

**SOUTHERN INDIANA GAS AND ELECTRIC COMPANY
d/b/a CENTERPOINT ENERGY INDIANA SOUTH
(CEI SOUTH)**

IURC CAUSE NO. 38708 FAC 137 S1

**REBUTTAL TESTIMONY
OF
F. SHANE BRADFORD
VICE PRESIDENT OF POWER GENERATION OPERATIONS**

ON

CULLEY UNIT 3 FORCED OUTAGE

**SPONSORING PETITIONER'S EXHIBIT NO. 1-R (PUBLIC),
ATTACHMENTS FSB-R1 THROUGH FSB-R5**

REBUTTAL TESTIMONY OF F. SHANE BRADFORD

1 **1. INTRODUCTION**

2

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

4 A. My name is F. Shane Bradford. My business address is 211 NW Riverside Drive,
5 Evansville, Indiana 47708.

6

7 **Q. BY WHOM ARE YOU EMPLOYED?**

8 A. I am employed by Southern Indiana Gas and Electric Company d/b/a CenterPoint
9 Energy Indiana South ("CEI South", "Petitioner", or "Company").¹

10

11 **Q. ON WHOSE BEHALF ARE YOU SUBMITTING THIS REBUTTAL TESTIMONY?**

12 A. I am submitting testimony on behalf of CEI South, which is an indirect subsidiary of
13 CenterPoint Energy, Inc.

14

15 **Q. WHAT IS YOUR ROLE WITH RESPECT TO PETITIONER CEI SOUTH?**

16 A. I am the Vice President, Power Generation Operations.

17

18 **Q. ARE YOU THE SAME F. SHANE BRADFORD WHO PRE-FILED DIRECT**
19 **TESTIMONY IN THIS CAUSE?**

20 A. Yes.

21

22 **2. SUMMARY OF TESTIMONY**

23

24 **Q. WHAT IS THE PURPOSE OF YOUR REBUTTAL TESTIMONY?**

25 A. I respond to testimony of the Indiana Office of Utility Consumer Counselor's ("OUCC")
26 witnesses Gregory L. Krieger and Michael D. Eckert as well as testimony of the
27 CenterPoint Energy Indiana South Industrial Group's ("IG") witness Kenneth H. Ditzel

¹ For the sake of clarity, my testimony refers to CEI South, even though in certain situations, I may be referring to one of CEI South's predecessor companies.

1 regarding the June 2022 – March 2023 Culley Unit 3 forced outage and CEI South's
2 Root Cause Analysis ("RCA"). I also address arguments raised by both the OUCC and
3 IG related to the history and maintenance of the three water-side valves. Lastly, I
4 discuss the OUCC and IG's analyses methods and assumptions that led to their
5 respective recommended fuel costs disallowance.

6
7 I have not attempted to respond to every argument made by the OUCC or IG
8 witnesses. The fact that I may not have responded to any particular argument or
9 statement made by OUCC or IG does not indicate my agreement with that argument
10 or statement.

11
12 **Q. ARE YOU SPONSORING ANY ATTACHMENTS TO YOUR REBUTTAL IN THIS**
13 **PROCEEDING?**

14 A. Yes. I am sponsoring the following attachments:

- 15 • Petitioner's Exhibit No. 1-R, **Attachment FSB-R1 (CONFIDENTIAL)**: IG's
16 Response to CEI South's DR 1.3
- 17 • Petitioner's Exhibit No. 1-R, **Attachment FSB-R2 (CONFIDENTIAL)**: GE
18 Steam Turbine Maintenance
- 19 • Petitioner's Exhibit No. 1-R, **Attachment FSB-R3 (CONFIDENTIAL)**: GE
20 Email
- 21 • Petitioner's Exhibit No. 1-R, **Attachment FSB-R4 (CONFIDENTIAL)**: CEI
22 South's Response to IG's DR 15.1
- 23 • Petitioner's Exhibit No. 1-R, **Attachment FSB-R5**: Public Redacted Version of
24 the RCA.

25
26 **Q. WERE THESE ATTACHMENTS PREPARED BY YOU OR UNDER YOUR**
27 **SUPERVISION?**

28 A. Yes, they were; or they were reviewed, and relied upon, by me as part of my role as
29 Vice President Power Generation Operations.
30

1 **Q. HAVE YOU MADE CHANGES TO ANY OF YOUR PRE-FILED TESTIMONY OR**
2 **ATTACHMENTS?**

3 A. Partially. I attached a copy of the RCA to my pre-filed direct testimony that was kept
4 entirely confidential on the basis that it contains critical infrastructure information that
5 could expose a vulnerability in similar generation units and that it was prepared at the
6 request of legal counsel and constitutes attorney-client and attorney work product
7 information. At the request of Citizens Action Coalition of Indiana, Inc. and in the
8 interest of being as transparent as practicable, I have attached a partially redacted
9 version of the RCA to my rebuttal testimony as **Attachment FSB-R5**.

10

11 **3. TIMELINE OF KEY CULLEY UNIT 3 ACTIVITIES PRIOR TO THE FORCED**
12 **OUTAGE**

13

14 **Q. BEGINNING AT PAGE 7, WITNESS DITZEL PRESENTS A SUMMARY OF “KEY**
15 **ACTIVITIES” LEADING UP TO THE FORCED OUTAGE.² HAS HE THOROUGHLY**
16 **PRESENTED THE ISSUES LEADING UP TO THE OUTAGE?**

17 A. No. Let me begin with the first trip of an [REDACTED], which occurred at 2:15 AM
18 on June 24, 2022.

19 As I stated in my direct testimony, “[REDACTED]
20 [REDACTED]
21 [REDACTED].”³

22

23 **Q. WHAT DOES EACH [REDACTED] DO?**

24 A. [REDACTED]
25 [REDACTED].

26

² Direct Testimony of Ditzel, at 7-9. The [REDACTED] shown in Witness Ditzel's key event summary is a normal operation; and not a contributing factor to the events that caused the damage to the Boiler Feed Pump Turbine.

³ Pet. Ex. No. 1-C, at 4.

1 **Q. PLEASE EXPLAIN WHAT HAPPENS TO THE [REDACTED], [REDACTED].**

2 A. [REDACTED]
3 [REDACTED]
4 [REDACTED]
5 [REDACTED].

7 **Q. WHAT WAS THE RESULT OF THE 2:15 AM CULLEY UNIT 3 [REDACTED]
8 [REDACTED]?**

9 A. As stated earlier, when the [REDACTED], [REDACTED]
10 [REDACTED], and the generation output of Culley Unit 3 was reduced to
11 approximately 115 MW. CEI South Electricians were called to troubleshoot the Culley
12 Unit 3 [REDACTED]. The Electricians found an [REDACTED]
13 [REDACTED] and released the
14 [REDACTED] to be put back in service.

16 **Q. WHAT HAPPENED NEXT?**

17 A. After the CEI South Electricians [REDACTED] and released the [REDACTED]
18 [REDACTED] to be put back in service, Plant Operations [REDACTED] at
19 4:20 AM.⁴ After that, the corresponding [REDACTED].

21 **Q. PLEASE EXPLAIN WHAT HAPPENED AFTER BOTH [REDACTED]
22 AROUND 4:20 AM ON JUNE 24, 2022.**

23 A. After [REDACTED], Culley Unit
24 3 tripped offline at 4:20 AM.

26 **Q. WHY DID CULLEY UNIT 3 TRIP OFFLINE AT APPROXIMATELY 4:20 AM?**

27 A. When the [REDACTED]
28 [REDACTED]
29 and tripping Culley Unit 3 offline.

30

⁴ In CEI South's Response to IG DR 1-11, CEI South erroneously placed the time at 4:15 AM.

1 Q. PLEASE EXPLAIN WHAT A [REDACTED] IS.

2 A. [REDACTED]
3 [REDACTED]
4 [REDACTED].

5
6 Q. ARE [REDACTED] A NORMAL CONDITION? EXPLAIN.

7 A. Yes. As CEI South explained in response to a data request, provided in Witness
8 Ditzel's testimony as Confidential Attachment KHD-1, [REDACTED]
9 [REDACTED]
10 [REDACTED].⁵

11
12 Q. PLEASE EXPLAIN HOW A [REDACTED] CAUSES A UNIT TO
13 TRIP OFF-LINE.

14 A. A [REDACTED] occurs if the monitored [REDACTED]
15 [REDACTED]
16 [REDACTED]
17 [REDACTED], the result could be a lower generation output
18 but typically, Culley Unit 3 will trip offline.

19
20 Q. DID CEI SOUTH TROUBLESHOOT THE [REDACTED]? IF SO,
21 WHAT WAS FOUND?

22 A. Once CEI South determined Culley Unit 3 tripped offline from a [REDACTED],
23 CEI South personnel, including Electricians, began troubleshooting to determine why
24 the [REDACTED]. They began by
25 confirming the [REDACTED]
26 [REDACTED]. For reference, [REDACTED]
27 [REDACTED]
28 [REDACTED]
29 [REDACTED]
30 [REDACTED]

⁵ Confidential Attachment KHD-1, CEI South's Response to IG DR 8.9, at 12.

1 [REDACTED]
2 [REDACTED]
3 [REDACTED]
4 [REDACTED]
5 [REDACTED]. Also, CEI South visually inspected
6 both [REDACTED]; however, CEI South personnel did not identify any obvious
7 issues related to the [REDACTED].
8

9 **Q. WHAT WAS CEI SOUTH'S NEXT COURSE OF ACTION RELATED TO**
10 **TROUBLESHOOTING THE [REDACTED] UNIT TRIP?**

11 A. Once all systems had been restored and no other operational issues were identified,
12 at 6:29 AM, with Culley Unit 3 still off-line, CEI South continued to troubleshoot the
13 [REDACTED] event by initiating startup, which consisted of [REDACTED]
14 [REDACTED]. During this [REDACTED], CEI South did not
15 experience any issues in [REDACTED]
16 [REDACTED]
17 [REDACTED].
18

19 **Q. PLEASE EXPLAIN WHAT HAPPENED WHEN THE [REDACTED]**
20 **AT 6:35 AM?**

21 A. First, to clarify, Culley Unit 3 was not online at 6:35 AM when the [REDACTED]
22 [REDACTED]. As I mentioned earlier, CEI South was still troubleshooting the [REDACTED]
23 [REDACTED] event by [REDACTED] to see if they could
24 replicate the [REDACTED] issue when [REDACTED] while the unit was
25 offline. It was during this troubleshooting that the [REDACTED]
26 [REDACTED].
27

28 **Q. PLEASE DESCRIBE THE ACTIONS TAKEN FOLLOWING THE 6:35 AM [REDACTED]**
29 **[REDACTED].**

30 A. CEI South Electricians again evaluated the reason for the [REDACTED].
31 During their troubleshooting of the trip, CEI South Electricians found and replaced what
32 they thought was a [REDACTED] on the [REDACTED].

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Q. WHAT HAPPENED NEXT?

A. After the CEI South Electricians' [REDACTED] at 8:34 AM, and the corresponding [REDACTED] at 8:43 AM. At 9:30 AM, the [REDACTED]. Culley Unit 3 was still not back online at this time. CEI South Electricians revisited the [REDACTED]. CEI South Electricians [REDACTED] at a later date.

Q. PLEASE CONFIRM THE [REDACTED] 3 DIFFERENT TIMES BETWEEN 2:25 AM AND 9:30 AM? AND IF SO, FOR THE SAME REASONS?

A. The [REDACTED] at 2:15 AM resulting in Culley Unit 3 curtailment. Then while Culley Unit 3 was offline, the [REDACTED] two more times – once at 6:35 AM and once at 9:30 AM. Of the three [REDACTED] – one issue was believed to be a [REDACTED] with the other two [REDACTED] related [REDACTED]; however, after testing the [REDACTED] sometime during the forced outage, it was determined not to be faulty. Thus, all three [REDACTED] were a result of the same [REDACTED].

Q. PLEASE DISCUSS WHAT HAPPENED AFTER CEI SOUTH ELECTRICIANS [REDACTED] ON THE [REDACTED] FOLLOWING THE 9:30 AM [REDACTED].

