

RFB 2024-17: Addendum 1
Substation Inspection, Testing, and Maintenance Services
South Dakota Science and Technology Authority
August 12, 2024
Amended Scope of Work

A) Annual Inspections

- 1) Perform Visual Inspection
 - a. Document any abnormal conditions
 - i. Verify no abnormal apparatus temperatures, pressures, or leaks
- 2) Perform IR surveys
 - a. SDSTA personnel would escort and open back covers of switchgear cubicles for inspection
 - b. SDSTA plans to investigate and potentially install IR windows in-house where applicable.
- 3) Perform site partial discharge survey
- 4) Power Transformer Oil Analysis – Main Tank and LTC where applicable
 - a. Dissolved Gas Analysis – D3612
 - b. Liquid Screen Analysis
 - i. Water Content – D1533
 - ii. Relative Saturation
 - iii. Color – D1500
 - iv. Dielectric – D1816
 - v. Interfacial Tension – D971
 - vi. Neut Number – D974
 - vii. Visual Examination – D1524
- 5) Oil Analysis
 - a. Furnans / DP – Evaluation of Cellulosic Material – D5837
 - b. PCB Analysis – This will likely not be required for current equipment.

B) Triennial Inspections

- 6) Perform Visual Inspection
 - a. Document any abnormal conditions
- 7) Perform IR surveys
 - a. SDSTA personnel would escort and open back covers of switchgear cubicles for inspection
 - b. SDSTA plans to investigate and potentially install IR windows in-house where applicable
- 8) Perform site partial discharge survey
- 9) Circuit Switcher Testing
 - a. Visual Inspection
 - b. Doble Insulation Test

- c. Contact Resistance
 - d. Time/travel analysis
 - e. Confirm proper SF6 pressure
 - f. Mechanism cleaning and checks
- 10) Power Transformers
- a. Visual Inspection
 - b. Double Insulation Test
 - c. Insulation Resistance
 - d. Winding Resistance
 - e. Functionals - check temp and pressure gauges alarms and trip points, check 63SPR and 63PR, auto/man check of cooling equipment
 - f. Oil Analysis
 - g. Verify and set proper N2 pressure
- 11) Switchgear VCB
- a. Visual Inspection, verify proper racking operations and interlocks
 - b. AC Hipot
 - c. Contact Resistance
 - d. Timing
 - e. Mechanical checks and lubrication
- 12) Protective Relaying
- a. Download settings to create a library database
 - b. If applicable download and document historical events
 - c. Perform testing and calibration testing, verify all programmed element and logic equations
- 13) Battery System
- a. Perform battery capacity testing
 - i. Confirm charger float and equalize setpoints are correct
 - ii. Insure proper equalize timing before conduction discharge testing
 - iii. Check all cells for temperature and specific gravity
 - iv. Perform contact resistance testing on all straps and leads
 - v. Perform discharge testing per OEM recommendations
- 14) Transformer Testing
- a. Double SFRA – perform once to establish a baseline to be archived
 - b. Turns Ratio Test – perform once to establish baseline to be archived, (no changing of DETC)
- 15) URD HV cables – *Cable testing will not be included but may be considered as a change order on a case-by-case basis.*
- a. Shield continuity checks
 - b. Insulation resistance – (megger) for both Pre and Post hipotential testing
 - c. VLF hipotential testing