

## **SOUTH DAKOTA SCIENCE AND TECHNOLOGY AUTHORITY**

### **REQUEST FOR PROPOSAL 2023-40**

#### ***Dewatering Control System Recapitalization***

|                             |                                   |
|-----------------------------|-----------------------------------|
| Register for Site Visit:    | 12/29/2023 (by close of business) |
| Mandatory Site Visit:       | 1/3/2024                          |
| Questions Submitted:        | 1/10/2024 (by close of business)  |
| Questions & Answers Posted: | 1/12/2024                         |
| Proposal Due Date:          | 1/19/2024 (by 2:00 P.M.)          |

#### **1. PURPOSE:**

This Request for Proposal (RFP) is issued by the South Dakota Science and Technology Authority (SDSTA) for Design and Construction Services for the Dewatering Control System Recapitalization project. An individual firm will be selected for a fixed price contract based on the total of the quantities and unit costs listed on the project bid sheet, demonstrated competence, and qualifications for the required work. Documents included with this RFP include:

- A. Draft Contract 2023-40 Agreement for Construction
- B. Draft Construction General Conditions Agreement & SDSTA Terms and Conditions
- C. Bid Security Form (submitted with proposal)
- D. Payment and Performance Bond Form (submitted after Contract award)
- E. SDSTA Bid Sheet
- F. SDSTA Documents
  - a. Shuttle Route, Parking, and Work Areas – Photos representing the Offeror's shuttle route and designated parking areas. Photos representing work areas where new control cabinets will be installed.
  - b. Specifications – Technical specifications describing the physical, functional, and performance characteristics of the new dewatering control system.
  - c. Drawings – Technical specification drawings of the new Process Monitoring HMI Cabinet and new Pump Station Controller Cabinet.
  - d. Existing HMI and SCADA Screens for Dewatering – Photos representing existing screens used for monitoring and controlling the dewatering process.
- G. Contractor Environmental, Safety and Health (ESH) Qualification Questionnaire

#### **2. PROJECT BACKGROUND:**

The South Dakota Science and Technology Authority (SDSTA) reopened the historic Homestake Mine to develop a world class underground science research facility, the Sanford Underground

Research Facility (SURF). To reopen and operate the underground portion of the facility, dewatering, water treatment, and environmentally safe water discharge are required. The dewatering system at SURF is responsible for removing all the natural water inflows that accumulate throughout the vast underground workings of the former mine. The pumping system removes water from the underground using a deep pool pump and (4) pump rooms. The water is pumped sequentially in “lifts” from the deep pool to pump rooms located at the 5000, 3650, 2450, and 1250 levels and finally to the Wastewater Treatment Plant (WWTP).

Each of SURF’s pump rooms consist of inlet/discharge lines, a collection reservoir/sump, a 700-hp pump to move the water, a medium voltage motor soft starter, and a GE Fanuc 90-30 PLC cabinet with GE QuickPanel HMI. The GE control system components communicate with a GE iFIX SCADA system. Currently, all of the pump room configurations at SURF have remained unchanged since Homestake’s closure in the early 2000s. The piping, pumps, and electrical infrastructure within these rooms are in need of replacement.

A separate series of projects are planned for execution between 2024 and 2026 to rehabilitate the four underground pump rooms. These projects focus on replacing the pumps, electric motors, motor starters, instrumentation cables, power cables, and water piping associated with each pump station. The Dewatering Control System Recapitalization project will focus on replacing the obsolete industrial control panels in these underground pump rooms and on installing new process monitoring HMIs and dewatering SCADA system on surface. The estimated cost of this control system recapitalization project is between \$345,000 and \$524,000.