A. After the CEI South Electricians [REDACTED] on the [REDACTED], the [REDACTED] at 11:13 AM and 11:17 AM, respectively.

Q. HOW MANY TIMES HAD THE [REDACTED] SINCE 6:29 AM?

A. Because of the [REDACTED] issue, the [REDACTED] three times, at 6:29 AM, 8:43 AM, and 11:17 AM.

1 Q. HAD THE [REDACTED] ISSUE YOU DESCRIBED EARLIER
2 REPEATED ITSELF DURING ANY OF THE THREE [REDACTED]
3 [REDACTED] BETWEEN 6:29 AM AND 11:17 AM?

4 A. No. During none of these multiple [REDACTED] did the [REDACTED] repeat itself.

5
6 Q. BASED ON NO EVIDENCE OF [REDACTED] ISSUES DURING
7 THE THREE [REDACTED], WHAT HAPPENED NEXT?

8 A. As such, CEI South personnel continued with the Culley Unit 3 startup.

9
10 Q. AT WHAT TIME DID CULLEY UNIT 3 COME ONLINE?

11 A. Culley Unit 3 came back online, for the first time since the 4:20 AM trip, at
12 approximately 3:40 PM.

13
14 Q. WHAT HAPPENED NEXT?

15 A. Following the 3:40 PM start of Culley Unit 3, it remained on-line without any issues or
16 alarms until just before 8:31 PM.

17
18 Q. WHAT HAPPENED AROUND 8:31 PM?

19 A. Around 8:31 PM, CEI South received a "[REDACTED]" alarm on the [REDACTED].

20 An [REDACTED] - [REDACTED]
21 [REDACTED]
22 [REDACTED]

23
24 When the "[REDACTED]" alarm sounded, CEI South personnel confirmed there was a

25 [REDACTED] with the [REDACTED]
26 [REDACTED]. [REDACTED]

27 [REDACTED] As such, at 8:31 PM, CEI South

28 personnel took the [REDACTED] to repair the [REDACTED]

29 [REDACTED]. Culley Unit 3 remained online. [REDACTED]

30 [REDACTED]

31

1 **Q. WHAT HAPPENED NEXT?**

2 A. CEI South Mechanical Maintenance repaired [REDACTED] and released
3 the [REDACTED] to be put back in service, which entailed [REDACTED]
4 [REDACTED]
5 [REDACTED].

6
7 **Q. WHAT HAPPENED NEXT?**

8 A. Prior to [REDACTED], even though the [REDACTED]
9 [REDACTED] three times without issue since Culley Unit 3 tripped earlier that
10 morning at 4:20 AM [REDACTED] (the "4:20 AM Unit Trip"),
11 CEI South revisited the [REDACTED]
12 [REDACTED]. Specifically, CEI South personnel discussed the possibility that the
13 difference between the [REDACTED] that caused the 4:20 AM Unit Trip and
14 the three [REDACTED] between 6:29 AM and 11:17 AM (which did NOT cause
15 a [REDACTED]) may be the [REDACTED]. With Culley
16 Unit 3 offline, [REDACTED]
17 [REDACTED]

18
19 **Q. GIVEN THAT DIFFERENCE, WHAT STEPS DID CEI SOUTH TAKE?**

20 A. As a precautionary measure, CEI South [REDACTED]
21 [REDACTED]
22 [REDACTED]
23 [REDACTED]. Thereafter, CEI South [REDACTED]
24 [REDACTED] at 9:04 PM, which [REDACTED] without any issues. Then, at approximately 9:11 PM,
25 when CEI South [REDACTED], a [REDACTED] issue
26 occurred similar to the event at 4:20 AM that morning, tripping Culley Unit 3 offline.

27
28 **Q. WERE THE 4:20 AM AND THE 9:11 PM CULLEY UNIT 3 TRIPS CAUSED BY THE
29 SAME CIRCUMSTANCES – THE [REDACTED]
30 [REDACTED] ?**

31 A. Yes. However as will I discuss below, neither the [REDACTED] nor [REDACTED]
32 [REDACTED] are the root cause of the Boiler Feed Pump Turbine damage.

1 **5. ROOT CAUSE ANALYSIS (“RCA”)**

2

3 **Q. OUCC WITNESS KRIEGER CRITICIZED CEI SOUTH FOR NOT HAVING A THIRD-**
4 **PARTY ANALYSIS OF THE OUTAGE ITSELF, SAYING SUCH AN ANALYSIS**
5 **“PROVIDES REASSURANCE THAT THE ANALYSIS IS NOT BIASED BY IN-**
6 **HOUSE ANALYSIS.”⁶ IS THIS ACCURATE?**

7 A. No, not at all. As I stated in my direct testimony, “CEI South also had Black & Veatch
8 perform an independent analysis of the [Boiler Feed Pump Turbine failure, also
9 referred to as the] overspeed event,”⁷ which confirms CEI South’s Root Cause
10 Analysis. Please refer to Petitioner’s Exhibit No. 1, Confidential Attachment FSB-3C
11 – Black & Veatch’s Memorandum (see section Assessment of Overspeed Event).

12

13 **Q. IG WITNESS DITZEL CONCLUDES CEI SOUTH’S ROOT CAUSE ANALYSIS**
14 **“WAS NOT CONDUCTED PROPERLY AS IT MISSED THE ULTIMATE ROOT**
15 **CAUSE OF THE STEAM TURBINE TRIP BASED ON [ROOT CAUSE ANALYSIS]**
16 **FUNDAMENTALS AS OUTLINED BY [THE AMERICAN SOCIETY FOR QUALITY]”**
17 **AND “BY NOT ADDRESSING THE ACTUAL CAUSE OF THE OUTAGE, THERE IS**
18 **RISK THAT ADDITIONAL ISSUES COULD OCCUR IN THE FUTURE, WHICH**
19 **COULD RESULT IN CATASTROPHIC FAILURE.”⁸ DO YOU AGREE?**

20 A. No. For reasons explained later, I do not agree with Witness Ditzel’s assertion that CEI
21 South missed the ultimate root cause of the Boiler Feed Pump Turbine failure and the
22 CEI South Root Cause Analysis is “fundamentally flawed.”⁹ Mr. Ditzel makes the
23 conclusion that because the [REDACTED] and unit trip incidents preceded the failure
24 of the Boiler Feed Pump Turbine, they necessarily caused it. This “after it and,
25 therefore, because of it” conclusion is a logical fallacy, and it is not true in this case.
26 The failure of the three water-side valves, which allowed high-pressure water to flow
27 back into the Boiler Feed Pump, was the root cause of the Boiler Feed Pump Turbine
28 failure. CEI South conducted a thorough Root Cause Analysis, focusing on the failure

⁶ Pub. Ex. No. 2, at 3.

⁷ Pet. Ex. No. 1, at 6-7.

⁸ Direct Testimony of Ditzel, at 19.

⁹ *Id.* at 16.

1 of a critical piece of equipment (the Boiler Feed Pump Turbine). That analysis
2 confirmed that if not for the failure of the three water-side valves, the turbine would not
3 have failed; therefore, understanding and correcting the failures of the valves (the root
4 cause of the event) are the factors that have the highest probability of preventing a
5 reoccurrence of the failure.

6
7 In addition, CEI South engaged Black & Veatch "to perform an independent analysis
8 of the [Boiler Feed Pump Turbine] overspeed event"¹⁰ using control system data
9 provided from the event, to "[REDACTED]

10 [REDACTED]"¹¹ [REDACTED]

11 [REDACTED].¹²

12 Black & Veatch's Memorandum, which was provided as Petitioner's Exhibit No. 1,
13 **FSB-3C (CONFIDENTIAL)** substantiated CEI South's root cause findings – that the
14 failure of the three water-side valves was the cause of the overspeed event, and
15 resulting damage to the Boiler Feed Pump Turbine. As such, CEI South's Root Cause
16 Analysis is sound, and Witness Ditzel's accusation that CEI South's Root Cause
17 Analysis was improper and may lead to additional catastrophic failures is unsupported
18 and incorrect.

19
20 **Q. IG WITNESS DITZEL'S TESTIMONY STATES, "THE ULTIMATE EVENT THAT**
21 **PRECIPITATED THE OUTAGE WAS THE [REDACTED]**
22 **[REDACTED]"¹³ AND THAT CEI SOUTH'S ROOT CAUSE ANALYSIS**
23 **SHOULD HAVE INCLUDED THE [REDACTED] AS PART OF ITS ROOT CAUSE**
24 **ANALYSIS. DO YOU AGREE?**

25 A. No, I do not. Neither the [REDACTED], nor the [REDACTED], are
26 the root cause of the Boiler Feed Pump Turbine damage. The root cause of the Boiler
27 Feed Pump Turbine damage and resulting Culley Unit 3 forced outage is the three
28 water-side valves that failed, either completely or initially, to close, allowing high

¹⁰ Pet. Ex. No. 1, at 6.

¹¹ Pet.'s Ex. No. 1, Attachment FSB-3C (CONFIDENTIAL) at 1.

¹² *Id.*

¹³ Confidential Direct Testimony of Ditzel, at 12.

1 pressure water to backflow, which in turn caused the Boiler Feed Pump Turbine to
2 overspeed, ultimately causing damage to the Boiler Feed Pump Turbine, and the need
3 for the ensuing repairs during the forced outage.

4

5 As further evidence that neither the [REDACTED] nor the [REDACTED]
6 [REDACTED] caused the Boiler Feed Pump Turbine to overspeed, I shared earlier (in my
7 rebuttal testimony), the same circumstances occurred several hours earlier (at 4:20
8 AM) – a Culley Unit 3 Trip following the same [REDACTED] – which did *not*
9 result in the backflow on the water-side that ultimately led to the Boiler Feed Pump
10 Turbine damage. Therefore, it is incorrect to say, but for the [REDACTED],
11 or [REDACTED], the resultant Boiler Feed Pump Turbine damage would not
12 have occurred. The failure of the water-side valves had nothing to do with the [REDACTED]
13 [REDACTED] or [REDACTED]. Nor did the [REDACTED],
14 or [REDACTED], contribute to the failure of the water-side valves. The events are
15 separate and distinct, and it is incorrect to say that the [REDACTED] caused the valve
16 failure simply because it occurred before it.

17

18 More importantly, any number of circumstances could have resulted in Culley Unit 3
19 tripping offline with the same damage occurring to the Boiler Feed Pump Turbine had
20 the three water-side valves acted in the same manner. In fact Witness Ditzel confirms
21 in his response to a data request from CEI South that the Boiler Feed Pump Turbine
22 failure also would have occurred in a different, hypothetical Culley Unit 3 trip scenario
23 described in CEI South's DR 1.3 to IG, if all three water-side check valves did not close
24 in the same manner as during the 9:11 PM Culley Unit 3 Trip—the forced outage
25 incident that is the subject of this Cause (see Petitioner's Exhibit No. 1, Attachment
26 **FSB-R1 (CONFIDENTIAL)**). Lastly, OUCC Witness Krieger agrees, identifying the
27 Boiler Feed Pump Turbine failure damage as what “ultimately led to the nine-month
28 outage.”¹⁴

29

¹⁴ Pub. Ex. No. 2, p. 8.

1 **Q. WITNESS DITZEL'S TESTIMONY FOCUSES ON THE [REDACTED]**
 2 **[REDACTED] THAT OCCURRED ON JUNE 24TH STATING**
 3 **"CEI[SOUTH] KNEW OF THE [REDACTED] PRIOR ISSUES";**
 4 **"CEI[SOUTH] FAILED TO INVESTIGATE AND CORRECT THE [REDACTED]**
 5 **[REDACTED] PRIOR TO THE ULTIMATE TRIP"; "THE [REDACTED]**
 6 **[REDACTED]"; "[REDACTED]**
 7 **[REDACTED]."¹⁵ HOW**
 8 **DO YOU RESPOND?**

9 A. Witness Ditzel seems to be implying the failure of the Culley Unit 3 Boiler Feed Pump
 10 Turbine could have been avoided, stating: "Had the [REDACTED] been addressed
 11 through proper [Root Cause Analysis], the Culley Unit 3 unplanned outage on 6/24/22
 12 might have been avoided."¹⁶ Neither the [REDACTED] causing the unit
 13 trip nor the [REDACTED] issues (discussed earlier in my rebuttal) caused the
 14 damage to the Boiler Feed Pump Turbine. In fact, [REDACTED]
 15 [REDACTED], that could trip the unit offline. If
 16 any of these other [REDACTED] would have occurred and the three water-side valves
 17 did not close in the same manner as this incident, then the Boiler Feed Pump Turbine
 18 would have undoubtedly failed. And discussed earlier, Witness Ditzel confirms one
 19 such scenario in response to CEI South's DR 1.3 to IG.
 20

21 **Q. DID THE "[REDACTED]**
 22 **[REDACTED]"¹⁷ AS WITNESS DITZEL CLAIMS?**

23 A. No. Witness Ditzel inaccurately implies the five [REDACTED] events are related. The
 24 [REDACTED] three times at 2:15 AM, 6:35 AM and 9:30 AM – all
 25 of these [REDACTED] due to the [REDACTED];
 26 nothing to do with a [REDACTED]. And technically, the 4:20 PM and 9:11 PM
 27 [REDACTED] events occurred during a [REDACTED] not during a [REDACTED].
 28

¹⁵ Confidential Direct Testimony of Ditzel, p. 18.

