Mississippi State University
Notice of Proposed Sole Source Purchase

167-76

Mississippi State University anticipates purchasing the item(s) listed below as a sole source purchase. Anyone objecting to this purchase shall follow the procedures outlined below.

1. *Commodity or commodities to be purchased (make, model, description):*

Refurbishment of the existing 3 million volt impulse generator in the ECE High Voltage Laboratory – generator, controls, and measurement system upgrade.

Upgrade includes:

1. **Measurement and Control System** (Impulse Control System ICS-1, Impulse Measurement System IMS-2)
* Computer and optical interface
* Power source (10 kW regulator)
* Stage voltage feedback divider (measurement of generator voltage)
* Power and optical interface cables
* Control and measurement software
* Emergency OFF hardware cable
* Calibration of stage voltage meter
* Test report of control unit
* Test report of measurement unit (compliance with IEC61083-2)
* Instruction manual
1. **Impulse Generator Rebuild** (all components for gap setup, charging system, voltage divider, and top stage of generator designed to fit existing frame)
	* Trigger and ignition system:
		1. Spark gap housing
		2. Bottom plate with air blower, motor, and gear box; top plate
		3. Lower and upper housing (spheres and drive included)
	* Charging system:
		1. Charging rectifier
		2. Resistive voltage divider
	* Stage components (19 stages in total, custom sizes and ratings):
		1. Middle housing and brackets for internal components
		2. Charging resistors (19 elements)
		3. Front resistors (38 elements)
		4. Tail resistors (19 elements)
2. **Installation, Commissioning, and Training**
	* Field service - one engineer on-site for 5 full working days
3. *Explanation of the need to be fulfilled by this item(s), how is it unique from all other options, and why it is the only one that can meet the specific needs of the department:*

Valid assessment of high voltage events requires the reproduction of representative real life electrical stresses in a controlled laboratory environment and cannot be fully replicated through miniature models, simulation or purely theoretical analysis. The existing 3 million volt impulse generator is a critical high voltage source in the laboratory allowing full-scale research, testing and evaluation of high voltage lightning and transient phenomena. No other university in North America has a comparable generator (this capacity level is rare on a global scale in the academic world).

Originally commissioned in 1962, the generator has surpassed its technical lifetime and has been maintained through in-house repairs to keep it functional to this day. However, the majority of its components have degraded past repair, and its capacity has been reduced to preserve some level of operation. Furthermore, as components have failed, certain operations have been removed which has resulted in the current mode of operation producing further degradation each time the generator is used. In short, the complete system will fail soon, if we continue to operate in the same manner.

The requested refurbishment will remove failed and outdated components and systems and replace them with new reliable modern technologies while still retaining some of the original generator structure. Updated controls, measurement, and protection will allow for safe, reliable, and fast operation as well as new testing procedures and protocols satisfying the latest standard requirements. Replacement and reconfiguration of internal circuit of the generator will allow for higher efficiency output thus requiring fewer components (which equates to fewer repairs and less expenses). Considerable savings are achieved by keeping the original generator frame and storage capacitors. Nevertheless, the new design would allow for increasing the energy rating of the system in the future by replacing the original capacitors if so desired. The new internal components be specifically designed and rated to suit the design of this generator and will allow for reliable and consistent operation – the materials are of USA origin resulting in well-defined performance characteristics of the constructed units. The integration of this upgrade will be fully supervised and verified to ensure successful implementation.

Upon successful completion, this refurbishment will allow for decades of continued leading research and testing in transient overvoltages and protection as well as introduce students to modern measurement and testing equipment.

In summation, the performance, efficiency, and capacity of the High Voltage Laboratory will be drastically improved.

1. *Name of company/individual selling the item and why that source is the only possible source that can provide the required item(s):*

**Evergreen High Voltage LLC**, William Larzelere (Founder)

This is not a procurement of a product, but of a complete service to ensure the successful integration of a customized solution tailored to meet the requirements of the MSU High Voltage Laboratory and as such it cannot be undertaken by any other party without the knowledge, skill, and resources that Evergreen High Voltage has. The design is unique.

Mr. Larzelere from Evergreen High Voltage has decades of expertise and experience in designing high voltage equipment and was involved in the original commissioning of the MSU high voltage laboratory. His unparalleled knowledge of the design of the MSU laboratory and equipment makes him the only candidate who can guarantee successful integration of the new upgrades with the existing generator design.

Evergreen High Voltage has been able to provide a customized design and implementation to essentially produce a new generator in its old skeleton. These customized components will be specifically constructed for the MSU generator frame and cannot be used elsewhere (custom shape, size, rating, etc.). Furthermore, only Evergreen High Voltage can guarantee the quality of the custom built components as they are designed in-house and built using American materials.

Evergreen High Voltage will be also supervising the installation to ensure proper assembly as well as training the High Voltage Laboratory staff to operate the new system.

1. *Estimated cost of item(s) and an explanation why the amount to be expended is considered reasonable:*

**Total $224,500.00** Consists of measurement and control system ($60,000), generator upgrade components ($149,500), installation, commissioning, and training ($15,000).

Evergreen High Voltage has defined the performance requirements for the generator, planned the reconfiguration and redesign of generator circuit, and verified the compatibility of the upgrades with existing components and structures to produce a very precise quote including all of the necessary investments to guarantee successful completion of the refurbishment project.

A standard measurement digitizer alone costs approximately $50,000 whereas the impulse control and measurement system is a far more versatile tool with not only measurement functions but also integrated control and programming functions specifically designed to operate with the refurbished generator. Equivalent tools are approximately $100,000 depending on specifications.

5 days of qualified on-site consultation, supervision, training and commissioning testing to ensure proper installation and operation for $15,000 ($3,000 per day, includes travel expenses) is well aligned with market value.

The generator upgrade components are used to construct the new generator circuit. The custom built components (e.g., resistors) provided by Evergreen High Voltage are made from USA materials with precisely known characteristics and stable behavior and are still comparable in price to prefabricated stock components of unknown quality. That is, the high quality custom components are relatively cheap as they are being procured as part of a complete rebuild package.

1. *Explanation of the efforts taken by the department to determine this is the only source and the efforts used to obtain the best possible price:*

Evergreen High Voltage has designed a customized solution reducing the amount of needed components and maintaining the existing 30 ft generator frame and a number of original components. As the developed custom design is unique, nothing comparable is provided by competitors. All other applicable known competitors were approached with the request and none could comply.

Any person or entity that objects and proposes that the commodity listed is not sole source and can be provided by another person or entity shall submit a written notice to:

Don Buffum, CPPO
Director of Procurement & Contracts
dbuffum@procurement.msstate.edu
**Subject Line must read “Sole Source Objection”**

The notice shall contain a detailed explanation of why the commodity is not a sole source procurement. Appropriate documentation shall also be submitted if applicable.

If after a review of the submitted notice and documents, MSU determines that the commodity in the proposed sole source request can be provided by another person or entity, then MSU will withdraw the sole source request publication from the procurement portal website and submit the procurement of the commodity to an advertised competitive bid or selection process.

If MSU determines after review that there is only one (1) source for the required commodity, then MSU will appeal to the Public Procurement Review Board. MSU will have the burden of proving that the commodity is only provided by one (1) source.