doing in excess of 460 megawatts. So as long as we can stay within the operating parameters of the steam turbine, and those are pressures and temperatures, why don't we try to get as much output from the generator as we can. Q Do you have Mr. Pollock's exhibit RAP-5 with
1 2 3 4 5 6 7 8 9 10 11	<pre>that this generator is capable of putting out. Power factor is the kilowatts divided by the kilovolt-amperes. So you can see the kilowatts is only 420.2 421.2. It's 421,200 kilowatts. So it's 421.2 megawatts. But with a power factor closer to one, you can get closer to 468 megawatts out of this steam turbine. That's what that information is telling you. So in the same document, they are saying you can get greater than 420 megawatts. BY MR. REHWINKEL:</pre>	1 2 3 4 5 6 7 8 9 10 11	<pre>14 parameter, but this gives you an idea of what the capability of the generator is. So we have a piece of equipment attached to the steam turbine that's capable at the power factors we run of doing in excess of 460 megawatts. So as long as we can stay within the operating parameters of the steam turbine, and those are pressures and temperatures, why don't we try to get as much output from the generator as we can. Q Do you have Mr. Pollock's exhibit RAP-5 with you?</pre>
1 2 3 4 5 6 7 8 9 10 11 12	<pre>that this generator is capable of putting out. Power factor is the kilowatts divided by the kilovolt-amperes. So you can see the kilowatts is only 420.2 421.2. It's 421,200 kilowatts. So it's 421.2 megawatts. But with a power factor closer to one, you can get closer to 468 megawatts out of this steam turbine. That's what that information is telling you. So in the same document, they are saying you can get greater than 420 megawatts. BY MR. REHWINKEL: Q So 468, is that approximately the rating of</pre>	1 2 3 4 5 6 7 8 9 10 11 12	<pre>14 parameter, but this gives you an idea of what the capability of the generator is. So we have a piece of equipment attached to the steam turbine that's capable at the power factors we run of doing in excess of 460 megawatts. So as long as we can stay within the operating parameters of the steam turbine, and those are pressures and temperatures, why don't we try to get as much output from the generator as we can. Q Do you have Mr. Pollock's exhibit RAP-5 with you? A I do. Okay, I am there.</pre>
1 2 3 4 5 6 7 8 9 10 11 12 13	<pre>that this generator is capable of putting out. Power factor is the kilowatts divided by the kilovolt-amperes. So you can see the kilowatts is only 420.2 421.2. It's 421,200 kilowatts. So it's 421.2 megawatts. But with a power factor closer to one, you can get closer to 468 megawatts out of this steam turbine. That's what that information is telling you. So in the same document, they are saying you can get greater than 420 megawatts. EY MR. REHWINKEL: Q So 468, is that approximately the rating of the generator?</pre>	1 2 3 4 5 6 7 8 9 10 11 12 13	<pre>14 parameter, but this gives you an idea of what the capability of the generator is. So we have a piece of equipment attached to the steam turbine that's capable at the power factors we run of doing in excess of 460 megawatts. So as long as we can stay within the operating parameters of the steam turbine, and those are pressures and temperatures, why don't we try to get as much output from the generator as we can. Q Do you have Mr. Pollock's exhibit RAP-5 with you? A I do. Okay, I am there. Q You got that, okay.</pre>
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1 2 3 4 5 6 7 8 9 10 11 12 13 14 15	<pre>that this generator is capable of putting out. Power factor is the kilowatts divided by the kilovolt-amperes. So you can see the kilowatts is only 420.2 421.2. It's 421,200 kilowatts. So it's 421.2 megawatts. But with a power factor closer to one, you can get closer to 468 megawatts out of this steam turbine. That's what that information is telling you. So in the same document, they are saying you can get greater than 420 megawatts. EY MR. REHWINKEL: Q So 468, is that approximately the rating of the generator? A Correct. Q Okay. So</pre>	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15	<pre>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>></pre>
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16	<pre>that this generator is capable of putting out. Power factor is the kilowatts divided by the kilovolt-amperes. So you can see the kilowatts is only 420.2 421.2. It's 421,200 kilowatts. So it's 421.2 megawatts. But with a power factor closer to one, you can get closer to 468 megawatts out of this steam turbine. That's what that information is telling you. So in the same document, they are saying you can get greater than 420 megawatts. EY MR. REHWINKEL: Q So 468, is that approximately the rating of the generator? A Correct. Q Okay. So A The well, kVA, to be more precise. And it</pre>	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16	14 parameter, but this gives you an idea of what the capability of the generator is. So we have a piece of equipment attached to the steam turbine that's capable at the power factors we run of doing in excess of 460 megawatts. So as long as we can stay within the operating parameters of the steam turbine, and those are pressures and temperatures, why don't we try to get as much output from the generator as we can. A Do you have Mr. Pollock's exhibit RAP-5 with you? A I do. Okay, I am there. A This is a document you prepared at our prepared at our prepared, the Public Counsel's request, right? A Yes.
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1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18	<pre>143 that this generator is capable of putting out. Fower factor is the kilowatts divided by the kilovolt-amperes. So you can see the kilowatts is only 420.2 421.2. It's 421,200 kilowatts. So it's 421.2 megawatts. But with a power factor closer to one, you can get closer to 468 megawatts out of this steam turbine. That's what that information is telling you. So in the same document, they are saying you can get greater than 420 megawatts. EY MR. REHWINKEL: Q So 468, is that approximately the rating of the generator? A Correct. A The well, kVA, to be more precise. And it depends on the power factor, and whether or not you can get that much megawatts, the real power out.</pre>	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18	14 parameter, but this gives you an idea of what the capability of the generator is. So we have a piece of equipment attached to the steam turbine that's capable at the power factors we run of doing in excess of 460 megawatts. So as long as we can stay within the operating parameters of the steam turbine, and those are pressures and temperatures, why don't we try to get as much output from the generator as we can. Q Do you have Mr. Pollock's exhibit RAP-5 with you? A I do. Okay, I am there. A I do. Okay, I am there. A Yes. Q Okay. So there is no question about the you?
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19	<pre>that this generator is capable of putting out. Power factor is the kilowatts divided by the kilovolt-amperes. So you can see the kilowatts is only 420.2 421.2. It's 421,200 kilowatts. So it's 421.2 megawatts. But with a power factor closer to one, you can get closer to 468 megawatts out of this steam turbine. That's what that information is telling you. So in the same document, they are saying you can get greater than 420 megawatts. EV MR. REHWINKEL: Q So 468, is that approximately the rating of the generator? A Correct. Q Okay. So A The well, kVA, to be more precise. And it depends on the power factor, and whether or not you can get that much megawatts, the real power out. </pre>	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19	14 parameter, but this gives you an idea of what the capability of the generator is. So we have a piece of equipment attached to the steam turbine that's capable at the power factors we run of doing in excess of 460 megawatts. So as long as we can stay within the operating parameters of the steam turbine, and those are pressures and temperatures, why don't we try to get as much output from the generator as we can. A Do you have Mr. Pollock's exhibit RAP-5 with you? A I do. Okay, I am there. A I do. Okay, I am there. A Yes. O Negot that, okay. A Yes. A yes. A suita sing a document you prepared at our prepared at the power. A Yes. A yes. A suita sing a couracy of it, right? A suita sing a couracy of it, right?