¹⁶ *Id.* at 29.

¹⁷ *Id.* at 18.

1 **Q. EARLIER YOU SHARED CEI SOUTH DETERMINED IT IS THE FAILURE OF**
2 **THREE WATER-SIDE VALVES AND NOT THE [REDACTED]**
3 **[REDACTED] THAT ARE THE ROOT CAUSE OF THE BOILER**
4 **FEED PUMP TURBINE FAILURE THAT ULTIMATELY LED TO THE CULLEY UNIT**
5 **3 FORCED OUTAGE. PLEASE EXPLAIN.**

6 A. As I included in my direct testimony, CEI South's Root Cause Analysis determined the
7 root cause of the damage to the Boiler Feed Pump Turbine was the failure of three
8 water-side valves (either completely or initially) to close, which allowed high-pressure
9 water to backflow into the Boiler Feed Pump causing the Boiler Feed Pump and the
10 coupled Boiler Feed Pump Turbine to spin backwards, at high rpms. This resulted in
11 turbine blades dislodging and breaking through the housing, among other extensive
12 damage.¹⁸ Specifically, my direct testimony states: "The RCA identified three water-
13 side valves that could have closed to prevent the backflow of water into the [Boiler
14 Feed Pump] but did not."¹⁹ Then, the following occurred:

15 [REDACTED]
16 [REDACTED]
17 [REDACTED]
18 [REDACTED]
19 [REDACTED]
20 [REDACTED]
21 [REDACTED]
22 [REDACTED]
23 [REDACTED]
24 [REDACTED]
25 [REDACTED]

26 **6. CULLEY UNIT 3 WATER-SIDE VALVES**

27
28 **Q. PLEASE DESCRIBE THE DEVICES IN PLACE TO PROTECT THE BOILER FEED**
29 **PUMP TURBINE.**

30 A. As explained in the Root Cause Analysis, both the steam-, and water-sides have
31 devices in place to prevent over speeding or reverse flow. The steam side of the Boiler
32 Feed Pump Turbine has five devices in place to prevent overspeed of the Boiler Feed

¹⁸ Pet. Ex. No. 1-C, at 5.

¹⁹ *Id.*

²⁰ *Id.*

1 Pump Turbine. CEI South's Root Cause Analysis determined that all five protection
2 devices on the steam side of the Boiler Feed Pump Turbine responsible for overspeed
3 protection were operational; did not fail; and therefore, performed as intended to
4 protect the steam side from over speeding. Please refer to Petitioner's Exhibit No. 1,
5 **Attachment FSB-3C (CONFIDENTIAL)** for additional details. The water side has
6 three devices in place to protect the Boiler Feed Pump and prevent reserve flow.

7

8 **Q. PLEASE DESCRIBE THE THREE WATER-SIDE PROTECTION DEVICES –**
9 **VALVES.**

10 A. As mentioned, the water side of the Boiler Feed Pump has three protection devices,
11 responsible for Reverse Flow Protection. Diagram 1, in **Attachment FSB-1C**, shows
12 the location, but as described in the narrative of **Attachment FSB-1C**, the three water-
13 side valves are:

14

(1) [REDACTED]

15

(2) [REDACTED]

16

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26

(3) [REDACTED]

27

28

29

30 **Q. PLEASE EXPLAIN WHAT FAILED WITH RESPECT TO EACH WATER-SIDE**
31 **VALVE?**

32 A. I shared the following in my direct testimony at pp. 5-6:

33

(1) [REDACTED]

34

35

36

(2) [REDACTED]

37

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[REDACTED]

(3)

19 **Q. BOTH WITNESS KRIEGER AND WITNESS DITZEL DISCUSS THE HISTORY OF**
20 **THE FIRST VALVE – THE [REDACTED], NOTING THE VALVE**
21 **WAS REPLACED IN 2013 AND REPAIRED IN 2019.²¹ PLEASE PROVIDE ANY**
22 **ADDITIONAL DETAILS.**

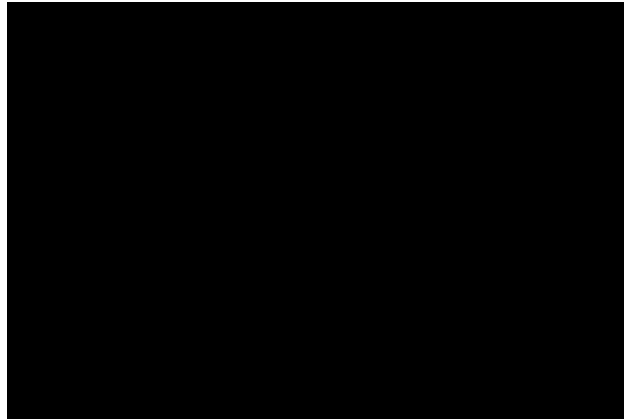
23 A. As stated in both witnesses' testimony, in 2013, [REDACTED], CEI South
24 replaced the [REDACTED] valve. The [REDACTED]
25 [REDACTED] that was replaced in 2013 was the original [REDACTED]
26 installed when Culley Unit 3 began operation in 1973, and as such had been in place
27 for 40 years.

28
29 In 2019, [REDACTED]
30 [REDACTED]
31 [REDACTED]
32 [REDACTED]. While Culley Unit 3 was offline, CEI South
33 inspected the [REDACTED]
34 [REDACTED]
35 [REDACTED] in a check valve [REDACTED]

²¹ In Petitioner's Exhibit No. 1, Attachment FSB1-C, CEI South erroneously states "The [REDACTED] valve was then repaired in January 2020 when the [REDACTED]". The repair occurred in December 2019.

1 [REDACTED] check valve [REDACTED]
 2 [REDACTED]
 3 [REDACTED]. Please see illustration of [REDACTED] below.

Illustration FSB-1



4
 5 **Q. WITNESS DITZEL SUGGESTS HAD CEI SOUTH PERFORMED A ROOT CAUSE**
 6 **ANALYSIS ON THE FIRST VALVE – THE [REDACTED]**
 7 **[REDACTED] CHECK VALVE – CEI SOUTH “LIKELY WOULD HAVE**
 8 **DISCOVERED FROM INTERACTIONS WITH PROFESSIONAL ENGINEERING**
 9 **FIRMS” . . . “THAT CHECK VALVES [REDACTED].”²²**
 10 **WHY DIDN’T CEI SOUTH DO A ROOT CAUSE ANALYSIS ON [REDACTED]**
 11 **[REDACTED] REPAIR?**

12 **A.** Based on the Boiler Feed Pump Turbine failure at issue in this Cause, it is easy for
 13 Witness Ditzel to assert, in hindsight, that a Root Cause Analysis was warranted;
 14 however, the 2019 [REDACTED] issue was [REDACTED] repair –
 15 not necessitating a Root Cause Analysis. The original [REDACTED] was
 16 in place for 40 years and replaced [REDACTED] in 2013; the 2019 issue was
 17 [REDACTED]; neither of which are issues that point to a reoccurring issue that would
 18 suggest a Root Cause Analysis is needed. To perform a structured Root Cause
 19 Analysis, utilizing outside engineering firms to support, for every repair encountered is
 20 unreasonable. Additionally, the [REDACTED] was thoroughly inspected in

²² Confidential Direct Testimony of Ditzel, p. 26.

1 2019 and, even if you accept Mr. Ditzel's claim, any suggestion that a "routine"
2 inspection should have occurred again in less than four years is irrational.

3
4 Further, on this particular valve, the only inspection that can be done is [REDACTED]
5 and visibly inspect it. It is unlikely that a subsequent inspection, after the 2019 valve
6 repair, would have shown any issues. Remember, the Culley 3 unit tripped earlier on
7 the morning of the event but did not result in a Boiler Feed Pump Turbine failure. And
8 even if one check valve were to fail to operate, the water-side of the system is designed
9 with triple redundancy to prevent backflow. So, it is nothing but speculation to suggest
10 that any form of root cause analysis or frequent inspection of the [REDACTED]
11 [REDACTED] would have prevented the event.

12
13 **Q. MOVING ON TO THE SECOND VALVE – THE [REDACTED]**
14 **[REDACTED] WITNESS DITZEL SAYS THE [REDACTED]**
15 **[REDACTED] CHECK VALVE “COMPLETELY FAILED.”²³ IS THAT**
16 **ACCURATE?**

17 **A.** No. The Second Valve [REDACTED]
18 [REDACTED]
19 [REDACTED] check valve [REDACTED]
20 [REDACTED] check valve [REDACTED]
21 [REDACTED] prevent backflow when the
22 pump [REDACTED]. The [REDACTED] check valve was activated by the backflow of
23 [REDACTED]
24 [REDACTED] the backflow. The motor-operated element [REDACTED]
25 [REDACTED]
26 [REDACTED] to prevent the backflow.²⁴

²³ *Id.* at 10.

²⁴ Confidential Direct Testimony of Bradford, p. 6.

1 **Q. PLEASE EXPLAIN THE NECESSARY STEPS TO IDENTIFY WHETHER THERE**
2 **COULD BE ISSUES WITH THE [REDACTED]**
3 **[REDACTED].**

4 A. The only way to identify whether there could be an issue with the Second Valve [REDACTED]
5 [REDACTED] is to disassemble the valve, which CEI South did after the Boiler Feed
6 Pump Turbine failure during the forced outage repair. Prior to the event occurring, CEI
7 South did not have industry guidance to routinely disassemble and inspect the Second
8 Valve.

9

10 **Q. WAS THE [REDACTED] INSPECTED**
11 **IN 2019?**

12 A. [REDACTED] was removed to facilitate the 2019
13 [REDACTED] repair. Upon removal, [REDACTED]
14 [REDACTED] was visually inspected but CEI South did not disassemble the valve. Any
15 suggestion that we should have known to disassemble the valve during an inspection
16 in order to identify some problem with it [REDACTED] is based entirely on
17 hindsight review. As I noted, there was no industry guidance suggesting either an
18 inspection frequency or an inspection protocol, especially one requiring the complete
19 disassembly of the valve.

20

21 **Q. MOVING TO THE THIRD VALVE – THE [REDACTED],**
22 **WITNESS DITZEL SAYS IN HIS TESTIMONY “[BLACK & VEATCH] INDICATED**
23 **THAT THE [REDACTED]**
24 **[REDACTED] VALVE [REDACTED]**
25 **[REDACTED] VALVE [REDACTED].”²⁵ IS THIS AN ACCURATE REPRESENTATION OF**
26 **THE BLACK & VEATCH ASSESSMENT?**

27 A. No. Mr. Ditzel's characterization of Black & Veatch's assessment is misleading.
28 Petitioner's Exhibit No. 1, Attachment FSB-3C (CONFIDENTIAL) – Black & Veatch's
29 report states the [REDACTED]

²⁵ Confidential Direct Testimony of Ditzel at 12.

1 [REDACTED]
2 [REDACTED]”²⁶

3
4 **Q. WITNESS DITZEL POINTS OUT CEI SOUTH HAS “ [REDACTED] ”**
5 [REDACTED]”²⁷

6 **PLEASE EXPLAIN WHY?**

7 A. Quite simply, CEI South has never experienced a mechanical issue with the
8 [REDACTED] in its 40 years of service. And as stated above
9 and in my direct testimony,²⁸ post-event inspection found the valve in the closed
10 position [REDACTED]
11 [REDACTED] In other words, an inspection would not have uncovered a possibility that the
12 valve might initially, partially fail to close.

