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REPORT

Errata - Opening Testimony and Evidence

Willow Rock Energy Storage Center (21-AFC-02)

Submitted by:

GEM A-CAES LLC

Submitted by:

WSP USA Inc.

401 B Street, Suite 1650, San Diego, California, USA 92101

August 2025

The WRESC will be capable of operating on a 24 hours per day, 7 days per week, and 365 days a year with an approximately 50-year lifespan. WRESC will typically cycle between Charging Mode (compression/energy storage) lasting approximately 14 hours and Discharging Mode (decompression/power production) lasting 8 hours at nameplate capacity.

During Charging Mode, electric power will be drawn from the grid (typically off-peak) to run the all-electric air compressors. Compressed air will be injected into a water-filled subterranean cavern displacing the cavern water upward into the hydrostatically compensating reservoir. Heat generated during the compression process will be recovered to heat water in a closed loop thermal storage system, with hot water stored in aboveground spherical tanks (spheres). Upon completion of the charging cycle, the system will be available to generate electricity.

During the Discharge Mode, water from the hydrostatically compensating reservoir will be allowed to flow down into the subterranean cavern, displacing the stored compressed air which will be expanded in power turbines to generate electricity for up to 8 or more hours. Hot water recovered and stored in the aboveground spheres during the charging cycle will be used to reheat the expanding air at intermediate turbine stages to facilitate higher efficiency power generation. During the compression process, water vapor entrained in the compressed air will be condensed and recycled. Dry air exiting the power turbines will be discharged to the atmosphere through four stacks, one serving each power generation train. No fossil fuels will be required to operate the Willow Rock facility

B. Facility Location

Willow Rock will be located in unincorporated Kern County (County), approximately 4 miles north of Rosamond, California. The WRESC site is within the southeast quarter of Section 33 of Township 10 North, Range 12 West.

The approximately 88.6-acre WRESC site is located on the western portion of an approximately 112-acre parcel with Assessor's Parcel Number (APN) 431-022-13 that is bisected by Sierra Highway and the Union Pacific Railway. The eastern portion of APN 431-022-13 is not included in the project boundary and will remain undeveloped. The WRESC site is bounded on the north and west by undeveloped property, on the east by Sierra Highway, and on the south by Dawn Road approximately 1,800 feet east of the State Route 14 corridor. Additional parcels adjacent to the WRESC site within the project boundary may be used for temporary parking, construction laydown, or construction of an architectural berm.

The WRESC site is currently proposed on undeveloped land in an area zoned Exclusive Agriculture (A) District. The area surrounding the project boundary is largely undeveloped with very sparse residential development; the nearest residence is approximately 0.8 miles northwest of the northwest corner of the WRESC site.

C. Key WRESC Features

WRESC includes the following key features:

- A-CAES Energy Storage Process, Cooling Systems and Electric Transmission
  - All-electric-motor-driven air compressors configured in four trains, totaling nominally 500 MW net
  - Air-powered turbine generators with air discharge stacks
  - Heat extraction and recovery main process heat exchangers
  - Thermal storage system using water
  - Electric, air-cooled heat exchangers

- Hydrostatically compensating surface reservoir with liner and interlocking shape floating cover
- Aboveground piping pipe racks and filter houses
- Underground compressed air storage cavern
- Interconnecting shafts for movement of compressed air and water to and from the cavern
- Optional permanent aboveground architectural berm for onsite re-use of excavated cavern rock[1]
- Approximately 19-mile long 230 kV single-circuit, double-conductor bundle generation-tie (gen-tie) line interconnecting to the SCE Whirlwind Substation with a preferred gen-tie route and alternate route options
- Approximately 186 transmission poles