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1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22	that this generator is capable of putting out. Fower factor is the kilowatts divided by the kilovolt-amperes. So you can see the kilowatts is only 420.2 421.2. It's 421,200 kilowatts. So it's 421.2 megawatts. But with a power factor closer to one, you can get closer to 468 megawatts out of this steam turbine. That's what that information is telling you. So in the same document, they are saying you can get greater than 420 megawatts. EY MR. REHWINKEL: Q So 468, is that approximately the rating of the generator? A Correct. Q Okay. So A The well, kVA, to be more precise. And it depends on the power factor, and whether or not you can get that much megawatts, the real power out. Q So is it Duke's position that as long as you stay within the IP, HP and condenser limits, that if you could get to 468 on a regular basis, that you would	1 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21	14 parameter, but this gives you an idea of what the capability of the generator is. So we have a piece of equipment attached to the steam turbine that's capable at the power factors we run of doing in excess of 460 megawatts. So as long as we can stay within the operating parameters of the steam turbine, and those are pressures and temperatures, why don't we try to get as much output from the generator as we can. Q Do you have Mr. Pollock's exhibit RAP-5 with you? A I do. Okay, I am there. G You got that, okay. An this is a document you prepared at our fequences, the Public Counsel's request, right? A Yes. G Okay. So there is no question about the fouldity of this data, and accuracy of it, right? A I will say I know that there is this is fit uses averaging. And it depends on how often you supple a data point, and that can cause discrepancies in the data.
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23	<pre>that this generator is capable of putting out. Power factor is the kilowatts divided by the kilovolt-amperes. So you can see the kilowatts is only 420.2 421.2. It's 421,200 kilowatts. So it's 421.2 megawatts. But with a power factor closer to one, you can get closer to 468 megawatts out of this steam turbine. That's what that information is telling you. So in the same document, they are saying you can get greater than 420 megawatts. BY MR. REHWINKEL: Q So 468, is that approximately the rating of the generator? A Correct. Q Okay. So A The well, kVA, to be more precise. And it depends on the power factor, and whether or not you can get that much megawatts, the real power out. Q So is it Duke's position that as long as you stay within the IP, HP and condenser limits, that if you could get to 468 on a regular basis, that you would be it would be perfectly okay to operate have operated that unit in 2001 Period 12. I are every:</pre>	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 22	 parameter, but this gives you an idea of what the capability of the generator is. So we have a piece of equipment attached to the steam turbine that's capable at the power factors we run of doing in excess of 460 megawatts. So as long as we can stay within the operating parameters of the steam turbine, and those are pressures and temperatures, why don't we try to get as much output from the generator as we can. Q Do you have Mr. Pollock's exhibit RAP-5 with you? A I do. Okay, I am there. Q You got that, okay. An this is a document you prepared at our focueset, the Public Counsel's request, right? A Yes. Q Okay. So there is no question about the fouldity of this data, and accuracy of it, right? A I will say I know that there is this is fit uses averaging. And it depends on how often you sample a data point, and that can cause discrepancies in the data. It's a good representation, I will say that.
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24	 that this generator is capable of putting out. Power factor is the kilowatts divided by the kilowolt-amperes. So you can see the kilowatts is only 420.2 421.2. It's 421,200 kilowatts. So it's 421.2 megawatts. But with a power factor closer to one, you can get closer to 468 megawatts out of this steam turbine. That's what that information is telling you. So in the same document, they are saying you can get greater than 420 megawatts. EY MR. REHWINKEL: Q So 468, is that approximately the rating of the generator? A Correct. A The well, kVA, to be more precise. And it depends on the power factor, and whether or not you can get that much megawatts, the real power out. Q So is it Duke's position that as long as you stay within the IP, HP and condenser limits, that if you could get to 468 on a regular basis, that you would be it would be perfectly okay to operate have operated that unit in 2001 Period 1? I am sorry. 	1 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24	
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25	that this generator is capable of putting out. Fower factor is the kilowatts divided by the kilowolt-amperes. So you can see the kilowatts is only 420.2 421.2. It's 421,200 kilowatts. So it's 421.2 megawatts. But with a power factor closer to one, you can get closer to 468 megawatts out of this steam turbine. That's what that information is telling you. So in the same document, they are saying you can get greater than 420 megawatts. EY MR. REHWINKEL: A correct. A correct. A The well, kVA, to be more precise. And it depends on the power factor, and whether or not you can get that much megawatts, the real power out. A So is it Duke's position that as long as you stay within the IP, HP and condenser limits, that if you could get to 468 on a regular basis, that you would be it would be perfectly okay to operate have operated that unit in 2001 Period 1? I am sorry. A Right. You have to look at other parameters as well. Again, it's hazardous to look at just any one	1 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24	<text><text><text><list-item><list-item><table-container><table-container><table-container><table-container><table-container><table-container><table-container></table-container></table-container></table-container></table-container></table-container></table-container></table-container></list-item></list-item></text></text></text>
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	-
2	A Yes, it does.
3	Q with that approximation caveat?
4	A It does.
5	Q So I just wanted to ask you about this,
6	because as you were talking about being able to increase
7	the output based on certain efficiencies, including
8	ambient temperature, weather, right? And what I mean
9	now, I am talking about the air temperature and the
10	water temperature, right?
11	A Sure.
12	Q Let's look at period of 2010. Would you agree
13	with me that and would you also agree with me that
14	the months of June through September are your hottest
15	months?
16	A I would.
17	Q Okay. And we look at here, we see a fairly
18	large distribution of the operating time above 420 in
19	the hottest months, right?
20	A Yes.
21	Q Okay. So it wouldn't necessarily be a
22	reasonable conclusion to suggest that you operated this
23	high above 420 or this much above 420 because the
24	weather was colder, right?
25	A Well, you have to understand what else is
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right --