13
14 **Q. BOTH WITNESS KRIEGER AND WITNESS DITZEL EXPRESS CONCERN WITH**
15 **CEI SOUTH NOT HAVING OPERATING AND MAINTENANCE (“O&M”) MANUALS.**
16 **DID EITHER PROVIDE MANUALS?**

17 A. No. Neither the IG nor OUCC provided any operating and maintenance manuals nor
18 any inspection frequency for the three check valves that they claim CEI South should
19 have been using.

20
21 **Q. WHY DOESN’T CEI SOUTH HAVE O&M MANUALS FOR THESE THREE WATER-**
22 **SIDE VALVES?**

23 A. The [REDACTED]
24 simplistic manual valves; they are not complex and therefore an O&M manual was not
25 needed. For the [REDACTED], CEI South provided the
26 OUCC and IG a maintenance repair manual, but the manual did not provide a
27 recommended inspection frequency. Notably, neither one of them has testified or

²⁶ Pet. Ex. No. 3-C at 3. Black & Veatch found also found the first two valves [REDACTED]
[REDACTED] were both [REDACTED]
[REDACTED] *Id.* at 3.

²⁷ Confidential Direct Testimony of Ditzel at 27.

²⁸ Pet. Ex. No. 1-C at 6.

1 suggested that CEI South was not in full compliance with this maintenance repair
2 manual.

3

4 **Q. WITH RESPECT TO THE CORRECTIVE ACTIONS IDENTIFIED IN CEI SOUTH'S**
5 **ROOT CAUSE ANALYSIS, HAS CEI SOUTH INSTITUTED AN INSPECTION**
6 **TIMETABLE FOR THESE THREE WATER-SIDE VALVES?**

7 A. Yes. CEI South will be inspecting the three water-side valves every four years.

8

9 **Q. HOW DID CEI SOUTH DETERMINE THAT FREQUENCY?**

10 A. Remember, there is no recommended protocol or procedure for inspecting the water-
11 side valves. Neither the OUCC nor the IG have provided a recommended protocol or
12 procedure that they believe to be reasonable. The turbine manufacturer (General
13 Electric) does not have a protocol for the water-side check valves, but it does have a
14 protocol for the steam-side check valves. The steam-side valves emit steam to turn
15 the turbine and boiler feed pump. GE recommends these steam-side valves be
16 inspected every four years, so CEI South is instituting the same four-year frequency
17 for the water-side check valves. Please see **Attachment FSB-2 (CONFIDENTIAL)** –
18 GE Steam Turbine Maintenance.

19

20 **Q. DOES THE GE O&M MANUAL RECOMMEND INSPECTION OF THE WATER-SIDE**
21 **VALVES OR PROVIDE A RECOMMENDED INSPECTION FREQUENCY?**

22 A. No. GE has recommendations on valve inspections to protect the turbine, but all of
23 those are on the steam-side. The manual does not provide recommendations for
24 inspection of the water-side valves. CEI South's steam-side valve inspections are fully
25 compliant with GE's recommendations.

26

27 **Q. HAS GE EVER EXPERIENCED AN EVENT SIMILAR TO THE BOILER FEED PUMP**
28 **TURBINE FAILING FROM THE BOILER FEED PUMP WATER-SIDE CHECK**
29 **VALVES FAILING TO CLOSE?**

30 A. No, GE has no record of a similar event. Please see **Attachment FSB-R3**
31 **(CONFIDENTIAL)**.

32

1 **Q. IN YOUR OPINION, IF CEI SOUTH HAD AN INSPECTION/MAINTENANCE**
2 **PROGRAM IN PLACE FOR THE THREE WATER-SIDE VALVES, WOULD THIS**
3 **HAVE PREVENTED THE BACKFLOW EVENT?**

4 A. No. As I indicated previously, had we instituted in 2019 the four-year inspection on the
5 water-side valves that is recommended on the steam-side, that four years would not
6 yet have passed since the 2019 repair of the [REDACTED] valve and instead would have
7 been performed during what was then the upcoming planned outage of Culley Unit 3
8 starting in October 2022. Further, an inspection based on what was known at the time
9 would not have disclosed the issue with the Second Valve, because it would not have
10 been detected without completely disassembling the valve, and it is only from this
11 event that we now know the valve must be disassembled to assure that it is completely
12 sealing. Finally, the third valve would likely have passed any inspection because it did
13 close during the event (just not quickly enough).

14

15 **7. IMPRUDENCE**

16

17 **Q. WITNESS DITZEL STATES “THERE WERE SEVERAL IMPRUDENT ACTIONS OR**
18 **FAILURE OF ACTIONS THAT ULTIMATELY LED TO CULLEY UNIT 3**
19 **UNPLANNED OUTAGE.”²⁹ PLEASE ADDRESS.**

20 A. I address most, if not all, of Witness Ditzel’s alleged “imprudent actions” or “failure of
21 actions” above but there are a few other points I’d like to address in the next several
22 Q&As.

23

24 **Q. WITNESS DITZEL STATES “[REDACTED]**
25 **[REDACTED]**
26 **[REDACTED].”³⁰ IS THIS ACCURATE?**

27 A. No. The Second Valve [REDACTED] did not fail
28 in 2019 – I believe Witness Ditzel is referring to the [REDACTED]; and as
29 I stated above, the First Valve [REDACTED] had a mechanical issue

²⁹ Confidential Direct Testimony of Ditzel at 20.

³⁰ *Id.* at 21.

1 that was repaired (not replaced) and did not necessitate a Root Cause Analysis. As
2 part of that 2019 repair to the First Valve [REDACTED], CEI South
3 removed the [REDACTED] in 2019 to get a visual on
4 the valve [REDACTED]. Prior to reinstalling the [REDACTED]
5 [REDACTED], no mechanical issues were identified.

6
7 **Q. WITNESS DITZEL ALSO STATED “[REDACTED]**
8 **[REDACTED] VALVES [REDACTED]**
9 **[REDACTED]”³¹ PROVIDING REFERENCES FROM A BOOK CALLED *WHAT***
10 ***WENT WRONG: CASE HISTORIES OF PROCESS PLANT DISASTERS AND HOW***
11 ***THEY COULD HAVE BEEN AVOIDED AND AN AMERICAN INSTITUTE OF***
12 ***CHEMICAL ENGINEERS (“AIChE”) PAPER PRESENTED AT ITS 2019 SPRING***
13 ***MEETING. DOES EITHER REFERENCE SUPPORT WITNESS DITZEL’S***
14 ***IMPRUDENCY ACCUSATIONS?***

15 **A.** No. First of all, while I recognized some similarities, the book reviews process plants
16 disasters, and the paper is from an AIChE meeting – both are chemical-process-plant-
17 related references. Witness Ditzel cites the *What Went Wrong* book showing check
18 valves should be tested regularly but there is no way to test the three water-side
19 valves. The First and Third Valves— [REDACTED]
20 [REDACTED] check valves with no indication
21 and, therefore, no way to test or confirm closure. The check valve part of the Second
22 Valve – the [REDACTED] cannot be tested either,
23 nor is there a way to confirm whether the check valve [REDACTED] while it is
24 in place.

25
26 **Q. DOES CEI SOUTH HAVE [REDACTED] VALVES THEY ROUTINELY INSPECT?**

27 **A.** Yes. Based on GE’s recommendation, CEI South has scheduled outage valve
28 preventative maintenance tasks to inspect the main steam turbine [REDACTED]
29 valves. Similar to a check valve, the [REDACTED] valves prevent reverse steam flow

³¹ *Id.*

1 back to the main steam turbine. Also, on a weekly basis, operations test the [REDACTED]

2 [REDACTED].

3
4 **Q. WHY DOES CEI SOUTH HAVE PERIODIC INSPECTION FOR THE [REDACTED]**
5 **[REDACTED] VALVES AND THE BOILER FEED PUMP TURBINE STEAM-SIDE**
6 **VALVES AND NOT THE THREE BOILER FEED PUMP WATER-SIDE VALVES?**

7 A. The [REDACTED] valves and the Boiler Feed Pump Turbine steam-side valves
8 periodic inspections were based on GE's original equipment recommendation. CEI
9 South did not have an original equipment manufacturer recommendation nor any other
10 documentation providing periodic inspection guidance for the water-side valves.
11 Neither Mr. Ditzel nor Mr. Krieger have provided any such recommendations either.

12
13 **Q. WITNESS KRIEGER STATED, "CEI SOUTH SHOULD HAVE BEEN**
14 **PERIODICALLY INSPECTING THE VALVES,"³² AND WITNESS DITZEL STATED,**
15 **"CEI SOUTH SHOULD HAVE KNOWN TO INSPECT THE CULLEY UNIT 3 VALVES**
16 **REGULARLY."³³ HOW DO THEY SUBSTANTIATE THEIR STATEMENTS?**

17 A. Neither of them does. Both discuss the prior repairs to the First Valve – the [REDACTED]
18 [REDACTED] in the justification. But beyond this, Mr. Krieger appears to be using the
19 CEI South Root Cause Analysis and the Black & Veatch Memorandum, both of which
20 are stating the hindsight corrective actions. Witness Ditzel references some literature
21 discussed earlier in my rebuttal testimony but also refers to the Black & Veatch
22 Memorandum. Neither has presented documentation to substantiate that a CEI South
23 should have known of a requirement for periodic inspections on the three water-side
24 valves or that such a requirement even existed. Also, the three water-side valves had
25 been in-service for approximately 40 years with no issues. Based on four decades
26 without issue and no recommended inspection frequencies, there is no indication CEI
27 South should have known to perform inspections on water-side valves.

28

³² Pub. Ex. No. 2 at 8.

³³ Confidential Direct Testimony of Ditzel at 26.

1 **Q. WITNESS DITZEL NOTES THAT CEI SOUTH CONSULTED WITH THE OTHER**
 2 **INDIANA UTILITIES WITH SIMILARLY DESIGNED SYSTEMS ABOUT WHETHER**
 3 **THEY HAVE PROGRAMS IN PLACE TO INSPECT WATER-SIDE VALVES, BUT**
 4 **HE IS CRITICAL THAT CEI SOUTH ONLY RECEIVED TWO RESPONSES AND**
 5 **THAT CEI SOUTH DID NOT CONSULT WITH UTILITIES OUTSIDE INDIANA.³⁴ IS**
 6 **THIS FAIR CRITICISM?**

7 A. No. As a result of this forced outage, CEI South consulted with four investor-owned
 8 electric utilities in Indiana and asked them whether they have specific programs or
 9 processes to inspect the water-side valves. CEI South did this as a part of best
 10 practices and to select an inspection protocol as a result of this incident. Two
 11 affirmatively responded that they have no protocols. One other utility responded that it
 12 does not have a similar system. Regardless of Witness Ditzel's claims, the fact of the
 13 matter is there is no evidence that any of CEI South's peer utilities in this state have
 14 protocols in place that Witness Ditzel claims CEI South should have been aware of.
 15 All four of these utilities have coal-fired steam generation, and two of them are part of
 16 much larger holding company structures operating coal-fired steam generation in
 17 multiple states.

18
 19 **Q. WITNESS DITZEL RAISES CONCERN THAT CEI SOUTH SHOULD HAVE KNOWN**
 20 **TO [REDACTED] THE**
 21 **SECOND VALVE [REDACTED]**
 22 **[REDACTED]**
 23 **EVENT FROM OCCURRING.³⁵ IS THIS ACCURATE?**

24 A. No. As I stated in my direct testimony³⁶ and reiterated earlier in my rebuttal, [REDACTED]
 25 [REDACTED]
 26 [REDACTED] to prevent the backflow of
 27 water into the Boiler Feed Pump. This is why the valve is designed with [REDACTED]
 28 [REDACTED]
 29

³⁴ *Id.* at 13.

³⁵ *Id.* at 28.

³⁶ Pet. Ex. No. 1-C at 6.