- Operation and Maintenance Facilities, Ancillary Support Systems and Other Features
  - Site stormwater drainage system and stormwater percolation/evaporation pond
  - Water supply from adjacent existing Antelope Valley East Kern Water Agency's supply pipeline
  - Fire detection and fire monitoring system
  - Firewater tank and fire suppression system
  - Electric and Diesel-fired backup emergency fire pump
  - Diesel-fired emergency backup power supply engines to maintain critical loads in the event of a loss of power
  - Combined Office, Control Room, and Maintenance Building
  - Employee and visitor parking area with electric vehicle charging ports and landscaping
  - Primary and secondary entrances with security access gates and site perimeter fencing
  - Permanent plant access roads within the WRESC
  - Extension/upgrades to Dawn Road between the State Route (SR) 14 interchange and Sierra Highway
  - Unpaved access road for portions of the gen-tie line corridor that do not have established access

[1] Approximately 1.3 million cubic yards of crushed rock (accounting for swell and void space) would be extracted during construction of the cavern. The WRESC will include options for managing the extracted rock that may be implemented alone or in any combination, including (a) permanent onsite storage in the form of an architectural berm around portions of the WRESC; (b) off-taker transport for commercial use; and (c) off-taker transport for permanent offsite storage. The size of the potential architectural berm will depend on the quantity of rock.

- Exhibit 1020, Queue Cluster 13 Phase II – Appendix C (TN 247179)
- Exhibit 1021, Queue Cluster 13 Phase II – Appendix D (TN 247180)
- Exhibit 1022, Queue Cluster 13 Phase II – Appendix F (TN 247181)
- Exhibit 1023, QC13 Phase II Appendix L - Subsynchronous Control Interaction Screening Assessment Report (TN 247182)
- Exhibit 1024, Queue Cluster 13 Phase II Interconnection Study Report (TN 247183)
- Exhibit 1025, Supplemental AFC Cover Letter and Data Adequacy Worksheets (TN # 254774), March 1, 2024.
- Exhibit 1033, Supplemental Application for Certification, Willow Rock Energy Center Volume I, Part A (21-AFC-02) (TN 254806), March 1, 2024.
- Exhibit 1032, Supplemental Application for Certification, Willow Rock Energy Center Volume I, Part B (21-AFC-02) (TN 254805), March 1, 2024
- Exhibit 1070, Willow Rock Data Adequacy Response (TN 256622), May 3, 2024
- Exhibit 1071, 2022 Generator Interconnection Reassessment Report Northern Area Final Report (TN 256824), May 2, 2024
- Exhibit 1072, 2022 Generator Reassessment Report (TN 256825), May 2, 2024
- Exhibit 1073, QC13 Phase 2 Study Report Attachment #2 Updated for 2022 Reassessment (TN 256826), May 2, 2024
- Exhibit 1155, Willow Rock Preliminary Staff Assessment Comments Report (TN 264316), June 16, 2025
- Exhibit 1119, Willow Rock Data Request Set 3 Response (TN 259675), October 23, 2024
- Exhibit 1127, Attachment DR84-1_Confidential (TN 260240), October 28, 2024
- Exhibit 1130, Attachment DR67 Large Generator Interconnection Agreement (TN 260243), October 23, 2024
- Exhibit 1132, Willow Rock Data Request Set 5 Responses Report (TN 260808), December 23, 2024
- Exhibit 1135, Willow Rock CURE Data Request 2 Response (TN 261315), January 27, 2025
- Exhibit 1155, Willow Rock Preliminary Staff Assessment Comments Report (TN 264316), June 16, 2025
- Willow Rock Data Adequacy Response, Attachment TSD-1 (Exhibit number and TN to be assigned)

All of the facts contained in this testimony (including all referenced documents) are true and correct to the best of our knowledge and belief. To the extent this testimony contains opinions, such opinions reflect our best professional judgement. We make these statements and render these opinions freely and under oath for the purpose of constituting sworn testimony in this proceeding.