147 Right, because I think in the cooler months, А 2 we were still having trouble with the circulating water system. I don't know that, but --3 4 0 Okay. And before 2012, you did not do an engineering analysis that showed that it was possible to 5 6 operate the unit above 420, did you? 7 А Well, I think we had all kinds of information 8 that showed that it was possible to operate above 420. In fact, if we could, let's refer back to the contract 9 10 for a minute. 11 I will have to find the exact page, but again, 12 the 420 megawatts that you keep referencing was a 13 contractual minimum that Mitsubishi had to meet in order to get full payment on the project. So just that fact 14 15 alone tells everybody that above 420 is okay. 420 is 16 the minimum that had to be achieved. And that's in this 17 contract. I will just have to -- if you give me a 18 moment. I will find the page. 19 Okay, so if you turn in the -- let me see what 20 the exhibit number is. It's the contract. It's the 21 very large document, Exhibit No. 109. And if you turn 22 to the Bates numbers 012434 in the bottom right hand. 23 Well, it's even better if you page to 12432, which is 24 two pages before that, 12432. 25 And you can see in paragraph 3.2.1 that the

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1	going on at the plant at the time. So our ability to
2	pump that cold or warmer water through the system is
3	really important. You are not going to get the
4	efficiency unless you are able to pump it.
5	And what I know is when we first commissioned
6	this plant, and during the first several months of
7	operation and I don't know how long it went into
8	2010, but we had some great difficulty with what's
9	called the circulating water system, which circulates
10	the cooling water through the equipment, including the
11	condenser underneath the steam turbine.
12	My conclusion from this data would be that
13	once we straightened that out and were able to fully
14	pump water through the condenser, we started really
15	taking advantage of what we could from an installed
16	equipment standpoint. Also understanding that in any
17	new operation, there is a period of learning for the
18	operating staff as well. But I know we had these
19	equipment issues with the circulating water system for
20	the first several months of operation.
21	Q But in 2010, there is not in fact, it looks
22	like you have more hours above 420
23	A I think
24	Q in the hot months than in the cooler
25	months, right?
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420.07 is a liquidated damage performance guarantee, 1 2 which means that's the minimum that the project had to 3 achieve in order to get full payment on the project. 4 0 But it says in 3.2.12: MPS Net Steam turbine Maximum Electrical Output 420.07, right? 5 6 A Yes, that's referring, in my opinion, to that generator capability curve that I just showed you. It's at a lower power factor than we operate. So again, you 8 have to make sure any time you talk about a rating, you 9 10 have to make sure you understand all the variables that 11 go into that rating. In this assistance, it used a 12 power factor that we can far out achieve. 13 0 Okay. So in 2012, after you had the first

