

Decision No. C21-0185-I

BEFORE THE PUBLIC UTILITIES COMMISSION OF THE STATE OF COLORADO

PROCEEDING NO. 20I-0437E

IN THE MATTER OF THE INVESTIGATION INTO THE HISTORY AND CONTINUING OPERATIONS OF THE PUBLIC SERVICE COMPANY OF COLORADO COMANCHE UNIT 3 GENERATING STATION PURSUANT TO DECISION NO. C20-0505.

**INTERIM DECISION REQUIRING RESPONSE TO
REPORT AND FILING OF DOCUMENTS**

Mailed Date: March 29, 2021

Adopted Date: March 24, 2021

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I. BY THE COMMISSION**A. Statement**

1. On March 1, 2021, Commission Staff (Staff) filed its report on the investigation of Public Service Company of Colorado's (Public Service or Company) Comanche 3 coal-fired generation plant, pursuant to Decision No. C20-0505.¹

2. In this interim decision, we require Public Service to file a written response to Staff's report to address future plant reliability. And we require Public Service to file in this proceeding, the three reports from Fleet Engineering, Structural Integrity Associates, and General Electric as well as the Xcel Human Performance Team Analysis, and include a motion for protective order for any proposed confidential treatment.

B. Background

3. In Proceeding No. 19AL-0268E, a general rate case for Public Service, parties raised concerns about ongoing operational problems with Comanche 3. As part of that proceeding, numerous historical operational problems were discussed. The Commission then opened this proceeding, Proceeding No. 20I-0473E and directed Staff to perform an investigation.

C. Staff's Report

4. Staff provided a thorough and detailed report based on extensive information provided by Public Service. Information provided by the Company includes: a Public Service Human Performance Team Analysis, a Turbine Blade Damage Report by Fleet Engineering, a Root Cause of Turbine Blade Failure and Steam Cycle Chemistry Analysis by Structural Integrity

¹ Decision No. C20-0505 was issued in Proceeding No. 19AL-0268E on July 14, 2020.

Associates, a General Electric Report, Root Cause Analyses by Xcel, and numerous other audit responses. These are provided in Confidential Report Volume 2.²

5. Staff's review of third party reports and studies provided by Public Service presents a thorough understanding of the specific incidents that occurred, along with corrective actions that were implemented. However, much of the information was provided to Staff as confidential.

6. A summary of the more significant operating issues includes:

- Boiler tube leaks encountered in late 2009 that Public Service indicated were due to inadequate post weld stress relieving treatments;
- A stack noise harmonics issue that required reconfiguring the exhaust stack;
- Reduced capacity factors due to planned outages required to correct improperly welded components in the boiler and unplanned outages as a result of slagging due to malfunctioning water cannons;
- Replacement of the finishing superheater;
- The extended outage that began in January of 2020 to repair and replace steam turbine blades; and
- Extensive damage to the turbine, generator and ancillary equipment at the completion of the January 2020 outage due to loss of lubrication to the main turbine shaft while in the process of returning the unit to service, resulting in an outage extended beyond the end of 2020.

7. Staff provides a detailed operating history of Comanche 3 since its commercial operation date of July 6, 2010. Staff's analysis includes:

- a) The likely root cause analysis of the January 13, 2020 turbine blade failure which resulted in an extended outage;
- b) The likely root cause analysis of the June 2, 2020 loss of Turbine Lube Oil which resulted in major damage and an extended outage;
- c) Corrective actions being implemented to prevent recurrence of similar events;

² Confidential Report Volume 2 was filed in this Proceeding on March 1, 2021.

- d) Adequacy of training programs as they apply to the actions taken by plant personnel during the June 2, 2020 event;
- e) Costs to repair damages and defects;
- f) Costs for replacement power for significant outages;
- g) Performance history of Comanche 3;
- h) Operating costs compared with original expected cost estimates when Comanche 3 was proposed, and compared to similar coal-fired generating units; and
- i) Human performance team analysis.