- Exhibit 1033, Supplemental Application for Certification, Willow Rock Energy Center Volume I, Part A (21-AFC-02) (TN 254806), March 1, 2024
- Exhibit 1112, Willow Rock CURE Data Request Set 1 Response (TN 259338), September 27, 2024
- Exhibit 1119, Willow Rock Data Request Set 3 Response (TN 259675), October 23, 2024
- Exhibit 1120, Willow Rock Data Request Set 4 Responses (TN 259736), October 28, 2024
- Exhibit 1132, Willow Rock Data Request Set 5 Responses Report (TN 260808), December 23, 2024
- Exhibit 1135, Willow Rock CURE Data Request 2 Response (TN 261315), January 27, 2025
- Exhibit 1155, Willow Rock Preliminary Staff Assessment Comments Report Comments - Willow Rock Preliminary Staff Assessment Comments Report (TN 264316), June 16, 2025
- Exhibit 1040, Hi Res Figures V1 File 1 of 2 (TN 254813), March 4, 2024

All of the facts contained in this testimony (including all referenced documents) are true and correct to the best of our knowledge and belief. To the extent this testimony contains opinions, such opinions reflect our best professional judgement. We make these statements and render these opinions freely and under oath for the purpose of constituting sworn testimony in this proceeding.

II. Summary of Testimony

A. Affected Environment

The proposed project would be located in the southeastern portion of Kern County on an undeveloped site.

During the construction, commissioning and operation of the facility, workers may be exposed to various surface and underground hazards such as silica dust, infectious disease such as Valley Fever, increase levels of radiation, loud noises, moving equipment, trench/excavation accidents, electrical hazards, dust hazards, use of explosives, and confined space incidents. This could result in falls, trips, burns, lacerations, being struck by objects, and other potential injuries.

To protect the safety and health of workers during the construction and operation, health and safety programs will be implemented to mitigate hazards and comply with applicable regulations. Periodic audits will be performed by qualified individuals to determine whether proper work practices are being used to mitigate hazardous conditions and to evaluate regulatory compliance.

Construction and operation of the project will be conducted in accordance with all applicable federal, state and local LORS relating to worker health and safety.

B. Potential Construction and Operational Impacts

Workers at the WRESC will be exposed to plant construction, operation conditions, and activities that pose potential safety hazards. A hazard analysis was conducted to evaluate the hazards and assess control measures.

Hazards identified during construction include motor vehicle and heavy equipment use, forklift operation, trenching and excavation, working at heights, cranes and lifting, working with flammable or combustible liquids, hot work, electrical systems, potential exposure to valley fever, working near water and confined space entry. General construction activities include hazards such as use of portable power tools, ergonomic hazards, heat and

structures within a one mile radius (or other distance as recommended by either the KCFD Chief or the Kern County Sheriff's Office (KCSO).

The applicant recommends that COC Worker Safety-8, specifically related to development of a detailed and comprehensive Construction Underground Fire Protection Plan, be revised to coincide with underground construction activities. As such, it is suggested, at least 90 days prior to the start of site mobilization underground construction activities, that the project owner provide to KCFD a copy of the plan for review and comment and to the CPM for review and approval.

COC Worker Safety-11 requires the project owner to install various infrastructure at site including emergency access gates, fire and heat sensors, fire water flow and CCTV cameras. The applicant recommends that this condition be revised to grant the CPM the flexibility to make certain changes based on site and project-specific conditions.

IV. Proposed Licensing Conditions

The Applicant agrees with Worker Safety and Fire Protection Conditions of Certification Worker Safety-1 through Worker Safety-12, with the modifications described above.

4.0 ENVIRONMENTAL IMPACT ASSESSMENT

4.1 Air Quality and Climate Change and Greenhouse Gas Emissions

I. Introduction

A. Names: Gregory Darvin, David Stein, Curt Hildebrand, Victor Grille and Andrew McGillis

B. Qualifications: The panel's qualifications are as noted in their resumes contained in Appendix A.

C. Prior Filings: In addition to the statements herein, this testimony incorporates by reference the following documents submitted in this proceeding:

- Exhibit 1025, Supplemental AFC Cover Letter and Data Adequacy Worksheets (TN 254774), March 1, 2024.
- Exhibit 1032, Supplemental Application for Certification, Willow Rock Energy Center Volume I, Part B (21-AFC-02) (TN 254805), March 1, 2024.
- Exhibit 1033, Supplemental Application for Certification, Willow Rock Energy Center Volume I, Part A (21-AFC-02) (TN 254806), March 1, 2024.
- Exhibit 1039, Supplemental Application for Certification, Willow Rock Energy Center Volume II, Appendix 1A-51F (TN 254812), March 4, 2024.
- Exhibit 1153, Consolidated Email Responses to CEC Staff on Lahontan's February 26, 2025, Request for Additional Information (TN# 261932), (TN 262349), March 25, 2025.
- Exhibit 1052, Eastern Kern Air Pollution Control District (EKAPCD) Application (TN 254897), March 7, 2024.
- Exhibit 1054, EKAPCD Determination of Completeness (TN 255273), March 26, 2024.
- Exhibit 1055, EKAPCD Preliminary Determination of Compliance (TN 255594), April 9,2024).
- Exhibit 1057, Eastern Kern Air Pollution Control District Notice of Final Determination of Compliance (FDOC) (TN 256372), May 14, 2024.

IV. Proposed Licensing Conditions

The Applicant agrees with the Hazards, Hazardous Materials/Waste and Wildfire Conditions of Certification HAZ-1 through HAZ-8 as proposed in the FSA.

4.7 Land Use, Agriculture, and Forestry

I. Introduction

A. Names: Kyralai Duppel, Jeremy Paris, Curt Hildebrand, Victor Grille and Cody Niehus

B. Qualifications: The panel's qualifications are as noted in their resumes contained in Appendix A.

C. Prior Filings: In addition to the statements herein, this testimony incorporates by reference the following documents submitted in this proceeding:

- Exhibit 1004, Gem Data Adequacy Master Response No. 1 (TN 242776), April 25, 202
- Exhibit 1025, Supplemental AFC Cover Letter and Data Adequacy Worksheets (TN 254774), March 1, 2024.
- Exhibit 1032, Willow Rock Energy Storage Center SAFC - Volume 1, Part B (TN 254805), March 1, 2024
- Exhibit 1033, Willow Rock Energy Storage Center SAFC - Volume 1, Part A (TN 254806), March 1, 2024
- Exhibit 1039, Supplemental Application for Certification, Willow Rock Energy Center Volume II, Appendix 1A-51F (TN 254812), March 4, 2024.
- Exhibit 1034, Supplemental Application for Certification, Willow Rock Energy Center Volume II, Appendix 56A-510A (TN # 254807), March 4, 2024.
- Exhibit 1034, Supplemental Application for Certification, Willow Rock Energy Center Volume II, Appendices 5.6A-5.10A (21-AFC-02) (TN 254807), March 4, 2024
- Exhibit 1040, Hi Res Figures V1 File 1 of 2 (TN 254813), March 4, 2024
- Exhibit 1041, High Resolution Figures WRESC SAFC 2 of 2 (TN 254814), March 4, 2024
- Exhibit 1058, Appendix 1D Site Related Property Owners and Relationship to Project Owner (TN 256448) March 4, 2024
- Exhibit 1059, Appendix 1B Property Owner's Addresses and Map (TN 256449) March 4, 2024
- Exhibit 1074, Attachment ES-1 Property Owners List (TN 256860) May 31, 2024
- Exhibit 1111, Willow Rock Data Request Set 2 Response, Willow Rock Energy Center, (TN 259220), September 19, 2024
- Exhibit 1138, Willow Rock CEC Docket Data Request Set 6 Attachment DR124-1 Cover Sheet (TN 261515), January 31, 2025
- Exhibit 1155, Willow Rock Preliminary Staff Assessment Comments Report Comments - Willow Rock Preliminary Staff Assessment Comments Report (TN 264316), June 16, 2025.