### 3. EXISTING CONDITIONS:

#### **Work Area, General Access, Crew Size, & Sanitation:**

Photos of the work areas are shown in **Attachment A**. The specific areas include:

- Surface:
  - Process Monitoring HMI Cabinet Installation:
    - Wastewater Treatment Plant (WWTP), Sand Filter Building
    - Yates Hoist Building, Cage Hoist Operator Platform
    - Rounds Operational Center (ROC), Maintenance Shop
    - Ross Top, Vent Bag Building
    - Ross Guard Shack
  - SCADA Deployment:
    - Administration Building, IT Server Room
- Underground:
  - Pump Station Control Cabinet Installation:
    - 1250L Pump Room
    - 2450L Pump Room
    - 3650L Pump Room
    - 5000L Pump Room

The 3650L Pump Room (Figures 1 through 3) will be the first pump room rehabbed in 2024 as part of a separate recapitalization program. This means the 3650L Pump Room will likely be rehabbed before the dewatering control system is replaced. A photo of the current pump setup is provided to give Offerors a general idea of the environment that these pumps operate in. These three photos are provided for informational purposes only. As part of the rehab, all of the piping shown will be reconfigured, the existing pump control PLC cabinet will be relocated to a different wall, and instrumentation cabling will be replaced as needed. It is anticipated that the other three pump rooms will not be rehabbed by the time the dewatering control system is replaced.



Figure 1. 3650L Pump Room



Figure 2. 3650L Pump Room



Figure 3. 3650L Pump Room

The 5000, 3650, 2450, and 1250 levels can have up to 8 people on each level. These numbers are limited by the refuge chamber capacity and shall not be exceeded by the Offeror. Additionally, SDSTA will provide portable toilets on these levels (1 on each level) in cutouts near the Ross shaft. The Offeror will be allowed to use these portable toilets for the duration of the project. The toilets are pumped weekly. The offeror will be required to bring the toilet to the station so they can be transported to the surface for pumping and replacing the toilet once pumped. The 5000, 3650, 2450, and 1250 levels are not high-foot-traffic areas so the primary waste generated will be from the Offeror. The toilet on the 5000L is the only toilet that will be provided with a privacy enclosure.

#### **Other Utilities:**

- Electric – Each of the pump rooms contain 120 VAC receptacles powered from a 15 kVA transformer.
- Water (potable) – No potable water is available in the pump rooms. The Offeror will need to provide bottled drinking water for their workers.
- WiFi – The 5000L Ross Station and 3650L Ross Station have open WiFi access available.

#### **Offeror Parking:**

The Ross Shaft is currently the only access to the 5000L, 3650L, 2450L, and 1250L pump rooms. Parking and space surrounding the Ross Shaft is limited by all the existing construction activities happening on the surface and underground. The Offeror will be required to shuttle their workers to/from the Ross using the following arrangement:

- Offeror employees park their personal vehicles in the Administrative Parking Lot at the Yates Complex
- Employees board a shuttle (provided by the Offeror)
- Shuttle transports workers (approximately 1 mile) to the Ross Shaft
- Offeror parks shuttle in designated parking area and walks approximately 200 ft to the Ross Shaft cage for transportation underground.

The shuttle route and designated parking areas are shown in **Attachment A**. The Offeror will be required to leave the keys in the shuttle so it can be moved by SDSTA if needed.

Access to the 5000L, 3650L, 2450L, and 1250L pump rooms is provided by the Ross Shaft. The pump rooms are approximately 400 feet from the Ross Shaft Stations.

**Underground Pump Room Access via the Ross Shaft:**

The offeror will be required to work within the Ross cage times. The following cage time is available for offeror access to the underground pump rooms: Cage time down 7:30 a.m., Cage time up 4:30 p.m.

**Offeror Material Transportation to/from the Pump Rooms:**

- Offeror notifies/coordinates with SDSTA for load movement
  - 1 day notice for material/load transportation that fit inside the cage
- Offeror delivers materials within 20 ft of the Ross shaft (headframe/station)
- SDSTA loads conveyance with offeror's supplied loads
- SDSTA delivers loads at least 20 ft from the Ross Shaft (headframe/station)
- Offeror transports loads where needed
- For all cases the Offeror will be responsible for ensuring that the transported loads are packaged/bundled in manageable individual lots that can be easily loaded on the cage. SDSTA will not repackage contractor loads for transport underground.