8. Some of these incidents are the result of single failures, but many incidents appear to be more of a chronic or systemic failure. For example, regarding the low pressure steam turbine blade failure in January 2020, Staff found that while not readily apparent and not impacting day-to-day operations, Comanche 3's cycle chemistry during the first ten years of operation has not met the standards expected for a supercritical unit. Staff states that proper steam cycle chemistry is a key requirement to minimize damage and efficiency losses and maximizes plant reliability. This contributed to pit-induced stress corrosion cracking in the turbine blade failure.

9. The June 2020 loss of turbine shaft lubrication was caused by a single valve failure, where a stop pin was sheared off and apparently allowed the 3-way valve to move to a position where no oil could flow to the turbine bearings. However, this incident also raised numerous questions regarding single point of failure analysis, operator training, valve actuator indicator labeling, change management policies, and general operating practices.

10. One of the more troubling aspects of Staff's report is the large number of findings in the various reports regarding improper operating practices, inadequate maintenance, and failure to adhere to industry standards.

11. Staff states that its investigation into 2020 outage causes and corrective actions focused on trying to understand the big picture. Specifically, why is Comanche 3, a unit still in the first decade of its 60-year useful service life, plagued with such poor unit reliability? In general, poor unit reliability is usually the result of a combination of poor equipment design and substandard operation and maintenance (O&M) practices. Staff's investigation revealed that this is likely the case for the Comanche 3 2020 outages.

12. While the Company's actions in response to the event are commendable, especially the engaging of outside consultants to assist in determining the cause and corrective actions to mitigate future incidences, it is not clear that these actions provide adequate assurance that a similar incident will not occur in the future.

13. Staff also states that its investigation indicates that reduced attention to O&M activities likely contributed to the recent Comanche 3 extended outages.

14. As a part of its report, Staff recommends that certain aspects of the investigation should be included in upcoming proceedings before the Commission. These include modeling of Comanche 3 in the 2021 Electric Resource Plan and Clean Energy Plan proceedings; 2020 Electric Commodity Adjustment (ECA) Prudence Review; Phase I Electric Rate Proceeding; and future depreciation studies. These proceedings will generally address how costs resulting from the outages and corrective actions will be recovered from ratepayers, as well as the long-term viability of Comanche 3 as part of Public Service's generation mix.

15. Staff provides an extensive analysis of the costs of the various incidents, including repair costs and replacement power costs as well as insurance coverage of portions of these costs.

16. As a part of its report, Staff recommends that the Commission require additional reporting from Public Service, including quarterly status reports on actions recommended by its

own investigatory teams, and monthly reports for October through May documenting unplanned outages for Comanche 3.

D. Discussion

17. Staff provides a thorough list of corrective actions Public Service has indicated that it will make. However, we find that it is important for Public Service itself to provide a response to affirmatively state how it will address future plant reliability, and what changes it plans to make to its systems, management, and operations, with proposed timelines, to correct the problems identified in the report. We therefore require Public Service to file a written response to Staff's report within 30 days to address this future plant reliability issue. We will address Staff's recommended reporting requirements after we receive Public Service's response.

18. We are also concerned that Staff presented a substantial amount of information as confidential, much of which comes from the three third party reports, and we have no protective orders or information in this proceeding as to why the information is held as confidential. Therefore, we require Public Service to file within 30 days, the three reports from Fleet Engineering, Structural Integrity Associates, and General Electric in this proceeding, as well as the Xcel Human Performance Team Analysis, and include a motion for protective order for any proposed confidential treatment.

II. ORDER

A. It Is Ordered That:

1. Public Service Company of Colorado (Public Service) shall file a written response to Commission Staff's report within 30 days to address future plant reliability, consistent with the above discussion.

2. Public Service shall file the three reports from Fleet Engineering, Structural Integrity Associates, and General Electric in this Proceeding, as well as the Xcel Human Performance Team Analysis, in this Proceeding, consistent with the above discussion. Public Service shall include a motion for protective order for any proposed confidential information.

3. This Decision is effective on its Mailed Date.

**B. ADOPTED IN COMMISSIONERS' WEEKLY MEETING
March 24, 2021.**

(S E A L)



ATTEST: A TRUE COPY

Doug Dean,
Director

THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF COLORADO

ERIC BLANK

JOHN GAVAN

MEGAN M. GILMAN

Commissioners