4.10 Socioeconomics and Environmental Justice

I. Introduction

A. Names: Jeremy Paris, Jimena Cadillo-Aldama, Kyralai Duppel, Bakai Ruslanbek Uulu, Curt Hildebrand, Victor Grille and Andrew McGillis

B. Qualifications: The panel's qualifications are as noted in their resumes contained in Appendix A.

C. Prior Filings: In addition to the statements herein, this testimony incorporates by reference the following documents submitted in this proceeding:

- Exhibit 1025, Supplemental AFC Cover Letter and Data Adequacy Worksheets (TN 254774), March 1, 2024.
- Exhibit 1032, Supplemental Application for Certification, Willow Rock Energy Center Volume I, Part B (21-AFC-02) (TN 254805), March 1, 2024.
- Exhibit 1033, Supplemental Application for Certification, Willow Rock Energy Center Volume I, Part A (21-AFC-02) (TN 254806), March 1, 2024.
- Exhibit 1034, Supplemental Application for Certification, Willow Rock Energy Center Volume II, Appendices 5.6A-5.10A (21-AFC-02) (TN 254807), March 4, 2024.
- Exhibit 1090, Willow Rock Data Request Set 1 Response Report (TN #258681), August 23, 2024
- Exhibit 1070, Willow Rock Data Adequacy Responses (TN 256622), May 31, 2024
- Exhibit 1155, Willow Rock Preliminary Staff Assessment Comments Report Comments - Willow Rock Preliminary Staff Assessment Comments Report (TN 264316), June 16, 2025.

All of the facts contained in this testimony (including all referenced documents) are true and correct to the best of our knowledge and belief. To the extent this testimony contains opinions, such opinions reflect our best professional judgement. We make these statements and render these opinions freely and under oath for the purpose of constituting sworn testimony in this proceeding.

II. Summary of Testimony

A. Affected Environment

The area surrounding the WRESC is sparsely populated, with approximately 24,376 residents living within a 10-mile radius of the project site, based on U.S. EPA EJScreen Mapper data. Of this total population, about 60 percent identify as people of color (POC), according to the 2020 Decennial Census. Within this 10-mile buffer, six census tracts meet the Council on Environmental Quality (CEQ) threshold for identifying minority or POC populations, meaning more than half of the residents in those tracts identify as POC.

In terms of income distribution, American Community Survey (ACS) data from 2017–2021 estimate that roughly 31,776 people within the same 10-mile area have poverty status determined, and approximately 35 percent of that population is considered low-income. While federal environmental justice (EJ) guidance does not provide a definitive threshold for identifying low-income populations, this analysis used the same 50 percent benchmark applied to POC populations. Based on this metric, no census tracts within the 10-mile radius meet the criteria for being classified as a low-income population under this analysis.

IV. Proposed Licensing Conditions

The Applicant agrees with the Solid Waste Management Conditions of Certification Solid Waste-1 as proposed in the FSA.

4.12 Transmission Line Safety and Nuisance

I. Introduction

A. Names: David Stein, Curt Hildebrand, Andrew McGillis, Cavan Lee, Victor Grille and Cody Niehus

B. Qualifications: The panel's qualifications are as noted in their resumes contained in Appendix A.

C. Prior Filings: In addition to the statements herein, this testimony incorporates by reference the following documents submitted in this proceeding:

- Exhibit 1025, Supplemental AFC Cover Letter and Data Adequacy Worksheets (TN # 254774), March 1, 2024.
- Exhibit 1033, Supplemental Application for Certification, Willow Rock Energy Center Volume I, Part A (21-AFC-02) (TN 254806), March 1, 2024.
- Exhibit 1032, Supplemental Application for Certification, Willow Rock Energy Center Volume I, Part B (21-AFC-02) (TN 254805), March 1, 2024.
- Exhibit 1040, Hi Res Figures V1 File 1 of 2 (TN 254813), March 4, 2024
- Exhibit 1041, High Resolution Figures WRESC SAFC 2 of 2 (TN 254814), March 4, 2024
- Exhibit 1115, Attachment DR26-1-Utility Pole Locations Map Book (TN 259490), September 27, 2024
- Exhibit 1155, Willow Rock Preliminary Staff Assessment Comments Report (TN 264316), June 16, 2025
- Exhibit 1127, Attachment DR84-1_Confidential (TN 260240) [includes - Project components, proposed access roads and proposed transmission line poles], October, 28, 2024
- Exhibit 1070, Willow Rock Data Adequacy Response (TN 256622), May 3, 2024
- Willow Rock Data Adequacy Response, Attachment TSSN-1 (Exhibit number and TN to be assigned)
- Willow Rock Data Request Set 2 Response, Attachment DR35-1 (Exhibit number and TN to be assigned)
- Exhibit 1119, Willow Rock Data Request Set 3 Response (TN 259675), October 23, 2024
- Exhibit 1132, Willow Rock Data Request Set 5 Responses Report (TN 260808), December 23, 2024