**Material/Equipment Access:**

Rail access from the pump room to the Ross Shaft can be used to transport material and equipment into the pump room. SDSTA can supply the offeror with the following locomotive and rail cars for equipment & material transportation:

- 1 electric locomotive (Offeror will be trained in its operation)
- 4 timber trucks capable of hauling conduit
- 1 flat deck
- While more loads maybe available for movement on a case-by-case basis, the offeror shall plan on limiting the number of loads transported per day to
  - 4 timber trucks & 1 flat deck during day shift or
  - 4 timber trucks & 1 flat deck at the end of shift that can be moved by the night shift shaft crew



Figure 4. Flat Deck Cart

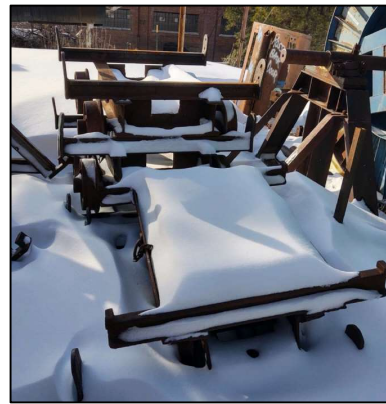


Figure 5. Timber Truck Cart

The Offeror will be required to provide powered equipment to assist with demolition and installation. With the legacy piping in place the largest pieces of powered equipment that can fit on the level are equivalent to a Bobcat MT100 walk behind and a Bobcat E10 mini excavator.

Additionally, all materials brought underground must fit inside the Ross Cage and be capable of transportation across the underground work level.

Ross Cage Limits:

- Height = 122 inches
- Width = 52.55 inches
- Length = 143.5 inches
- Payload = 13,000 lbs.

Transported Load Limits (tunnel limited assuming flat deck rail car):

- Width = 45 inches (some flexibility but wider items need to be checked)
- Height = 37.625 inches (Strict 1250L pump room limits)
- Length = 93 inches (some flexibility but wider items need to be checked & excludes pipe)

This will also require that all demoed materials be 11 ft in length or less and that all new materials for this project that are brought underground be limited to 11-ft lengths. The Offeror is ultimately responsible for determining the equipment that is needed to complete this project and ensuring that all items can fit inside the Ross Cage and travel to the pump rooms.

#### **Pump System Downtime:**

SDSTA relies on this pumping system to remove water from the underground. Limited functionality of the dewatering process should be maintained during construction and handoff to the new SCADA System. The Offeror shall be responsible for coordinating times with SDSTA for any disturbances to the process that may be necessary. It is anticipated that there will be no automatic control of a dewatering pump room while its control cabinet is being upgraded. Manual operation via a Hand-Off-Auto switch on the dewatering pump motor soft starter cabinet may be possible.

If complete pump system outages are necessary, Offerors must limit the combined pumping outages to no more than 120 calendar days. This will require Offerors to plan work efficiently to minimize system cutover. Outages must be built into the Offeror's project schedule. A minimum of two weeks' notice must be provided if changes to scheduled outages are needed.

#### **4. SCOPE OF WORK:**

This project's overarching Scope of Work is to rehabilitate the obsolete dewatering control system. Rehabilitation will be accomplished with the implementation of a new SCADA system and new control equipment, including pump station control cabinets and process monitoring HMI cabinets. A brief description of each Offeror provided product and service has been listed below. Notable requirements, characteristics, and constraints related to the new control system have also been listed below. Refer to **Attachment B** and **Attachment C** for requirements and additional details.

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**Products:**

Pump Station Control Cabinets

- Four new industrial control cabinets containing Allen Bradley PLCs and HMIs will be constructed for the pump rooms (1250L, 2450L, 3650L, and 5000L). These four control cabinets will be of the same design and will contain DIN rails, wiring ducts, terminal blocks, internal wiring, interposing relays, fuses, circuit breakers, HMIs for local control, and power supplies needed for supporting and connecting external devices to the PLCs. Uninterruptible Power Supplies (UPS) will be included to provide resiliency against power quality disturbances in SURF's electrical distribution system. These UPS devices will provide enough backup runtime (approx. 8-12 hours) for operations to safely enact contingency plans and monitor water levels during prolonged power outages. See pages 1-12 of **Attachment C** for the technical specification drawing of the new pump station control cabinets.

