SECTION 16350

ARC FLASH MITIGATION SYSTEM

PART 1 GENERAL

1.1 SUMMARY

A. Description of System
   1. Provide a complete arc mitigation system suitable for attachment to switchgear and substations as indicated on the design documents for the protection of the equipment against the effects of internal arcs, to ensure personnel safety and to minimize damage and outage to the equipment. This specification covers the minimum technical requirements for the design, manufacturing, testing, supply and delivery, transportation to site, installation and commissioning of the arc mitigation system, complete in every respect with all components and necessary accessories for reliable continuous operation, even if not all details are expressively stated in this specification.
   2. Operation
      a. The arc monitoring unit (arc flash detector) shall detect the occurrence of short-circuit arcing by means of arc detectors/sensors and current sensing units and immediately transmit a tripping signal to trip and lock out all relevant circuit breaks connected to the affected busbar.
      b. The arc mitigation system shall not respond to interfering light sources, electromagnetic influences, vibration and touching. Automatic or manual ombient compensation shall be provided.
      c. The protection principle of the arc mitigation system shall consist of two (2) important criteria:
         1) Dynamic rise of light intensity and overcurrent
         2) Dynamic rise of light intensity only
      d. The system shall perform the proper protection even if all outgoing feeders are supplied by one (1) incoming feeder by closing the bus tie breaker. If the internal arc occurs at any point in the bus section fed through the bus tie breaker, only the affected bus section shall be removed from service. In the case of an internal arc on the busbar section with fault current supplied from an outgoing feeder, the arc mitigation system shall perform complete busbar protection according to applicable scheme using light only without supervision of fault current detectors.
      e. The system shall be complete with control and indicating devices, and testing facilities for routine functional testing of the protection system while switchgear is energized.
      f. The arc monitoring unit with current sensing shall provide three-phase over current measurement, switchgear existing current transformers shall provide the current inputs for the current sensing unit. The current sensing unit shall block circuit breaker tripping via the arc-monitoring unit at load currents below a preset valve. Integrated circuit breaker failure protection shall be provided.
      g. Fault current supervision (fault detectors) of the optical system shall be switch selectable.

h. The system shall be capable of indicating the affected cubicle as well as selective tripping by using appropriate extension unit.

1.2 RELATED WORK SPECIFIED UNDER OTHER SECTIONS

1.3 QUALITY ASSURANCE

A. Reference Specifications and Standards
   1. All design, material, equipment required, manufacturing and testing shall be in accordance with the latest IEC, DIN, VDE, ANSI, or equivalent: unless otherwise specified in this specification.

B. Qualifications of Manufacturer
   1. Furnish essentially standard products of manufacturer regularly engaged in the production of such equipment.

C. Source Quality Control
   1. Perform and record all normal factor tests on equipment/cables.
   2. Manufacture shall have a minimum of 5 year's experience in the design, manufacturing and testing of the Arc Flash Mitigation System.
   3. The Arc Flash Mitigation System shall be U.L. recognized.

1.4 SUBMITTALS

A. Furnish submittals for items that are identified in this SECTION by a different typeface and a bracketed code (e.g., Item [L]). Refer to SECTION 01340 for definition of codes for types of submittals and the administrative requirements governing submittal procedure. Additional submittal requirements pertaining to this SECTION are specified herein under this Article.

B. Submit complete manufactures drawings of the arc mitigation system components and drawings showing placement of system components, routing of sensor cables and network communication cables in the switchgear and substation sections.

1.5 MAINTENANCE DATA AND OPERATING INSTRUCTIONS

A. Furnish, per SECTION 01730, operating and maintenance manuals covering installation, operations and servicing procedures for the equipments furnished, and complete illustrated parts breakdown with manufacturer's name, nomenclature, and part number for each component part and assembly. Include a list of recommended spare parts.

1.6 ENGINEERING FIELD SERVICE

A. Require the manufacturer of the Arc Detection System to provide a qualified engineer to check the complete installation after all equipment is installed and wired. Furnish to the OWNER the manufacturer's written certification assuring that each item of the installation is complete, in good condition, free from damage, and properly installed, connected and adjusted. Require the manufacturer's engineer to make any adjustments or replacements

which may be necessary to insure the proper functioning of the equipment furnished and to instruct the OWNER'S personnel in operation and maintenance of the equipment.

PART 2 PRODUCTS

2.1 FABRICATION AND MANUFACTURE

A. Manufacturer
   1. ABB "REA Arc Mitigation System"

B. Equipment
   1. REA Arc Mitigation System [D.P] furnish equipment providing system operation as described under Article "DESCRIPTION OF SYSTEM," as indicated on the design documents and as indicated below.
      a. Arc detection monitoring unit REA 101 (Master Unit) with integrated current sensing unit. Detects short circuit arcing and overcurrent and transmits a tripping signal to trip all relevant circuit breakers. Communicates with other REA 101 units via optolink cables for transmitting light or current tip threshold signals. Communicate with REA 105 units via a network connection cable for tripping of unit associated circuit breakers.
      b. Arc detection unit REA 105 for fast fault tripping of compartment feeder breaker upon compartment detector/sensor cable detection of arc flash or upon signal from the REA 101. Also, with one dry contact output for alarming.
      c. Detection/sensor cable shall be fiber optic light sensitive cable with a maximum length of 65 meters.
      d. Network connection cable shall be RJ-45 communication cables.
      e. Cable between REA 101's shall be optolink transmitting and receiving cables for transmitting light or current trip threshold signals.
      f. The arc mitigation system shall be designed and constructed for operation under the following conditions:
         1) Altitude: up to 1,000 meters above sea level.
         2) Ambient air temperature: -10° C (14°F) to 55° C (131°F)
         3) Relative humidity: up to 90%.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install Arc Flash Mitigation System to equipment shown on the contract documents and per manufacturer's installation instructions.

END OF SECTION

Revision History	
Date	**Rev. No.**
D	0
E	0
F	0
02-19-09	0

EY/ca
C:\d\timsdatasf\BROOKHAVEN_NATIONAL_LABORATORY\SF070003\200-PROJEXEC\280-SPEC\16350.doc