discovery of blade damage, isn't it true that you went 14 15 to Mitsubishi and asked them for their help in telling 16 you how you could operate above 420? 17 I would phrase it a little differently than А 18 that. 19 So we opened up the steam turbine for a 20 routine inspection in the spring of 2012. We found five 21 of the mid-span snubbers that had damage. We were

2.2 concerned with that. So we consulted with Mitsubishi.

23 They recommended we don't continue running with those

24 snubbers broken. That could lead to blade failure,

25 which would be catastrophic, as I have described

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1	earlier.	1 And if you look at the picture over here, you
2	At that time, Mitsubishi, as we've seen and	2 can see that the machine has two ends. The
3	you pointed out, they were concerned we were running	3 generator is coupled to the right-hand side, and
4	higher than their fleet experience from a pounds per	4 the HP IP turbine is coupled to the left-hand side.
5	hour per square foot standpoint in the last stage blade,	5 So on the turbine end of the machine, we replaced
6	so they gave us, for the first time, a lower operating	6 all 64 LO blades.
7	limit.	7 Before we started operating again in April of
8	And in this case, if we could turn to my to	8 2012, Mitsubishi, in order to make sure that we
9	JS-2 in the root cause, I can show you what the	9 didn't exceed their operating experience with
10	operating limit is. It's page 5 of 18, Table A in JS-2,	10 40-inch LO blades, they put this 118-pound limit on
11	or JS-1.	11 the intermediate pressure turbine exhaust. And in
12	Are you there, Your Honor?	12 this case, that served as a proxy.
13	THE COURT: I am just about there. Yeah, I am	13 Why that intermediate pressure exhaust rather
14	there now.	14 than the low pressure turbine inlet. There was no
15	THE WITNESS: Okay. So in that table, you can	15 pressure instrument on the low pressure inlet, but
16	see it has columns for each of the five periods.	16 there was one on the intermediate pressure exhaust,
17	And the one, two, three, four, the fifth row down	17 so that was used as a proxy.
18	says MHPS IP exhaust pressure operating limits.	18 And if I could stand up just a minute just to
19	So it's at the start of Period 2, because of	19 make sure everyone understands. Mitsubishi was
20	that damage we found, following Mitsubishi's	20 concerned, as I described, with the steam flow, but
21	recommendation, we replaced all of the blades on	21 there was no pressure instrument on the pressure
22	just one end of the machine because all five	22 going into the low pressure turbine, but there was
23	snubbers were damaged on the same end of the	23 one coming out of the intermediate pressure. So
24	machine, I believe on the turbine end. It says in	24 there is just a slight amount of pressure drop
25	this chart. I am not looking at it.	25 across this pipe.
114 W	5th Avenue, Tallahassee, FL 32303 premier-reporting.com	n 114 W. 5th Avenue. Tallahassee. FL 32303 premier-reporting.com
114 W Premie	. 5th Avenue, Tallahassee, FL 32303 premier-reporting.com or Reporting (850) 894-0828 Reported by: Debbie Krick	I L Premier-reporting.com k Premier Reporting (850) 894-0828 Reported by: Debbie Krick
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114 W Premie	. 5th Avenue, Tallahassee, FL 32303 premier-reporting.com r Reporting (850) 894-0828 Reported by: Debbie Krici 151	n 114 W. 5th Avenue, Tallahassee, FL 32303 premier-reporting.com Premier Reporting (850) 894-0828 Reported by: Debble Krick
114 W Premie	.5th Avenue, Tallahassee, FL 32303 r Reporting (850) 894-0828 Reported by: Debbie Kric 151 So we used this pressure as a proxy for the	n 114 W. 5th Avenue, Tallahassee, FL 32303 premier-reporting.com Premier Reporting (850) 894-0828 Reported by: Debbie Krick 152
114 W Premie	.5th Avenue, Tallahassee, FL 32303 r Reporting (850) 894-0828 Reported by: Debbie Krid 151 So we used this pressure as a proxy for the low pressure turbine inlet. It was more	n 114 W. 5th Avenue, Tallahassee, FL 32303 premier-reporting.com Premier Reporting (850) 894-0828 Reported by: Debbie Krick 152 1 that can be done? 2 They studied it and came back with us to us
114 W Premie	.5th Avenue, Tallahassee, FL 32303 r Reporting (850) 894-0828 Reported by: Debbie Krid 151 So we used this pressure as a proxy for the low pressure turbine inlet. It was more conservative than what had been in the past, so the	114 W. 5th Avenue, Tallahassee, FL 32303 Premier Reporting (850) 894-0828 reported by: Debbie Krick 152 1 that can be done? 2 They studied it and came back with us to us 3 and said, yes, we can redesign the L0 blades and put a