Process Monitoring HMI Cabinets

- Five new process monitoring HMI cabinets will be constructed and mounted at the WWTP, Yates Hoist Building, Ross Top, Ross Guard Shack, and the Rounds Operational Center. These five HMI cabinets will be of the same design and will include DIN rails, wiring ducts, terminal blocks, internal wiring, fuses, circuit breakers, and uninterruptible power supplies. These cabinets will be mounted near the existing GE HMI cabinets and will allow staff to monitor both the new and old dewatering control systems as they're being transitioned from old to new. See pages 13-17 of **Attachment C** for the technical specification drawing of the new process monitoring HMI cabinets.

Training & Development Cabinets

- One new industrial control cabinet with the same design as the pump station control cabinet will be constructed for SDSTA electrical staff to utilize as both a training and development platform for troubleshooting, modifying, maintaining, and expanding the pump station controllers in the future.
- One new HMI cabinet with the same design as the process monitoring HMI cabinet will be constructed for SDSTA electrical staff to utilize as both a training and development platform for troubleshooting, modifying, maintaining, and expanding the pump station controllers in the future.

**Services:**

Control System Design & Integration Service

The Offeror will develop the new rehabilitative design using SDSTA's technical specifications and collected information about the present dewatering control system design. In addition, the Offeror will be responsible for providing construction administration services

in the form of project management and technical oversight during project execution.

#### Control System Hardware Construction Service

The Offeror will be responsible for procuring the control panel materials and constructing the new control cabinets. The new control cabinets will be built in compliance with the UL Standard for Industrial Control Panels, UL 508A. The new control cabinets will bear an NRTL-listing mark identifying them as an “Industrial Control Panel.”

#### Control System Programming Service

The Offer will develop the programming (i.e. logic and operator screens) for the new PLCs, HMIs, and SCADA. The programming structure and methods will follow industry best practices (e.g., International Society of Automation). The HMI and SCADA display screen designs will also follow industry standards and best practices. Programming will include configuring data historians and alarm setpoints.

#### Control System Installation Service

After the new control panels have been constructed, they will be shipped to SURF, where they will be installed by the Offeror. An exclusion to this will be the Training & Development controllers, which will be installed by SDSTA staff.

#### Control System Commissioning Service

After each new product has been installed, the Offeror will commission each new product individually. The new dewatering control system will then be commissioned at the subsystem and system levels. Commissioning will include field verification and validation of the new dewatering system. Verifications will include checking the field wiring connections, calibration, and functionality of all sensors and devices connected to the new control panel products. Communications within the new control system and with external data interfaces will also be verified.

#### Control System Training Service

The Offeror will provide operations and maintenance training to SDSTA staff needed to operate, troubleshoot, maintain, and expand the new dewatering control system. Part of the training will include O&M manuals for all equipment supplied for the new control system and complete system documentation.

#### **Notable Requirements, Characteristics, and Constraints:**

- The new dewatering control system will need to be able to operate alongside the rest of the facility’s obsolete industrial control system as obsolete components are being phased out.
  - Even though this project is moving the dewatering control system over to a new system, SDSTA staff will need to access two separate SCADA