All of the facts contained in this testimony (including all referenced documents) are true and correct to the best of our knowledge and belief. To the extent this testimony contains opinions, such opinions reflect our best professional judgement. We make these statements and render these opinions freely and under oath for the purpose of constituting sworn testimony in this proceeding.

II. Summary of Testimony

A. Affected Environment

B. Qualifications: The panel's qualifications are as noted in their resumes contained in Appendix A.
C. Prior Filings: In addition to the statements herein, this testimony incorporates by reference the following documents submitted in this proceeding:

- Exhibit 1000, Section 6_Alternatives_Gem Energy Storage Center (TN 240751-23), December 1, 2021.
- Exhibit 1002, Joint Response of Pecho and Gem Supporting NOI Exemption and Request for Committee Order (TN 241503), February 9, 2022.
- Exhibit 1003, Joint Reply to CEC Staff's Response to Applicants' Filing Requesting Exemption from the NOI Process (TN 242224), March 8, 2022.
- Exhibit 1004, Gem Data Adequacy Master Response No. 1 (TN 242776), April 25, 2022.
- Exhibit 1006, Order and Final Commission (TN 243543), June 15, 2022.
- Exhibit 1033, Supplemental Application for Certification, Willow Rock Energy Center Volume I, Part A (21-AFC-02) (TN 254806), March 1, 2024.
- Exhibit 1032, Supplemental Application for Certification, Willow Rock Energy Center Volume I, Part B (21-AFC-02) (TN 254805), March 1, 2024. Exhibit 1025, Supplemental AFC Cover Letter and Data Adequacy Worksheets (TN # 254774), March 1, 2024.
- Exhibit 1000, Section 6_Alternatives_Gem Energy Storage Center (TN 240751-23), December 1, 2021
- Exhibit 1090, Willow Rock Data Request Set 1 Response Report (TN 258681), August 23, 2024.
- Exhibit 1135, Willow Rock CURE Data Request 2 Response (TN 261315) January 27, 2025.
- Exhibit 1155, Willow Rock Preliminary Staff Assessment Comments Report (TN 264316), June 16, 2025.

All of the facts contained in this testimony (including all referenced documents) are true and correct to the best of our knowledge and belief. To the extent this testimony contains opinions, such opinions reflect our best professional judgement. We make these statements and render these opinions freely and under oath for the purpose of constituting sworn testimony in this proceeding.

II. Summary of Testimony

A. Project Objectives

The WRESC will be a nominal 520-megawatt (MW) gross (500 MW net) and 4,160 megawatt-hour (MWh) gross (4,000 MWh net) facility using Hydrostor, Inc.'s (Hydrostor's) proprietary, advanced compressed air energy storage (A-CAES) technology located in unincorporated Kern County (County), approximately four miles north of Rosamond, California. The WRESC site is within the southeast quarter of Section 33 of Township 10 North, Range 12 West. Energy stored at the WRESC will be delivered to Southern California Edison's (SCE's) Whirlwind Substation located southwest of the WRESC at the intersection of 170th Street W and Rosamond Boulevard, via a new approximately 19-mile 230-kilovolt (kV) generation-tie (gen-tie) line.

The WRESC has been designed to deliver energy and reliability services with no fossil fuel combustion or related air quality impacts. The Project will be one of the first commercial applications of Hydrostor's Advanced Compressed Air Energy Storage (A-CAES) technology at this scale. The WRESC will combine dispatchable, operationally flexible, and efficient energy generation with state-of-the-art A-CAES technology to facilitate the integration of variable renewable energy sources on the grid and to meet the needs of California and the region for reliability services.

The WRESC basic project objectives are the following:

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