114 W Premie 1 2 3 4	5th Avenue, Tallahassee, FL 32303 r Reporting premier-reporting.con Reported by: Debble Krid 151 So we used this pressure as a proxy for the low pressure turbine inlet. It was more conservative than what had been in the past, so the combination	114 W. 5th Avenue, Tallahassee, FL 32303 Premier Reporting (850) 894-0828 reported by: Debbie Krick 152 1 that can be done? 2 They studied it and came back with us to us 3 and said, yes, we can redesign the L0 blades and put a 4 different design of blade in both L0 rows, and you will
114 W Premie 1 2 3 4 5	.5th Avenue, Tallahassee, FL 32303 r Reporting (850) 894-0828 reported by: Debbie Krid file file for the fil	114 W. 5th Avenue, Tallahassee, FL 32303 Premier Reporting (850) 894-0828 premier-reporting.com Reported by: Debbie Krick 152 1 that can be done? 2 They studied it and came back with us to us 3 and said, yes, we can redesign the L0 blades and put a 4 different design of blade in both L0 rows, and you will 5 be able to achieve, we estimate, 450 megawatts.
114 W Premie 1 2 3 4 5 6	.5th Avenue, Tallahassee, FL 32303 r Reporting (850) 894-0828 reported by: Debbie Krid fil So we used this pressure as a proxy for the low pressure turbine inlet. It was more conservative than what had been in the past, so the combination And I am sorry, but I forgot what your question was, but, yeah, we put a more conservative	114 W. 5th Avenue, Tallahassee, FL 32303 Premier Reporting (850) 894-0828 premier-reporting.com Reported by: Debble Krick 152 1 that can be done? 2 They studied it and came back with us to us 3 and said, yes, we can redesign the L0 blades and put a 4 different design of blade in both L0 rows, and you will 5 be able to achieve, we estimate, 450 megawatts. 6 Q Well, are you familiar with the quote that
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114 W Premie 1 2 3 4 5 6 7 8 9 10 11	Sh Avenue, Tallahassee, FL 32303 r Reporting (850) 894-0828 151 50 we used this pressure as a proxy for the low pressure turbine inlet. It was more conservative than what had been in the past, so the combination And I am sorry, but I forgot what your question was, but, yeah, we put a more conservative operating limit in place based on pressure, which is consistent with operating parameters that we followed from the start of Period 1 throughout each of the periods. BY MR. REHWINKEL:	111 W. 5th Avenue, Tallahassee, FL 32303 premier-reporting com Premier Reporting (850) 894-0828 Premier-reporting com 1 that can be done? 1 1 2 They studied it and came back with us to us 3 and said, yes, we can redesign the L0 blades and put a 4 different design of blade in both L0 rows, and you will 5 be able to achieve, we estimate, 450 megawatts. 6 Q Well, are you familiar with the quote that 7 they gave you for an engineering study for additional 8 optimization and reliability for \$232,025? 9 A Could I see that? 10 Q Yeah. It's on it's in Exhibit 102 at Bates 11 145. It's the late filed exhibit for 145.
114 W Premis 1 2 3 4 5 6 7 8 9 10 11 12	(850) 894-0828 Premier-reporting.com Reported by: Debble Knd Reported by: Debble Knd Reported by: Debble Knd Schwarz (850) 894-0828 50 we used this pressure as a proxy for the low pressure turbine inlet. It was more conservative than what had been in the past, so the combination And I am sorry, but I forgot what your question was, but, yeah, we put a more conservative operating limit in place based on pressure, which is consistent with operating parameters that we followed from the start of Period 1 throughout each of the periods. BY MR. REHWINKEL: Q So I asked you if, after the failure, you went	114 W. 5th Avenue, Tallahassee, FL 32303 premier-reporting com Premier Reporting (850) 894-0828 Reported by: Debble Krick 1 that can be done? 1 2 They studied it and came back with us to us 3 and said, yes, we can redesign the L0 blades and put a 4 different design of blade in both L0 rows, and you will 5 be able to achieve, we estimate, 450 megawatts. 6 Q 9 A 1 they gave you for an engineering study for additional 8 optimization and reliability for \$232,025? 9 A 145. It's the late filed exhibit for 145. 12 A I have 102.
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114 WPremie 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15	15th Avenue, Tallahassee, FL 32303 (850) 894-0823 151 151 So we used this pressure as a proxy for the low pressure turbine inlet. It was more conservative than what had been in the past, so the combination And I am sorry, but I forgot what your question was, but, yeah, we put a more conservative operating limit in place based on pressure, which is consistent with operating parameters that we followed from the start of Period 1 throughout each of the periods. BY MR. REHWINKEL: Q So I asked you if, after the failure, you went to Mitsubishi and asked for them to help you A Right. Q increase the output in the unit.	114 W. 5th Avenue, Tallahassee, FL 32303 premier, reporting com 114 W. 5th Avenue, Tallahassee, FL 32303 (850) 894-0828 114 W. 5th Avenue, Tallahassee, FL 32303 reported by: Debble Krick 114 W. 5th Avenue, Tallahassee, FL 32303 (850) 894-0828 114 W. 5th Avenue, Tallahassee, FL 32303 reported by: Debble Krick 114 W. 5th Avenue, Tallahassee, FL 32303 (850) 894-0828 114 W. 5th Avenue, Tallahassee, FL 32303 reported by: Debble Krick 114 W. 5th Avenue, Tallahassee, FL 32303 (850) 894-0828 114 W. 5th Avenue, Tallahassee, FL 32303 reported by: Debble Krick 114 W. 5th Avenue, Tallahassee, FL 32303 (850) 894-0828 114 that can be done? 2 114 that can be done? 1 114 that can be done? 2 114 that can be done? 3 114 that can be done? 4 114 that can be done?