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- systems and process monitoring HMI panels to monitor and control the facility's industrial control system until all control systems have been replaced through follow-on control system recapitalization projects.
- Some data linkages (data interfaces) will be created between the new dewatering control system and the obsolete control system to help ease the transition.
  - Operations staff with SDSTA will receive training on the new control system and be given the proper software to troubleshoot and maintain the new control system.
  - This project is planned for execution during the year 2024.
    - The 3650L Pump Room is expected to be electrically & mechanically rehabilitated by the 3650L Pump Room Rehab project before this project executes.
    - The existing GE pump station control cabinet in the 3650L Pump Room will be removed (demolished) and replaced with a new Allen Bradley pump station control cabinet by the Offeror during the rehabilitation of the dewatering control system.
  - Pump rooms on the 1250L, 2450L, and 5000L are planned for electrical & mechanical rehabilitation between the years 2025 and 2028.
    - The new pump station control cabinets will be installed next to the existing GE pump station control cabinets at these pump rooms during the rehabilitation of the dewatering control system as part of this project's scope.
    - The existing control cabinets in these pump rooms will also be converted into marshaling cabinets (aka junction boxes), and new temporary wiring will connect terminal blocks in the marshaling cabinets to terminal blocks in the new pump station control cabinets as part of this project's scope.
    - If needed for maintaining the underground water level, the dewatering pump motor starters in these rooms can be manually operated using door-mounted hand-off-auto switches while the new pump station control cabinets are being installed.
  - The hardware and software (logic) of the new pump station controllers need to allow them to interface with the instrumentation of the existing pump rooms, plus the new instrumentation that will be added to the electrically & mechanically rehabilitated pump rooms. The preliminary design on pages 1-12 of **Attachment C** includes the new instrumentation.
  - Networking Equipment: SDSTA will provide the networking equipment and communication cables used in the new dewatering control system. The Offeror shall work with the SDSTA to determine the communication hardware & software configuration settings for the new SCADA, Pump Station Controllers, and Process Monitoring HMI Cabinets.

- SCADA Computer: SDSTA will provide the SCADA computer needed for hosting the new SCADA system. As part of finalizing the new dewatering control system design, the Offeror shall work with the SDSTA to determine hardware and operating system specs required to support the new SCADA system. During the installation phase of the Contract, the Offeror will be responsible for configuring the new SCADA software on the SCADA computer, deploying the new SCADA system, and commissioning the new SCADA system.
- Software: The Offeror shall provide and utilize their own software for developing the new dewatering control system and the new SCADA system. The SDSTA shall provide the software needed at the SURF to install, host, maintain, troubleshoot, and expand the new dewatering control system and new SCADA system. The Offeror shall work with the SDSTA to determine the software and license types required at the facility to effectively operate, support, and expand the new control and SCADA systems. Reference Section 40 6900 of **Attachment B** for a preliminary list of software.

## 5. TECHNICAL EVALUATION CRITERIA:

A best value selection process will be used to award this Contract. The selection criteria are listed below. Selection will be made based on tradeoffs between price and non-price evaluation criteria.

- a. The offeror's total project package including proposed project team and other technical requirements defined in this document.
- b. Specialized experience and technical competence in:
  - Designing, developing, installing, and commissioning industrial control and SCADA systems.
  - Underground mine dewatering or other water pumping processes
- c. Construction safety practices, procedures, and safety record relating to the scope of work.
- d. Qualified professional personnel in the following key areas:
  - Industrial control panel design, construction, and installation
  - HMI and SCADA screen design and development
  - Industrial control and SCADA systems programming and commissioning
- e. Past performance on SDSTA, US Department of Energy, State of South Dakota, or other contracts with respect to cost control, quality of work, and compliance with performance schedules.

## 6. SUBMISSION REQUIREMENTS:

### Submission Requirement: General

To be eligible for contract award, a firm must be registered as a business entity with the South Dakota Secretary of State.

Proposals should be provided in digital format as a pdf file with standard letter size format. Note that there is a 50-page limit for proposals. Proposals must contain the following:

- Description of the working relationship between each of the overall team members, including a personnel specific organization chart. Note that the named subcontractors and outside associates or consultants must be used for project execution, and any change must be approved in advance by the SDSTA.
- Primary points of contact for the proposed team.
- Description of the approach to cost and schedule control. What project management tools will be used and how will information be communicated to the project team and SDSTA?
- Any exceptions to the draft contract, terms and conditions, specifications, or other RFP materials.
- Travel expenses must be at current GSA rates.

#### **Submission Requirement: Similar Projects**

Describe at least two and up to five similar projects that the Contractor/Subcontractor has installed and commissioned within the past five years. Example projects should be of approximately the same complexity and scale as proposed for this project. Examples should include:

- Project Title and Location.
- Project Owner and point of contact.
- Period of performance.
- Discuss the relevance of the example projects to this Contract.