1 Q. WITNESS DITZEL INSINUATES THERE ARE OTHER OPERATING CULTURE
2 CONCERNS SUCH AS “ [REDACTED]

3 [REDACTED]”³⁷; “ [REDACTED] VALVES [REDACTED]

4 [REDACTED]”³⁸; “ [REDACTED]

5 [REDACTED] VALVES [REDACTED]”³⁹; “ [REDACTED]

6 [REDACTED]

7 [REDACTED]”⁴⁰; AND “EXPERTS WERE NOT CONSULTED WHEN THE [REDACTED]

8 [REDACTED] TIME ON 6/24/2022.”⁴¹

9 A. I find it fascinating that Witness Ditzel’s perception about CEI South operating culture
10 can be drawn by various data requests responses – he has never been to CEI South’s
11 facilities or seen the operation. My testimony above addresses these innuendos
12 except for the “[REDACTED].” CEI South
13 requested additional time to respond to a data request because the system housing
14 maintenance records was not available at that time, but these historical records are
15 available – this is how CEI South obtained the 2013 and 2019 maintenance history
16 related to the First Valve [REDACTED]. Just because CEI South’s
17 two record maintenance (historical and new record systems) systems are not merged
18 does not translate to operating culture concerns. Additionally, inspection and
19 maintenance scheduled for [REDACTED] valves were maintained – as stated earlier, CEI
20 South is compliant with the steam-side valve inspection and maintenance schedule
21 recommended by GE. Lastly, I’m not sure what Witness Ditzel is expecting on
22 equipment restart logs when the generating unit is online. CEI South provided the
23 various start and shutdown times to Witness Ditzel – there is nothing else to log.

25 Q. WITNESS DITZEL SUMMARIZES HIS ARGUMENTS BY SAYING “CEI SOUTH’S
26 OPERATING CULTURE SYSTEMATICALLY LACKED A REASONABLE LEVEL
27 OF OPERATIONAL AND MAINTENANCE DILIGENCE.”⁴² DO YOU AGREE?

³⁷ Confidential Direct Testimony of Ditzel at 31.
³⁸ *Id.* at 30.
³⁹ *Id.*
⁴⁰ *Id.* at 31.
⁴¹ *Id.*
⁴² *Id.* at 29.

1 A. I do not agree with his summation. Witness Ditzel implies lackadaisical practices at
2 CEI South or among its employees contributed to the Boiler Feed Pump Turbine failure
3 and that is simply not the case. CEI South has numerous equipment manuals,
4 maintains operating logs, and has a work management system that has historical
5 records. This demonstrates CEI South's operating culture is not lacking, and I believe
6 my rebuttal testimony clearly refutes the notion of lacking operational and maintenance
7 diligence.

8

9 **Q. HAS WITNESS DITZEL PRESENTED ANYTHING IN HIS TESTIMONY TO**
10 **DETERMINE IMPRUDENCY?**

11 A. Yes, Witness Ditzel testified that he based his definition of prudence on the
12 Commission's June 15, 2022, Order in Cause No. 38706 FAC 130 S2 ("38706 FAC
13 130 S2 Order"), which relates to an outage at a NIPSCO facility.⁴³ Mr. Ditzel testified
14 that the 38706 FAC 130 S2 Order defines "prudence" as follows:

15 [P]rudency is a standard by which a utility's conduct or actions are
16 evaluated. . . . It is the degree of care required by the circumstances
17 under which the action or conduct is to be exercised and judged by
18 what is known, or could have reasonably been known, at the time
19 of the conduct. It is a term often used interchangeably with what is
20 considered 'reasonable' under the circumstances. The Commission
21 must determine whether decisions were made in a reasonable
22 manner in light of the conditions or circumstances that were known
23 or reasonably should have been known when the decision was
24 made. The prudence of an electric utility's actions is not judged with
25 twenty-twenty hindsight. Rather, the Commission will focus on the
26 prudence of the decisions when made, based on the facts and
27 circumstances as they existed at the time."⁴⁴

28

29 **Q. HOW DO YOU RESPOND?**

30 A. Witness Ditzel tried to focus on the [REDACTED] to show
31 imprudence when in fact they were not the root cause of the Boiler Feed Pump Turbine
32 Failure or the ensuing repairs. Witness Ditzel focuses on the [REDACTED]
33 [REDACTED] because the only other option for an imprudence argument he has is that CEI

⁴³ *Id.* at 19.

⁴⁴ Cause No. 38706 FAC 130 S2, at 45-46 (IURC June 15, 2022) (internal citations omitted).

1 South “should have known” to routinely inspect the water-side check valves. However,
2 neither Mr. Ditzel nor the OUCC provided any O&M procedures, manuals, or industry
3 publications recommending the routine inspection of the water-side valves. The only
4 thing that Mr. Ditzel provided is an unrelated publication and paper discussing
5 chemical process plants. So, in my opinion, Witness Ditzel has not demonstrated that
6 any CEI South imprudence caused the Boiler Feed Pump Turbine failure or the June
7 2022 – March 2023 forced outage.

8
9 **Q. IN YOUR OPINION, DID CEI SOUTH ACT PRUDENTLY AND REASONABLY IN**
10 **MAINTAINING THE CULLEY 3 UNIT?**

11 A. Yes. First, CEI South followed all inspection protocols recommended by the original
12 equipment manufacturer, GE, for the steam-side valves. As discussed above, GE did
13 not recommend any inspection protocols for the water-side check valves, and CEI
14 South was not aware of (nor has any other party provided evidence of) any other
15 recommendation to routinely inspect the water-side check valves.

16
17 Second, neither CEI South nor GE was aware of any similar event ever occurring
18 during a generation unit outage. Although the Black & Veatch report listed three
19 potentially similar events, CEI South was not aware of those events at the time the
20 Culley Unit 3 event occurred (and neither, presumably, was GE, the original equipment
21 manufacturer). In addition, from the description of those events in the Black & Veatch
22 report, it appears that each event was caused by the failure of a single check valve.
23 By contrast, the Culley Unit 3 system is a triple-redundant system with three water-
24 side check valves [REDACTED]. CEI South could not have reasonably foreseen
25 that all three check valves would partially or completely fail at the same time in a
26 “perfect storm” type event. This is most significantly evidenced by the fact that the
27 same unit trip occurred earlier on the morning of the event, but the check valves did
28 not fail. It is also worth noting that CEI South has a similar system installed on its A.B.
29 Brown coal-fired generation units, which have never experienced a similar issue with
30 the water-side check valves on the Boiler Feed Pump.

31

1 Finally, Culley Unit 3 has an excellent operating history over its 40-year life span, which
2 adequately demonstrates the prudence of CEI South's operation of the unit.
3

4 **8. INSURANCE AND WARRANTY CLAIMS**

5
6 **Q. OUCC WITNESS ECKERT ASSERTED THAT CEI SOUTH [REDACTED]**
7 **[REDACTED]**
8 **[REDACTED].⁴⁵ IS THIS CORRECT?**

9 A. Yes.

10
11 **Q. WITNESS ECKERT ALSO ASSERTED THAT CEI SOUTH [REDACTED] A CLAIM**
12 **FOR REPLACEMENT POWER.⁴⁶ WHY NOT?**

13 A. CEI South's [REDACTED] – this is not
14 industry standard.

15
16 **Q. WITNESS ECKERT SHOWED CEI SOUTH [REDACTED] A WARRANTY**
17 **CLAIM.⁴⁷ [REDACTED] ?**

18 A. The three water-side valves had exceeded the warranty timeframe – as I mentioned,
19 the [REDACTED] had been installed since 2013⁴⁸ and the other two valves
20 had been in-service for 40 plus years.

21
22 **9. OUCC AND IG RECOMMENDED REFUND ANALYSES**

23
24 **Q. PLEASE SUMMARIZE THE OUCC WITNESSES AND THE IG WITNESS**
25 **RECOMMENDATIONS REGARDING THEIR REQUESTED REFUNDS.**

26 A. Both the OUCC and IG have claimed CEI South was imprudent. I have refuted these
27 claims above. However, OUCC Witness Krieger recommends “the Commission find

⁴⁵ Pub. Ex. No. 1 at 7.

⁴⁶ *Id.* at 8.

⁴⁷ *Id.*

⁴⁸ The 2019 repair to the First Valve – the [REDACTED] – was not a full valve replacement – i.e., installation of a new piece of equipment or valve – [REDACTED] but rather only replaced the [REDACTED] of the valve.

1 that CEI South ratepayers are not responsible for the Cully 3 outage and the cost for
2 the related replacement power is the responsibility of CEI South.”⁴⁹ OUCC Witness
3 Eckert recommends, “CEI South ratepayers should not have paid for \$21,457,720 in
4 fuel costs, and this amount should be credited back to the consumers over 4 FAC
5 periods. In addition, the total cost to repair Culley 3 should not be paid for by
6 ratepayers.”⁵⁰ And lastly, IG Witness Ditzel recommends “ratepayers be refunded by
7 \$26.5 million.”⁵¹ Again, I disagree with and have already responded to their claims of
8 imprudence: I also disagree with their refund calculations.

9

10 **Q. THERE’S A CONSIDERABLE DIFFERENCE IN THE RECOMMENDED**
11 **DISALLOWANCE BETWEEN WITNESS ECKERT’S RECOMMENDATION OF**
12 **APPROXIMATELY \$21.5M AND WITNESS DITZEL’S RECOMMENDATION OF**
13 **\$26.5M. WHY WOULD THAT BE THE CASE?**

14 A. As stated in previous FAC testimony, “it is not possible to accurately determine what
15 portion of that total cost impact might be related to the Culley Unit 3 outage”. So many
16 assumptions must be made in this sort of calculation that any result is purely
17 speculative. This is why you will see such a wide disparity between the OUCC’s and
18 IG’s calculations (\$5 million) and even between the minimum and high-end cost
19 disallowances in Mr. Ditzel’s calculation (\$8.6 million).

20

21 **Q. STARTING WITH WITNESS DITZEL’S CALCULATION OF DISALLOWANCE, DO**
22 **YOU AGREE WITH HIS ANALYSIS?**

23 A. No. The analysis provided by Witness Ditzel is not an appropriate method. To
24 summarize, the analysis is fundamentally an elaborate “top down” approach that
25 assigns essentially all deviations in the forecasted FAC costs vs the actual FAC costs
26 to the Culley 3 outage. The analysis ignores the fact that there were other significant
27 considerations that contributed to the FAC deviations beyond the Culley 3 outage.

28

⁴⁹ Pub. Ex. No. 2 at 1.

⁵⁰ Pub. Ex. No. 1 at 9.

⁵¹ Confidential Direct Testimony of Ditzel at 44.

1 **Q. WHAT ARE SOME OF THE OTHER SIGNIFICANT CONSIDERATIONS THAT**
 2 **WOULD HAVE AFFECTED THE FAC DEVIATIONS REGARDLESS OF THE**
 3 **CULLEY 3 OUTAGE THAT WERE NOT INCLUDED IN WITNESS DITZEL'S**
 4 **ANALYSIS?**

5 A. First are the impacts of other generation on purchased power and sales:
 6 Table 3 of Witness Ditzel's testimony estimates \$24.74 million of costs – referred to
 7 as "Row [D]" – the "Total Culley Station Level" attributable to the Culley 3 outage. This
 8 value is detailed in Witness Ditzel's attachments, KHD-2, KHD-3, and KHD-4, which
 9 correspond to CEI South 38708 FAC 137, FAC 138, and FAC 139, respectively. The
 10 attachments identify a total of 726,451 MWh of "Culley 'But For' Generation", which he
 11 describes in his testimony as the loss of generation attributed to the Culley 3 outage.
 12 The attachments also identify 560,644 MWh of generation loss due to sources other
 13 than Culley (or "Non-Culley Generation"). He adds those two values (i.e., Culley "But
 14 For" Generation plus Non-Culley Generation) to calculate the total deviation in
 15 generation which equals 1,287,095 MWh. As such, as shown in Table FSB-R1
 16 (below), approximately 44% of the total deviation in generation is acknowledged to be
 17 due to sources other than Culley.

Table FSB-R1: Generation Losses as Identified in Attachments KHD-2 through KHD-4

	KHD-2	KHD-3	KHD-4	Total	
	MWh	MWh	MWh	MWh	% of total
Culley "But For" Generation	395,080	66,481	264,890	726,451	56%
Non-Culley Generation ⁽¹⁾	99,853	170,281	290,510	560,644	44%
Total	494,933	236,762	555,400	1,287,095	100%

⁽¹⁾ Sum of the following line items from Attachments KHD-2 through KHD-4: Other Steam Generation, Additional Other Generation, and Solar Generation Shortage

18 Witness Ditzel's attachments also identify a total deviation of 374,334 MWh due to
 19 additional purchased power and a deviation of 796,480 MWh in lost off-system sales
 20 over the period. I will address this "lost off-system sales amount" later. But the sum of
 21 these two values is 1,170,814 MWh. Witness Ditzel applied assumed costs to the
 22 aforementioned energy volumes to arrive at the additional cost to CEI South customers
 23 due to the Culley 3 forced outage. The estimated savings due to the generation
 24 deviations were subtracted from the sum of the additional purchased power costs and

1 the opportunity cost of sales to arrive at the estimated additional cost to customers,
2 labeled as Row [D] ("Total Culley Station Level") in Table 3 of Witness Ditzel's
3 testimony.