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114 WPremie 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17	15th Avenue, Tallahassee, FL 32303 (850) 894-0828 151 151 So we used this pressure as a proxy for the low pressure turbine inlet. It was more conservative than what had been in the past, so the combination And I am sorry, but I forgot what your question was, but, yeah, we put a more conservative operating limit in place based on pressure, which is consistent with operating parameters that we followed from the start of Period 1 throughout each of the periods. BY MR. REHWINKEL: Q So I asked you if, after the failure, you went to Mitsubishi and asked for them to help you A Right. Q increase the output in the unit. A So it's just not so simple as that. It's a very collaborative back-and-forth process, but because	114 W. 5th Avenue, Tallahassee, FL 32303 premier-reporting.com Premier Reporting 122 1 that can be done? 2 They studied it and came back with us to us 3 and said, yes, we can redesign the L0 blades and put a 4 different design of blade in both L0 rows, and you will 5 be able to achieve, we estimate, 450 megawatts. 6 Q 9 A Could I see that? 10 Q Yeah. It's on it's in Exhibit 102 at Bates 11 145. It's the late filed exhibit for 145. 12 A I have 102. Could you say the Bates number 13 again, please? 14 Q 15 more back, it's at 145, and it's a real tiny print up in 16 the upper right above the slide. 17 A I am almost there. Okay, I see that.
114 WPremie 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18	15th Avenue, Tallahassee, FL 32303 r Reporting (850) 894-0823 151 So we used this pressure as a proxy for the low pressure turbine inlet. It was more conservative than what had been in the past, so the combination And I am sorry, but I forgot what your question was, but, yeah, we put a more conservative operating limit in place based on pressure, which is consistent with operating parameters that we followed from the start of Period 1 throughout each of the periods. BY MR. REHWINKEL: Q So I asked you if, after the failure, you went to Mitsubishi and asked for them to help you A Right. Q increase the output in the unit. A So it's just not so simple as that. It's a very collaborative back-and-forth process, but because we then had to we followed this lower, more	114 W. 5th Avenue, Tallahassee, FL 32303 premier.reporting.com Premier Reporting 122 1 that can be done? 2 They studied it and came back with us to us 3 and said, yes, we can redesign the L0 blades and put a 4 different design of blade in both L0 rows, and you will 5 be able to achieve, we estimate, 450 megawatts. 6 Q 9 A 145. It's on it's in Exhibit 102 at Bates 11 145. 12 A 14 Q 14 Q 15 be able to achieve, we estimate, 450 megawatts. 6 Q 16 optimization and reliability for \$232,025? 9 A 16 Q 17 A 18 Q 19 Q 10 Q 14 D 14 Q 14 Q 14 Q 15 more back, it's at 145, and it's a real tiny print up in 16 the upper right abov
114 WPremie 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19	15th Avenue, Tallahassee, FL 32303 (850) 894-0823 151 151 So we used this pressure as a proxy for the low pressure turbine inlet. It was more conservative than what had been in the past, so the combination And I am sorry, but I forgot what your question was, but, yeah, we put a more conservative operating limit in place based on pressure, which is consistent with operating parameters that we followed from the start of Period 1 throughout each of the periods. BY MR. REHWINKEL: Q So I asked you if, after the failure, you went to Mitsubishi and asked for them to help you A Right. Q increase the output in the unit. A So it's just not so simple as that. It's a very collaborative back-and-forth process, but because we then had to we followed this lower, more conservative guidance on the IP exhaust pressure, we	144W. 5th Avenue, Tallahassee, FL 32303 premier-reporting.com 114W. 5th Avenue, Tallahassee, FL 32303 reported by: Debble Krick 1 that can be done? 1 2 They studied it and came back with us to us 3 3 and said, yes, we can redesign the L0 blades and put a 4 4 different design of blade in both L0 rows, and you will 5 5 be able to achieve, we estimate, 450 megawatts. 6 6 Q Well, are you familiar with the quote that 7 they gave you for an engineering study for additional 8 optimization and reliability for \$232,025? 9 A Could I see that? 10 Q Yeah. It's on it's in Exhibit 102 at Bates 11 145. It's the late filed exhibit for 145. 12 A I have 102. Could you say the Bates number 13 again, please? 14 Q Yeah. It's kind of two-thirds of the way or 15 more back, it's at 145, and it's a real tiny print up in 16 the upper right above the slide. 17 A I am almost there. Okay, I see that. 18 Q