#### **Submission Requirement: Safety**

Provide a description of the safety programs of contractors and subcontractors who would be performing work at SURF under this Contract. Safety manuals will not count toward the 50-page limit. Demonstrate the firm's understanding and awareness of all ESH issues that will be present on this project. Note that this project allows the project superintendent to also be the safety officer.

- Identify who will serve as the safety officer for this project.
- Include safety records for the past five years (incident/injury records, OSHA 300 logs, and EMR data) of contractors and subcontractors who would be performing work at SURF under this Contract.

#### **Submission Requirement: Quality Control**

Provide a description of the QC programs of contractors and subcontractors who would be performing work under this Contract. QC manuals will not count toward the 50-page limit.

#### **Submission Requirement: Qualifications**

Provide resumes for key personnel proposed for this project. As a minimum, include the project manager, project superintendent, lead engineer, and project safety officer. Resumes should include qualifications, certifications, and experience in the specific role proposed with relevant projects. Include qualification descriptions of subcontractors proposed for this project.

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**Submission Requirement: Schedule**

Proposed schedule/work plan. Offerors shall provide the basic schedule, outlined below, and specific number of calendar days required for project completion after Notice to Proceed (NTP) on the bid sheet (**Attachment E**):

- Finalize Design
- Lead Time for Materials
- Construction & Programming
- Installation
- Commissioning & Training
- Project Complete (total days)

The total project duration shall be within 365 days of the Notice to Proceed (NTP) issued after the Project Preconstruction/Kickoff Meeting. Note that liquidated damages of \$75/day will be applied for additional schedule days after the approved contract completion date. Refer to the draft contract for additional details.

**Submission Requirement: Price**

Provide a project pricing breakdown using the bid sheet (**Attachment E**). The offeror's fixed price shall constitute full payment for the work, materials, services, quality control testing, other items required, and include all applicable federal, state use, sales, and local taxes, duties, permits, bonding, and all the Subcontractor's other obligations related to such work.

**Submission Requirement: Mandatory Site Visit**

All offerors are required to attend an onsite pre-proposal conference & site visit *January 3, 2024* from 8:00 a.m. -12:00 p.m. MT at the SURF, 630 East Summit Street, Lead South Dakota. Pre-registration is required. Email [bbrack@sanfordlab.org](mailto:bbrack@sanfordlab.org) by close of business *December 29, 2023* to receive instructions and directions. Only companies represented at the pre-proposal conference will be eligible to submit proposals. Contractors' subcontractors are encouraged, but not required, to attend.

**7. DELIVERABLES:**

Refer to SDSTA Division 1 and other technical specifications for deliverables required after contract award but before the start of work and during project execution. While not a complete list, key deliverables include:

- Safety Plan
- Quality Control Plan
- Schedule
- Schedule of Prices
- Submittal Register
- Design Drawings and As Built Drawings
- Industrial Control Panels
- Test Reports

- Development Files for PLC, HMI, and SCADA
- Contractor Daily Reports
- O&M Manuals
- Warranties
- Critical spare parts list with itemized pricing, availability, and estimated delivery times
- Training records for all Owner training

## 8. PROPOSALS DUE:

Offerors should submit an electronic copy (pdf format) of the proposal no later than 2:00 p.m. on *January 19, 2024*, to [bbrack@sanfordlab.org](mailto:bbrack@sanfordlab.org). Late submissions will not be accepted.

Questions are due by 4 pm on *January 9, 2024*.

Questions & Answers will be posted to the [sanfordlab.org](http://sanfordlab.org) website no later than *January 12, 2024*.

The proposal period may be extended at the discretion of SDSTA based on the quantity and/or complexity of questions. Any notices of extension of time to respond will be distributed to all prospective offerors by SDSTA.

All communications regarding this procurement between RFP release and award shall be directed by email to [bbrack@sanfordlab.org](mailto:bbrack@sanfordlab.org). Communications with other SDSTA staff regarding this procurement in advance of the award are not allowed.

## Revision History

| Rev | Date     | Section | Paragraph | Summary of Change | Authorized by |
|-----|----------|---------|-----------|-------------------|---------------|
| 01  | 1/3/2023 | NA      | NA        | Initial release   | CCR 663       |
|     |          |         |           |                   |               |