

Engineering, Operations, & Technology Committee Colorado River Aqueduct High-Voltage Transformers Replacement Project

Item 8-1 May 12, 2025 Item 8-1 Colorado River Aqueduct High Voltage Transformers Replacement

Subject

- Award a \$131 million procurement contract to Siemens Energy Inc. to furnish 35 high voltage power transformers
- Authorize an increase of \$6.5 million to an agreement with HDR Engineering Inc. for final design services

Purpose

This project will enhance the reliability of Colorado River Aqueduct (CRA) deliveries by replacing key elements of its electric power systems

Recommendation and Fiscal Impact

Award a procurement contract and amend an agreement for final design services to replace the CRA transformers Fiscal Impact 26/28 – \$5 million Total Fiscal Impact – \$149.2 million

Budgeted

Project Location



Typical Site Layout



Background

- Facilities initially constructed in 1939
- 35 transformer units
 - 15 in service since 1940
 - 20 in service since late 1950s
- Major maintenance performed in late 1980's with CRAPPR
- Failure will impact water deliveries
 - Recent Hinds Pumping Plant bushing leak forced CRA low flow period



Hinds Pumping Plant

CRA Transformer Condition Assessment Program

- Assessments include:
 - Online & Offline testing
 - Offline testing performed every 5 years
 - Winding resistance, power factor, turns ratio, etc.
 - Online testing performed every 6 months
 - Oil quality & sampling
 - Diagnostic testing
 - Triggered by abnormal results
 - Increased sampling and/or internal inspection
- Perform repairs based on results
 - No local shop can repair 230 kV units.
 - Current repair times quoted approx. 2 years



Staff Installing Refurbished Intake 2C Transformer Unit (Removed 10/19, Installed 6/20, Energized 2/21)

Planned Improvements

- Replace 35 transformers at 5 CRA pumping plants
- Upgrade foundations to meet current seismic standards
- Enhance physical security features
- Construct secondary containment systems
- Replace transformer cranes at two plants



Gene Pumping Plant



Iron Mtn. Pumping Plant

Installation Methodology

- All 35 units will be delivered in advance & stored onsite for installation
- Transformers will be replaced one unit at a time across all plants
 - Provides 8-pump flow flexibility
 - Ensures alignment with water supply needs
- 5 transformers will be replaced per year
 - Coordination required with annual CRA shutdowns to minimize impacts on plant operations



Eagle Mtn. Pumping Plant



Intake Pumping Plant

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Alternatives Considered

- Considered Alternative:
 - Replace 7 single-phase units with 3 three-phase units
 - Potential cost savings in procurement & maintenance
 - Requires major electrical facility modifications
- Selected Alternative:
 - Retain single-phase configuration
 - Minimize construction & operational impacts

Procurement Approach

- Apr '21: Initiated preliminary design
- Mar '22: Prequalified 6 transformer manufacturers & conducted extensive vendor outreach
- May '23: Completed preliminary design & advertised transformer procurement package
 - No responsive bids received due to:
 - Limited pool of manufacturers meeting technical requirements
 - Reluctance to provide upfront pricing amid supply chain disruptions & material price volatility
 - Preference for repeat customers

Best-Value Procurement

- RFP No. 1360 (Specifications No. 1897)
 - Direct negotiation of contract terms with supplier
 - No advantage in competitive bidding
 - Metropolitan Admin. Code Section 8150
- Award of procurement contract
 - Siemens Energy Inc.
 - Amount: \$131 M
 - Cost deemed reasonable



Rendering of New Siemens Transformer

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Scope of Work (Procurement)

- Siemens Energy Inc.
 - Fabricate & deliver 35 high-voltage power transformers
 - Off-load & prepare units for storage
 - Provide training
- Metropolitan
 - Fabrication inspection & functional testing
 - Submittal reviews & response to RFIs
 - Site preparation for transformer storage
 - Field monitoring & testing
 - Project management & contract administration

Negotiations Highlights

- Reduced upfront deposit from 10% to 3%
- Lowered milestone payments prior to delivery
- Purchased extended warranty coverage (8-year term)
- Increased cap on liquidated damages with more favorable limits
- Siemens to provide a 100% performance bond

Change Order Authority

- Change order authority determined by Admin. Code (Section 8123)
 - Procurement contract: \$6.5 M (5%)
- Request for additional change order authority
 - Price adjustment formula (Industry standard since 2020)
 - Based on published indices for currency, labor & materials
 - 7% annual escalation based on historical trends
 - Potential for de-escalation (Metropolitan receives credit)
 - Unit pricing adjusted 6 months before delivery
 - Invoiced upon delivery of each unit
 - Additional authority: \$36 M
- Total authority: \$42.5 M

Price Adjustment Overview

- Adjustment calculated per unit 6 months before delivery
- Adjusted cost invoiced at time of delivery
- Formula accounts for:
 - Base Price
 - EUR/USD Exchange Rate
 - Austrian Consumer Price Index
 - Labor Wages
 - Materials (copper, steel, core sheets)

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HDR Engineering Inc. - Agreement (Final Design)

- Competitively selected under RFP 1252
 - Completed preliminary design
- Recommend amendment
 - Perform final design
 - Drawings & technical specs
 - Construction cost estimate
 - Construction sequencing plan
 - Provide technical support for procurement
 - Review fabrication drawings
 - Amendment amount: \$6.5 M
 - New NTE amount: \$8.2 M
- SBE Participation level: 25%

Allocation of Funds

Metropolitan Labor		
Final Design	\$	1,500,000
Owner Costs (Proj. Mgmt., Contract Admin., Envir. Support)		1,550,000
Construction Inspection & Support		758,000
Force Construction		244,000
Submittals Review, Tech. Support, Record Dwgs.		435,000
Professional/Technical Services		
HDR Engineering Inc.		6,500,000
Fabrication Inspection Consultant		920,000
Geotechnical Services Consultant		580,000
Other Consultants (Environ., Haz. Matls., & Tech		250,000
Contracts		
Siemens Energy Inc.		131,000,000
Remaining Budget		5,463,000
	Total \$	149,200,000*

*Includes \$138.8 M for procurement & \$10.4 M for final design. The total estimated cost to complete the project is anticipated to range from \$250 M to \$300 M.

Project Schedule



Board Options

- Option #1
 - a. Award a \$131 million procurement contract to Siemens Energy Inc. to furnish 35 high-voltage power transformers;
 - b. Authorize the General Manager to execute change orders for the CRA transformer procurement contract up to an aggregate amount not to exceed \$42.5 million; and
 - c. Authorize an increase of \$6.5 million to an existing agreement with HDR Engineering Inc. for a new not-to-exceed amount of \$8.2 million for final engineering design services to replace the high-voltage power transformers at all five CRA pumping plants.

• Option #2

Do not proceed with the project at this time. Staff will continue to monitor the operational status of the transformers.

Staff Recommendation

• Option #1