4

5 The fallacy with this approach is all of the deviation in purchased power and sales
6 opportunity costs is assigned to the Culley 3 forced outage. Any net FAC deviations
7 associated with lower than forecasted generation from other generation sources
8 during this period were independent of the Culley 3 outage. Therefore, these costs are
9 irrelevant in the context of the Culley 3 outage. Witness Ditzel's analysis gives no
10 consideration to what portion of the additional purchased power costs and opportunity
11 cost of sales could be assigned to other sources of generation.

12

13 As illustrated in Table FSB-R2 below, which summarizes pertinent data extracted from
14 Witness Ditzel's attachments KHD-2 through KHD-4, Witness Ditzel's testimony
15 assigns 38% of the total fuel cost savings over the analysis period to generation
16 sources other than Culley. If this same percentage is applied to MISO purchases and
17 Lost Sales, the total net cost impact due to Non-Culley generation would be nearly \$10
18 million, reducing Witness Ditzel's estimate. This may be a simplification of Witness
19 Ditzel's approach but illustrates the point. Therefore, even if one accepts his premise
20 and calculation methodology, Witness Ditzel's analysis significantly overestimates the
21 impact of the Culley 3 outage.

Table FSB-R2: Fuel Cost Savings as Identified in Attachments KHD-2 through KHD-4

	Fuel Cost Savings					Additional Cost Impact		
	KHD-2 (\$)	KDG-3 (\$)	KHD-4 (\$)	Total (\$)	% of total	MISO Purchases (\$)	Lost Sales (\$)	Net Cost Impact (\$)
Culley "But For" Generation	(10,603,107)	(2,264,612)	(8,155,989)	(21,023,708)	62%	22,541,699	14,745,406	16,263,397
Non-Culley Generation ⁽¹⁾	309,225	(5,332,709)	(7,764,927)	(12,788,411)	38%	13,711,783	8,969,413	9,892,785
Total	(10,293,882)	(7,597,321)	(15,920,916)	(33,812,119)	100%	36,253,482	23,714,819	26,156,182

(1) Sum of line items; Other Steam Generation, Additional Other Generation, and Solar Generation Shortage

22

1 **Q. YOU TESTIFIED THERE WERE “OTHER SIGNIFICANT CONSIDERATIONS THAT**
 2 **CONTRIBUTED TO THE FAC DEVIATIONS.” PLEASE DESCRIBE THE NEXT**
 3 **CONSIDERATION.**

4 A. Second is seasonal NOx pricing. CEI South steam generating units are included in the
 5 EPA Group 3 seasonal NOx allowance program. Group 3 allowance prices
 6 experienced an extraordinary increase during the Summer of 2022. The price of Group
 7 3 seasonal NOx allowances increased from approximately \$ [REDACTED] per allowance at
 8 the beginning of 2022 to a peak of approximately \$ [REDACTED] in August. [REDACTED]
 9 [REDACTED].
 10 [REDACTED]. At the peak pricing during August 2022, the NOx portion of the
 11 generation offer for the A.B. Brown steam units and Warrick Unit 4 range from
 12 [REDACTED]. All of these units have post combustion NOx controls in the
 13 form of selective catalytic reduction (“SCR”) equipment. F.B. Culley 2 does not have
 14 post combustion NOx control, and the NOx portion of the generation offer for that unit
 15 was approximately [REDACTED].



16 Higher offer prices will tend to lead to lower generation for the affected generating units
 17 and higher purchased power volumes. These considerations were unknown at the
 18 time that the FAC projections for the ozone season months were filed and were not
 19 accounted for in the projections. Referring to workpaper KHD-1, Witness Ditzel
 20 identifies 614,062 MWh of Culley Station generation loss for the ozone season months
 21 of June through September. CEI South estimates that this level of generation would

1 have resulted in the need to purchase an additional \$11.8 million in NOx emission
2 allowances, assuming the 2022 average purchase price and that generation at the
3 other stations was unchanged. These additional NOx emission allowance costs would
4 have been allocated between retail and wholesale customers through the settlements
5 process. Those additional NOx allowance costs due to jurisdictional generation would
6 have been recovered from customers, and they were not.

7

8 **Q. PLEASE DISCUSS THE NEXT CONSIDERATION.**

9 A. Another consideration is planned outage assumptions. Culley 3 was scheduled to be
10 in planned outage from Oct 1, 2022, through Nov 19, 2022—7 weeks. Culley 2 was
11 also scheduled to be in planned outage from Oct 1, 2022, through Nov 5, 2022—5
12 weeks. The planned outages were contemplated in FAC 135, which included the
13 October 2022 projection and was filed on May 16, 2022, before the Culley 3 outage
14 occurred. The CEI South response to IG DR 15.1 (see **Attachment FSB-R4**
15 **(CONFIDENTIAL)**) verifies that CEI South projected no generation for the month of
16 October 2022. FAC 136, which included the November 2022 projection, was filed on
17 August 16, 2022. The Culley 3 forced outage had occurred by this time and was
18 recognized in the FAC projection.

19

20 Witness Ditzel does not correctly account for the planned outages when developing
21 his estimates for what is labeled in Table 3 as the “Culley Unit 3 Opportunity Cost (Nov
22 2022-Dec 2022)” and the corresponding “High End Additional Cost (Disallowance).”
23 The ““Culley Unit 3 Opportunity Cost (Nov 2022-Dec 2022)” is detailed in attachment
24 KHD-6. Referring to this attachment, the November value for opportunity cost Witness
25 Ditzel shows is overstated because Culley 3 was projected to be in planned outage for
26 the first 21 days of the month.

27

28 **Q. PLEASE CONTINUE WITH DISCUSSING ADDITIONAL CONSIDERATIONS.**

29 A. Another consideration is that Witness Ditzel’s analysis did not factor coal supply. Coal
30 supply concerns were an ongoing issue that emerged in 2021 and continued into 2022.
31 These concerns are covered in detail in multiple CEI South FAC filings during that time

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frame. With respect to the Culley 3 outage, Witness Games stated the following on page 18 of his FAC 136 Direct Testimony:

[REDACTED]

Witness Games also stated the following in testimony from FAC 137, page 21:

[REDACTED]

[REDACTED]

Timing is also an important consideration with respect to coal supply. The coal supply concerns would have been most acute during the summer months of 2022 as the coal burns would have been high and inventories were still relatively low.

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

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Q. DO YOU AGREE WITH MR. DITZEL'S STATEMENT THAT "BY THEIR NATURE, BACKCASTS ARE MUCH LESS SPECULATIVE THAN FORECASTS BECAUSE ONE OF THE KEY INPUTS MENTIONED ABOVE—MISO MARKET CONDITIONS—HAS ALREADY OCCURRED AND IS THUS COMPLETELY KNOWN"?⁵²

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Q. DO YOU AGREE WITH WITNESS DITZEL'S ASSUMPTION THAT "LOST SALES OPPORTUNITY" SHOULD BE A COMPONENT OF THE EFFECT OF THE CULLEY 3 OUTAGE ON THE FUEL COST TO RATEPAYERS?

16

17

18

A. No. Witness Ditzel's analysis identifies \$23.7M in "lost sales opportunity" (Attachments KHD-2, KHD-3, and KHD-4) that is applied in full to the recommended disallowance. CEI South does not agree that the benefits of wholesale sales should be included in the analysis. These alleged "lost off-system sales" exceed the scope of this subdocket and do not relate to the elements set forth in Ind. Code § 8-1-2-42(d).

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24

Q. WHAT DO YOU MEAN THAT OFF SYSTEM SALES EXCEED THE SCOPE OF THIS SUBDOCKET?

25

26

A. In creating this subdocket, the Commission stated: "a subdocket is created for the purpose of considering whether and how the forced outage of Culley 3 impacts CEI South's fuel procurement, contracting and hedging and whether modifications should

27

28

⁵² Direct Testimony of Ditzel at 38.

1 be made to CEI South's proposed and future fuel factors."⁵³ There is no mention for
2 consideration of off-systems sales that allegedly were lost.

3

4 **Q. WHAT DO YOU MEAN THAT "LOST OFF-SYSTEM SALES" DO NOT RELATE TO**
5 **THE ELEMENTS SET FORTH IN IND. CODE § 8-1-2-42(D)?**

6 A. Ind. Code § 8-1-2-42(d)(1) is the element that would govern the issues in this
7 subdocket. In approving the FAC factor, the Commission must find that "the electric
8 utility has made every reasonable effort to acquire fuel and generate or purchase
9 power or both so as to provide electricity *to its retail customers* at the lowest fuel cost
10 reasonably possible." I have already explained how CEI South did make every
11 "reasonable effort" to generate power (i.e., CEI South was not imprudent), but even if
12 the Commission were to disagree, the focus of an FAC is the cost of providing
13 "electricity to [our] retail customers." Off-system sales, by definition, do not relate to
14 providing electricity to CEI South's retail customers and so are irrelevant to the issues
15 in this subdocket and the FAC statute.

16

17 The benefits of wholesale sales are not guaranteed and there is no statutory standard
18 by which an electric utility is required to make off-system sales. This is why the benefits
19 of off-system sales margins are shared; because there is no requirement to make off-
20 system sales.

21

22 **Q. ARE THERE OTHER PROBLEMS WITH INCLUDING "LOST OFF-SYSTEM**
23 **SALES"?**

24 A. Yes. These sales are opportunistic and dependent upon dynamic market conditions
25 and generating unit availability. Although a nominal level of wholesale sales are
26 included in the FAC projections in recognition of projected unit availability and market
27 conditions, it must be emphasized that the projection of wholesale sales is highly
28 uncertain, both in terms of energy volumes and price. Outside forces such as coal and
29 natural gas prices and weather events can unexpectedly influence market prices both
30 in the near and the long term. For example, the relatively high energy prices in the

⁵³ Docket Entry Creating Subdocket (Jan. 3, 2023), p. 2.

1 summer of 2022 can be largely attributed to higher than anticipated natural gas prices
2 and the previously discussed seasonal NOx considerations.

3
4 Another important consideration with respect to the difficulty in projecting wholesale
5 sales is simply a consequence of participating in the MISO power market. CEI South
6 generating units are offered into a large power pool and not simply dispatched to meet
7 CEI South's "native" load demand. Therefore, whether or not CEI South generating
8 units are committed and/or dispatched is basically a function of the MISO energy
9 market clearance price. At times when CEI South generating units are offered close to
10 the clearing price, a relatively small change in clearing price can determine whether a
11 unit is running at full load or is off-line in economic reserve shutdown. The dynamics
12 and volatility of the MISO market has made generation forecasting extremely difficult.
13 Projecting wholesale sales is even more difficult because the most expensive, and
14 therefore more marginal, segments of the generation offers are assigned to wholesale
15 sales.

16
17 **Q. DOES MR. DITZEL'S ANALYSIS USE AN ACCURATE TIME FRAME?**

18 A. No. In addition to the numerous issues discussed above, Mr. Ditzel's analysis includes
19 the month of June 22 in full. The Culley 3 outage did not start until June 24, 2022. The
20 analysis does not prorate for the portion of June when Culley 3 was available and,
21 thus, is overstated.

22
23 **Q. LOOKING AT WITNESS ECKERT'S CALCULATION, DO YOU HAVE ISSUES**
24 **WITH HIS ASSUMPTIONS?**

25 A. Yes. Witness Eckert's calculation is too simplistic. Comparing the purchased power
26 amounts from one ten-month period to another ten-month period and assuming that
27 100% of the difference can be assigned to one cause is not reasonable. How much
28 the performance of a given generating unit influences the overall position of the
29 company is too dynamic and complex to make such a gross simplifying assumption.

