

Statement of Work for
Restoration of Electrical Distribution System – High Voltage
Located at
NASA Ames Research Center
7/18/2012

This statement of work describes the tasks required to upgrade and increase load capacity of the aged and overloaded transformers and their related power equipment for system A and B electrical building loops. The work shall encompass the following:

1. Replace the existing 115kV-6.9kV transformers and its associated components with new higher primary voltage 125.6kV nominal to 13.8kV transformers and its associated components.
2. Replace the existing 75kVA service station transformer (three (3) 25kVA) for a new 15 kV system.
3. Upgrade the existing six building substations by replacing the existing 6.9kV transformers and breakers with new 13.8KV transformers and 15KV breakers, cables rated at 8kV with new cables rated at 15kV, and other 6.9kV rated equipment as required.
4. Replace potential and control transformers at all building substations in the A and B electrical building loop system.
5. Replace the existing 6.9kV power factor correction capacitor banks with 13.8kV rated capacitor banks at both substations.
6. Reprogram the Ames Power Monitoring System (APMS) and all P124 Alstom and Schweitzer relays in the A and B electrical building loop system.
7. All other related work deemed necessary to provide a complete new 15kV A and B electrical building loop system at Ames Research Center main electrical power distribution system.

Two construction packages are detailed as follows:

1. Package #1:

Building N246 Upgrade:

- a. Replace the existing transformer T-154 (6.9kV—480/277V) with a dual voltage transformer rated at 750kVA, 13.8kVx6.9kV-480/277V.
- b. Replace existing 6.9kV medium voltage (MV) switchgear with 13.8kV MV switchgear. Switchgear relays shall be replaced by Alstom equivalent relays.
- c. Replace existing 6.9kV incoming varnished cambric lead cables from pad-mount switch number SW 539 to switchgear with 15kV EPR distribution cables.

Building N223 Upgrade:

Upgrade the existing N223 building substation by replacing the existing 6.9kV ACB492 with a new 13.8kV VCB, cables rated at 8kV with new cables rated at 15kV, and other 6.9kV rated equipment as required.

Building N213E Upgrade:

- a. Replace the existing transformer T-102 (6.9kV—480/277V) with a dual voltage transformer rated at 1000kVA, 13.8kVx6.9kV-480/277V.
- b. Replace existing 6.9kV medium voltage (MV) switchgear with 13.8kV MV switchgear. Switchgear relays shall be replaced by Alstom equivalent relays.
- c. Replace existing 6.9kV incoming cables from pad-mount switch number SW 446 to switchgear with 15kV EPR distribution cables.

Building N213W Upgrade:

- a. Replace the existing transformer T-14 (6.9kV—480/277V) with a dual voltage transformer rated at 500kVA, 13.8kVx6.9kV-480/277V.
- b. Replace the existing 6.9kV ACB080 with a new 13.8kV VCB. Switchgear relays shall be replaced by Alstom equivalent relays.

Building N246 Upgrade:

- a. Replace the existing transformer T-154 (6.9kV—480/277V) with a dual voltage transformer rated at 750kVA, 13.8kVx6.9kV-480/277V.
- b. Replace existing 6.9kV medium voltage (MV) switchgear with 13.8kV MV switchgear. Switchgear relays shall be replaced by Alstom equivalent relays.

Building N227 Upgrade:

- a. Replace the existing transformer T-308 (6.9kV—480/277V) with a dual voltage transformer rated at 300kVA, 13.8kVx6.9kV-480/277V.
- b. Provide a new 13.8kV VCB492 with Alstom relays.
- c. Provide new 15kV EPR distribution cables from the existing S&C switch 539.

2. Package #2:

- a. Replace existing 6.9kV rated potential and control transformer with a 15kV rated transformers and change main distribution transformer tap from 7.2kv to 13.8kV for every building substation on the A and B electrical building loop system.
- b. Adjust all CT tap ratios to make sure they work well with the APMS and relays in the new 15KV system, including CTs in the S&C switches and in the A/B switchgear. Reprogram all the APMS and relays to make sure they work well in the 15KV system.

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- c. Replace existing 115kV-6.9kV power transformers T-49 and T-90 with same power rating 125kV-13.8kV transformers with automatic load tap changer (ALTC). Provide design for a new concrete foundation, 15kV bus duct, protective relays system and new grounding resistors as required for the new 15kV system.
- d. Inspect existing medium voltage (MV) switchgears line-up for suitability to be used for 13.8kV system. Replace existing medium voltage air circuit breakers (ACB) with 15kV vacuum circuit breakers (VCB).
- e. Replace existing 75kVA station service 6.9kV-208/120V transformer (three 25kVA) with a 13.8kV-208/120V, 75kVA transformer
- f. Replace existing 1800kVAR capacitor banks “A” and “B” rated for 6.9kV to capacitors rated for 15kV. Replace existing ACBs # 544 and 547 to VCBs rated for 15kV.