114 WP Premie 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20	(55) Avenue, Tallahassee, FL 3233 (55) 894-0823 (50) 894-0823 151 50 we used this pressure as a proxy for the low pressure turbine inlet. It was more conservative than what had been in the past, so the combination And I am sorry, but I forgot what your question was, but, yeah, we put a more conservative operating limit in place based on pressure, which is consistent with operating parameters that we followed from the start of Period 1 throughout each of the periods. BY MR. REHWINKEL: Q So I asked you if, after the failure, you went to Mitsubishi and asked for them to help you A Right. Q increase the output in the unit. A So it's just not so simple as that. It's a very collaborative back-and-forth process, but because we then had to we followed this lower, more conservative guidance on the IP exhaust pressure, we were not satisfied that we were getting as much out of	144W. 5th Avenue, Tallahassee, FL 32303 premier-reporting.com Premier Reporting 1 1 that can be done? 2 They studied it and came back with us to us 3 and said, yes, we can redesign the L0 blades and put a 4 different design of blade in both L0 rows, and you will 5 be able to achieve, we estimate, 450 megawatts. 6 Q 7 they gave you for an engineering study for additional 8 optimization and reliability for \$232,025? 9 A 145. It's the late filed exhibit for 145. 12 A 145. It's the late filed exhibit for 145. 12 A 145. It's this of two-thirds of the way or 13 again, please? 14 Q 15 more back, it's at 145, and it's a real tiny print up in 16 the upper right above the slide. 17 A I am almost there. Okay, I see that. 18 Q Do you know what this was for. 19 A I don't recall what this was for. 20 Q Okay.
114 WPremie 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21	15th Avenue, Tallahassee, FL 3233 (50) 894-0823 151 151 So we used this pressure as a proxy for the low pressure turbine inlet. It was more conservative than what had been in the past, so the combination And I am sorry, but I forgot what your question was, but, yeah, we put a more conservative operating limit in place based on pressure, which is consistent with operating parameters that we followed from the start of Period 1 throughout each of the periods. BY MR. REHWINKEL: Q So I asked you if, after the failure, you went to Mitsubishi and asked for them to help you A Right. Q increase the output in the unit. A So it's just not so simple as that. It's a very collaborative back-and-forth process, but because we then had to we followed this lower, more conservative did ask	114 W. 5h Avenue, Tallehassee, FL 32303 premier reporting.com 114 W. 5h Avenue, Tallehassee, FL 32303 reported by: Debble Kick 114 W. 5h Avenue, Tallehassee, FL 32303 reported by: Debble Kick 114 W. 5h Avenue, Tallehassee, FL 32303 reported by: Debble Kick 114 W. 5h Avenue, Tallehassee, FL 32303 reported by: Debble Kick 114 W. 5h Avenue, Tallehassee, FL 32303 reported by: Debble Kick 114 W. 5h Avenue, Tallehassee, FL 32303 reported by: Debble Kick 114 that can be done? 2 114 that can be done? 1 114 that can be done? 2 114 that can be done? 1 114 that can be done? 1 114 that can be done? 1 114 different design of blade in both L0 rows, and you will 5 115 be able to achieve, we estimate, 450 megawatts. 6 115 be able to achieve, we estimate, 450 megawatts. 6 116 they gave you for an engineering study for additional 8 117 Premier Reporting A Could I see that? 118 Q Y eah. It's kind of two-thirds of the way or 119 A I don't recall what this was for? 14 1100 Y eahle they a few pages to 135. 14
114 WPremie 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22	(80) 894-0828 [19] Temperature of the second of the periods. Definition of the period of the per	114 W. Sh Avenue, Tallahassee, FL 32303 premier.reporting.com 114 W. Sh Avenue, Tallahassee, FL 32303 reported by: Debble Krick 114 W. Sh Avenue, Tallahassee, FL 32303 reported by: Debble Krick 1 that can be done? 1 1 that can be done? 2 1 that can be done? 2 2 They studied it and came back with us to us 3 and said, yes, we can redesign the L0 blades and put a 4 different design of blade in both L0 rows, and you will 5 be able to achieve, we estimate, 450 megawatts. 6 Q Well, are you familiar with the quote that 7 they gave you for an engineering study for additional 8 optimization and reliability for \$232,025? 9 A Could I see that? 10 Q Yeah. It's on it's in Exhibit 102 at Bates 1145. It's the late filed exhibit for 145. 12 A I have 102. 13 again, please? 14 Q Yeah. It's kind of two-thirds of the way or 15 more back, it's at 145, and it's a real tiny print up in 16 the upper right