30
31 Similar to Witness Ditzel's disallowance analysis, Witness Eckert's calculation assigns
32 100% of the calculated increase in purchased power to the Culley 3 outage. The

1 calculation makes no attempt to account for the impact of the availability of other CEI
2 South generating units or other considerations such as seasonal NOx costs, planned
3 outages, or coal supply constraints that were discussed previously in this testimony.
4

5 Further, Mr. Eckert's calculation includes the months of June 22 and March 23 in full.
6 The Culley 3 outage did not start until June 24, 2022 and ended on March 12, 2023.
7 The calculation does not prorate for the portion of those months when Culley 3 was
8 available and, thus, like Mr. Ditzel's analysis, is overstated.
9

10 **10. CONCLUSION**

11

12 **Q. DOES THIS CONCLUDE YOUR REBUTTAL TESTIMONY?**

13 **A.** Yes, at the present time.

VERIFICATION

I affirm under penalties for perjury that the foregoing representations are true to the best of my knowledge, information, and belief.

SOUTHERN INDIANA GAS AND ELECTRIC
COMPANY D/B/A CENTERPOINT ENERGY
INDIANA SOUTH



F. Shane Bradford
Vice President of Power Generation Operations

10 | 23 | 2023
Date

CEI South
Cause No. 38708 FAC 137-S1
Data Request Set No. 1 to Industrial Group
Received: September 27, 2023

1.3 Confirm or Deny. If the Culley Unit 3 tripped offline due to low deaerator storage tank level and all 3 water side check valves did not close in the same manner as this incident, would the BFP Turbine failure occurred?

Response:

Confirm, but only subject to the logic within in the DCS at the time of the June 24, 2022 trip was designed such that a hypothetical low deaerator storage tank level would have tripped the Culley Unit 3 offline.

Note that this response in no way diminishes the fact that CEI South considered the [REDACTED] issue as a “normal condition” (confidential responses to IG DR 8-9, IG DR 11-15 and IG DR 12-5) and a source of prior trips (confidential IG DR 11-1), which clearly demonstrates CEI South was imprudent by not addressing this issue in prior investigations or root cause analysis. If the low [REDACTED] had been identified and corrective actions had been taken, the trip would not have occurred.

Similarly, if a hypothetical low deaerator storage tank level was the result of operational error, such as not properly following procedures, or was another “normal condition” (to use CEI South’s word) that CEI South decided not to properly address through investigations or root cause analyses, then it would suffer the same conclusion of imprudence as Mr. Ditzel determined on the [REDACTED].

ATTACHMENT FSB-2R

This attachment will be filed using the confidential channel of the Commission's electronic filing system.

ATTACHMENT FSB-3R

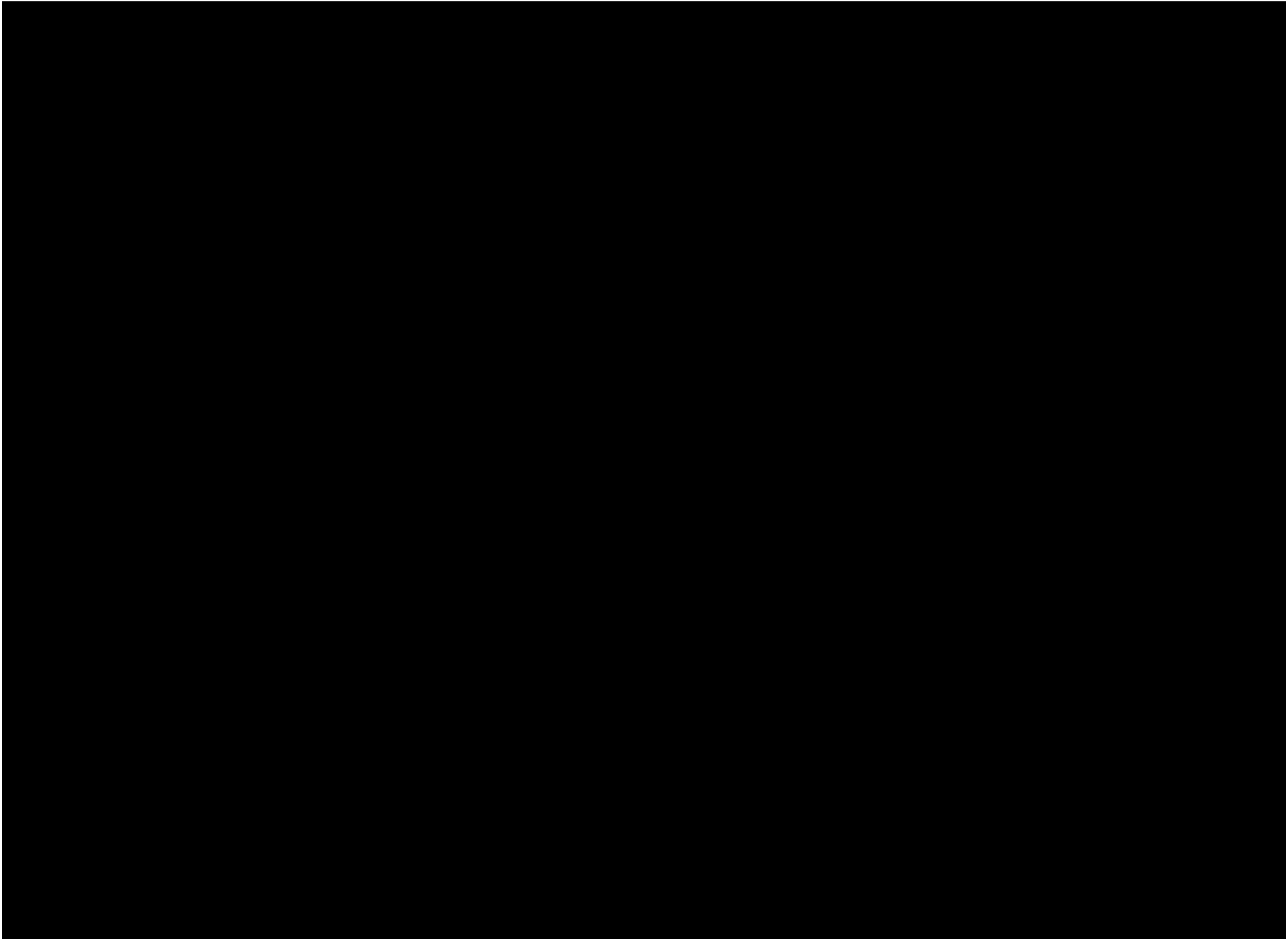
This attachment will be filed using the confidential channel of the Commission's electronic filing system.

- 15-1. Please provide the estimated monthly steam generation in kWh for each generating unit that totals to the values shown for “Steam Generation” in Schedule 1 in Attachment RMW-2 for all filed Wilhelmus testimonies for FAC 134 through FAC 139. (Note that FAC 134 through 136 estimated costs for the period during which the outage occurred).

Objection: CEI South objects subpart (a) of this request because it seeks information that is outside the scope of this proceeding, not relevant to the subject matter of this proceeding, and not reasonably calculated to lead to the discovery of relevant or admissible evidence. The issues in this proceeding are limited to the June 24, 2022, outage at the Culley 3 generating unit and its related impact on fuel procurement and fuel costs.

CEI South further objects to this request to the extent it seeks confidential information. CEI South is providing responses to this request pursuant to its NDA with the Industrial Group.

Response: Forecasted steam generation in kWh is calculated on a per generating station basis, not on a generating unit basis. Please see attachment 38708 FAC 137 S1 – IG DR15.1
- CONFIDENTIAL.





**Privileged & Confidential Draft Report – Prepared at the Request of Counsel
Attorney-Client Communication**

**CEI South F.B. Culley 3 Generating Station (“Culley 3”) Summary of
Boiler Feed Pump Turbine failure, 6/24/22**

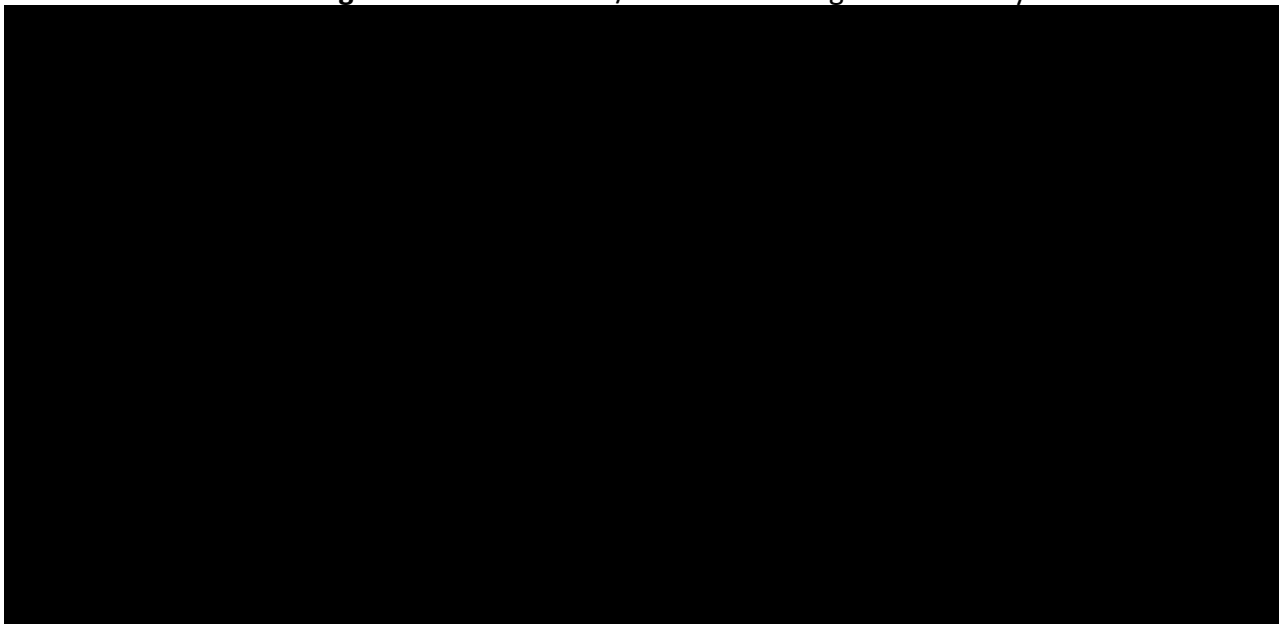
1. Summary. On June 24, 2022, a mechanical failure occurred on the Culley 3 Generating Unit, resulting in extensive damage to the Culley 3 Boiler Feed Pump Turbine (“BFPT”) as well as some of its foundation and auxiliaries.

2. Description of Culley 3 Generating Unit.

- Culley unit 3 was designed with a [REDACTED] Boiler Feed Pump (“BFP”) with a steam driven turbine.
- The BFP, a Pacific Pump Boiler Feed Pump, is a variable speed pump used to maintain a water level in the steam drum. The BFP pumps water from the condensate system

[REDACTED] up to a drum [REDACTED]
 [REDACTED] Please refer to Diagram 1, below, [REDACTED]
 [REDACTED]

Diagram 1 – Basic Water/Steam Flow Diagram for Culley 3



- BFPT, a steam driven General Electric (“GE”) turbine, uses steam [REDACTED] [REDACTED] to rotate the turbine. This BFPT uses [REDACTED] during normal operation. Please refer to Diagram 2, below, [REDACTED]

[REDACTED] Provided for illustrative purposes only.

Diagram 2 – A.B. Brown Unit 1 BFP / BFP T Operational Data at Full Load Condition

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Attorney-Client Communication**

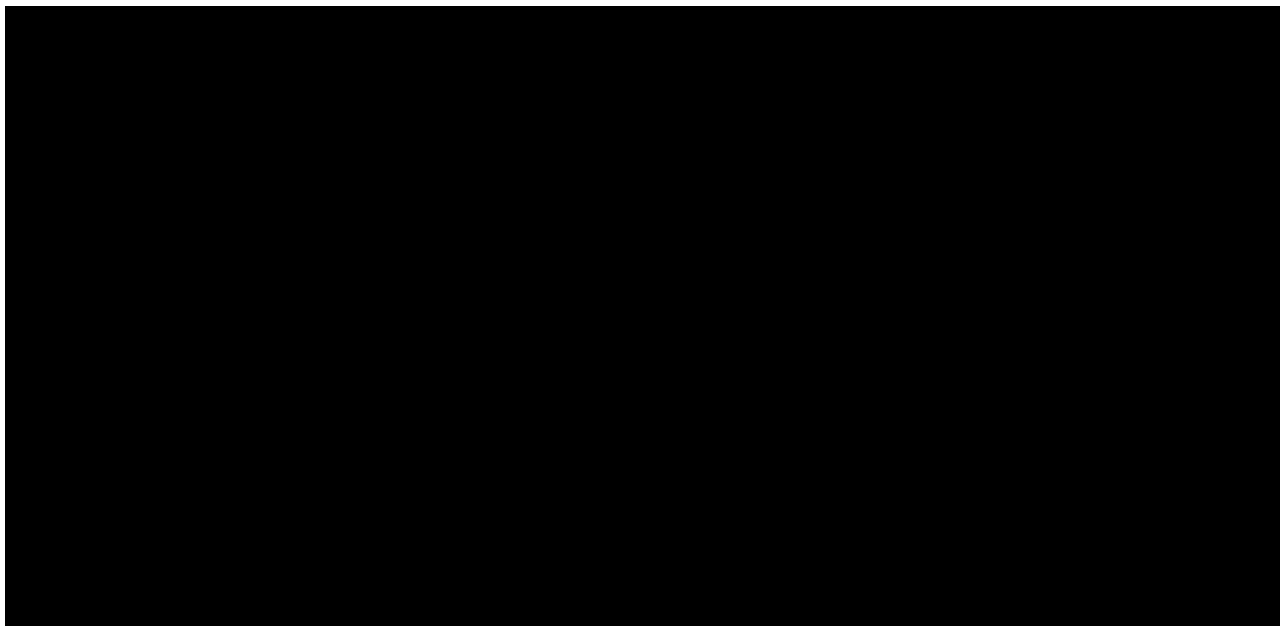
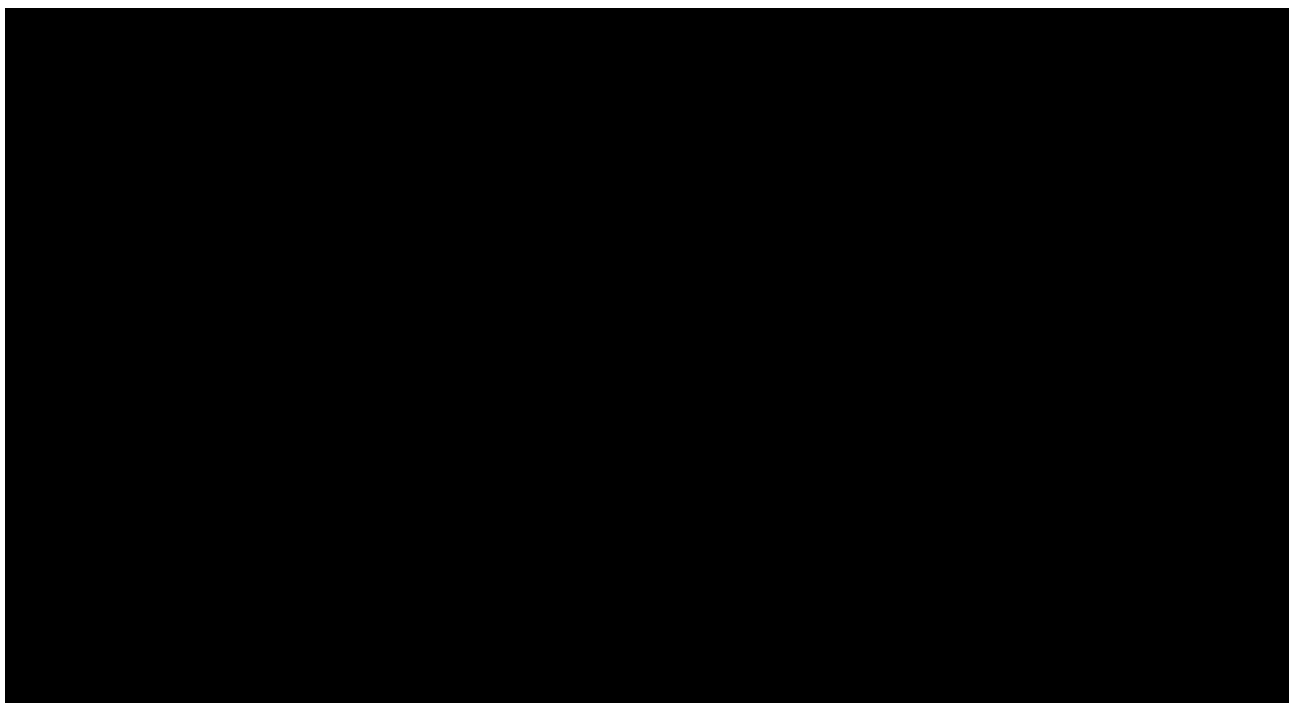


Diagram 3 – A.B. Brown Unit 1 Boiler Operational Data at Full Load Condition



3. Overview of Mechanical Failure. On Friday June 24 at 9:11pm, Operations was in the process of starting [REDACTED] to get Culley 3 capable for full load. As Operations was selecting “start” for the [REDACTED], the plant experienced a failure [REDACTED] [REDACTED] which in turn tripped the Culley 3 boiler and main steam turbine/generator. Operators initiated the necessary steps in accordance with the plant’s operating procedures for when a boiler or main turbine/generator trips. Within 2 minutes of the unit tripping, operators heard a loud spinning noise from the unit outside of and under the control room. Shortly thereafter, operators heard [REDACTED]

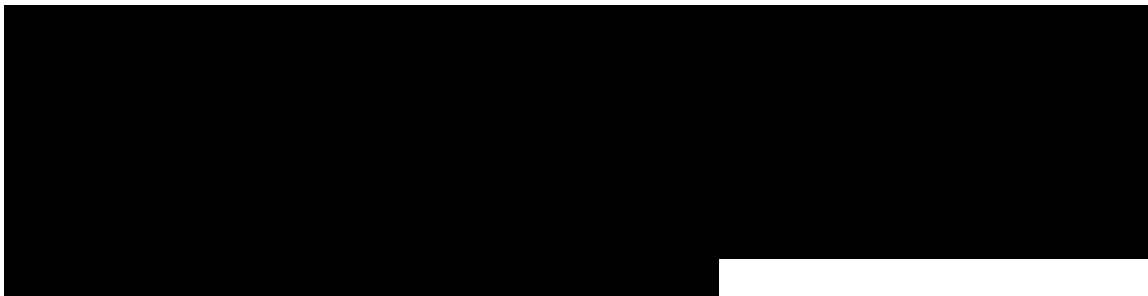
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and then observed [REDACTED] – all of which was abnormal. Given the circumstances, the Production Supervisor hit the muster alarm; verified all personnel at the plant were accounted for; called the fire department due to a very large [REDACTED] oil leak on the main turbine oil system that was caused by the event; and then called in technical and leadership support staff to respond to the event, isolate equipment as needed, and assist with getting all systems to a safe condition. A more detailed timeline of events is provided below:

Event	[REDACTED]	Timestamp hh:mm:ss	elapsed time from unit trip hh:mm:ss	interval from prior event hh:mm:ss
Attempted Start [REDACTED]	[REDACTED]	21:10:35		--
[REDACTED] Unit trip	[REDACTED]	21:10:36	--	00:00:01
BFP reverse flow starts	[REDACTED]	21:10:52	00:00:17	00:00:17
	[REDACTED]	21:10:58	00:00:22	00:00:05
	[REDACTED]	21:11:02	00:00:26	00:00:04
	[REDACTED]	21:11:05	00:00:29	00:00:03
	[REDACTED]	21:11:12	00:00:36	00:00:07
BFP Overspeed	[REDACTED]	21:14:01	00:03:25	00:02:49
	[REDACTED]	21:14:08	00:03:32	00:00:07
	[REDACTED]	21:14:14	00:03:38	00:00:06
[REDACTED]	[REDACTED]	21:14:17	00:03:41	00:00:03
[REDACTED]	--	21:14:20	00:03:44	00:00:03
Power restored		21:45:45	00:35:09	

- Note that the Boiler Feed Pump and the Boiler Feed Pump Turbine [REDACTED] together therefore [REDACTED] Boiler Feed Pump and Boiler Feed Pump Turbine Post Unit Trip: Post event review of data shows the BFP/BFPT [REDACTED]. Shortly thereafter, logs disclosed abnormal activity [REDACTED]. Specifically, diagnostics/logs revealed that as the [REDACTED] which is abnormal. Post-event analysis determined that [REDACTED]

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No one was injured during the event; nor was anyone in the area of the BFPT exhaust hood at the time of the event. Support staff were able to get all systems in a safe condition; no environmental issues were identified or present; and the fire department was released. Operations secured the area with red tape and began further isolation of electrical equipment as well as the cleanup processes to determine the extent of damage.

4. Post-Event Findings BFPT () Side:

o BFPT () Side . The BFPT has



o Post-event analysis determined that were operational and did not fail, therefore performed as intended to protect the

o was visually inspected post-event and appeared to be in good working order with undisturbed. The
o was visually inspected post-event and appeared to be in good working order with undisturbed.

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- [REDACTED] did not fail. Operators routinely test [REDACTED] while the unit is online. Post event, EM verified working properly.
- The [REDACTED] did not fail, and instead operated [REDACTED] as designed, as verified via the Emerson EDS system. Post-event analysis revealed the system was [REDACTED] as evidence by data showing the [REDACTED]
- [REDACTED] did not fail. [REDACTED] was triggered; data supports working properly.

5. Post-Event Findings Pump ([REDACTED]) Side of the BFP. Post-event analysis identified [REDACTED] protection devices on the **Pump Side/ [REDACTED] of the BFP**, responsible for Reverse Flow Protection, failed to operate, thereby allowing the BFP/ [REDACTED] to spin backwards and create a reverse flow. The main data analyzed to make this determination was [REDACTED] at the BFP. This [REDACTED]. A third-party engineering firm who reviewed this data, in addition to our internal experts, reached the same conclusion – that the [REDACTED]

- Pump ([REDACTED]) Side of BFP - [REDACTED] exist to protect the BFP, each of which (as explained in greater detail below) failed in its entirety or initially to operate. See Diagram 1 above for their general location in the [REDACTED] system.

(1) [REDACTED]

[REDACTED]

[REDACTED]

- Findings Related to Pump ([REDACTED]) Side BFP [REDACTED]
- [REDACTED] Failed. Post-event inspection revealed [REDACTED] resulting in failed [REDACTED] operation of the [REDACTED]
- [REDACTED] Failed. Post-event inspection disclosed [REDACTED]

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[REDACTED]

- [REDACTED] Valve Failed to Operate Initially. Post-event inspection [REDACTED] revealed visual wear but no abnormal conditions. [REDACTED] manufacturer visually examined the disassembled [REDACTED] on-site and found no issues that would cause it not to work. Based on [REDACTED] data that confirms [REDACTED] this [REDACTED] did not 'operate' initially (at the onset of the event) as designed; but at some point did [REDACTED] and perform correctly – [REDACTED]. This was evident when the mechanics attempted to dismantle the [REDACTED] as they opened [REDACTED] for safety reasons which resulted [REDACTED]. The mechanics found the [REDACTED] in the [REDACTED] once disassembled.

6. Post-Event Findings Related to Turbine Speed. Post-event analysis disclosed it was the failure of the [REDACTED] that allowed [REDACTED], thereby creating the energy necessary to cause the BFP/BFPT to [REDACTED], resulting in extensive damage to the BFPT and BFP/BFPT foundation, exhaust ductwork and surrounding equipment.

- This finding is supported by the physical [REDACTED] data collected by Emerson Enterprise Data Solutions EDS data collection system and the Thermodynamic properties [REDACTED] on both sides of the BFP.

7. Additional Findings.

- While it is customary to inspect the high energy steam piping on coal fired units on a routine basis, [REDACTED]

- The [REDACTED] was replaced [REDACTED]. The [REDACTED] replaced was a [REDACTED]; a new [REDACTED] was ordered and installed in 2013*. The [REDACTED] was then repaired in January 2020 when [REDACTED].

*Originally filed report had a typo and read 2014

8. Conclusions

- During a unit trip event on June 24th at 9:11pm, [REDACTED] through the BFP [REDACTED] which destroyed the BFPT and damaged the BFP.