23		So	we	don '	't wa	int	to	have	this	1	limit.	. 1	Ve	
24	weren't	suppo	sed	to	have	e th	is	limit	. W	ie	want	to	get	as

25 much out of the generator as we can. Is there something

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A I am looking back at the beginning to see if I

24 Duke?

25

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	153			15
1	can get an idea.			output product of this study if you did, in fact, say,
2	Q On 122, it talks about August 21st, 2012,		2	yes, go ahead and do that?
3	discussion.		3	A That I would say that would be a likely
4	A Okay. It does appear to be a meeting where we		4	output, yes.
5	discussed the turbine.		5	Q Okay. Now, did that study say that Mitsubishi
6	Q Okay. Just back on 135, a discussion		6	agreed that you could run the unit above 420 without
7	further discussion to support their own investigation		7	different blades?
8	and possible means of increasing unit output.		8	A Well, I am not familiar with the study, but
9	And then it looks like they have a response.		9	so if I could have a few minutes to read it, but I think
10	It says: We will continue technical support for you.		10	it's really important to remember that at this point in
11	As of now, it is difficult for us to propose a concrete		11	time, Mitsubishi thought that the root cause was too
12	method to increase the unit output. An engineering		12	much steam flow in the low pressure turbine, and that
13	study is suggested.		13	they there was a way to get from steam flow and
14	And so my question is, is that what 145 is, is		14	correlate it, as you have already said, to megawatts.
15	them saying here's what it will cost you for us to do an		15	So that's been disproven in later cases, later
16	engineering study?		16	periods of time. So I am not sure what your question
17	A It does appear to be that, yes.		17	is.
18	Q Okay. And did you engage them to do that		18	THE COURT: I am going to jump in while we are
19	study?		19	on a pause here.
20	A I don't recall if we engaged them to do this		20	One thing we didn't have in our order of
21	study, or if that was included in the ultimate we did		21	procedure was a lunch break. I am just wondering
22	contract with them to supply new blades that could		22	what the will of the, you know, the room is as far
23	that were theoretically going to be able to raise the		23	as taking a break and how long you think we need.
24	output to about 450 megawatts.		24	MR. BREW: Yes, I think we should have one.
25	Q Okay. So that would have been the most likely		25	MS. BROWNLESS: Yes.
				35
		7		
1	THE COURT: we agree on that. How long?			CERTIFICATE OF REPORTER
2	should we try to get back inside of an nour, of is			COUNTY OF LEON)
1	It going to take an nour:			
4 E	MR. REHWINKEL: I UNINK AN NOUT IS FEASONADIE.			I DEBDA KRICK Court Dopostor do borobu
5	THE COURT: OKAY. We will we'll say, then,			I, DEBRA RRICK, Court Reporter, do nereby
0	We will reconvene at 120:20, and if everybody, by			certify that the foregoing proceeding was heard at the
/	some miracle, is back sooner, we will start sooner.			time and place nerein stated.
8	MR. REHWINKEL: UKay. Sounas good.			IT IS FORTHER CERTIFIED that I
9	THE COURT: We will stand in recess then.		3	stenographically reported the said proceedings; that the
10	(Lunch recess.)		10	same has been transcribed under my direct supervision;
11	(Transcript continues in sequence in Volume			and that this transcript constitutes a true
12	2.)		12	transcription of my notes of said proceedings.
13			13	I FURTHER CERTIFY that I am not a relative,
14			14	employee, attorney or counsel of any of the parties, nor
15			15	am I a relative or employee of any of the parties'
16			16	attorney or counsel connected with the action, nor am I
17			17	financially interested in the action.
18			18	DATED this 18th day of February, 2020.
19			19	
20			20	A un a V
21			21	Deblie K Arice
22			· ·	
22			22	DEBRA R. KRICK
23			22	DEBRA R. KRICK NOTARY PUBLIC COMMISSION #GG015952

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