

## Idaho National Laboratory

### Analytical Laboratory Replacement Manipulators

Battelle Energy Alliance, LLC (BEA), Management and Operating Contractor of the Idaho National Laboratory (INL) for the U.S. Dept. of Energy (DOE), is seeking Expressions of Interest from suitably qualified companies to support the replacement of thirteen (13) manipulators at the Analytical Laboratory (AL), Bldg. 752 located at the Materials and Fuels Complex (MFC). It is anticipated that the successful replacement of the manipulators will enable BEA to more effectively operate and maintain the facility as required to support its DOE mission.

#### 1. **BACKGROUND**

The current mission of the AL is to perform chemical, radiochemical and physical measurements; provide nondestructive analysis measurements; and conduct applied research and engineering development activities in support of advanced nuclear fuel design, waste management, environmental, and other programs conducted at MFC and the INL. A significant portion of this work is accomplished in six interconnected hot cells using master-slave manipulators.

The current manipulators were installed in the early 1990's. The manipulators are 3-piece manipulators: master arm, seal tube, and slave arm. However, since the cells have an air environment and the manipulators are pulled similar to a one piece manipulator; a one-piece manipulator may be a satisfactory replacement manipulator. The manipulators are mounted in a 10 in. diameter wall tube and have boots that extend over the entire slave arm. The boot stays in place during manipulator removal and can be changed out by pushing in the old boot out while installing the new boot. The facility does not have overhead handling capability in the cell or outside the cell. Dimensions of the cell are shown in Appendix A.

#### 2. **REQUIREMENTS/FEATURES:**

2.1. The replacement manipulator requirements and/or features are outlined below. The following elements are listed as means to gain information on available solutions/options for replacement manipulators. Some features may not be presently available but may be in the future (e.g. increased dexterity or ergonomic features). These development plans may be proposed with a target date for completion.

- 2.1.1. The manipulators shall interface with the existing hot-cell without modification. A sketch of the applicable cell envelop and cold side space restrictions is attached. The sketch also shows the approximate coverage of the current manipulator for reference.
- 2.1.2. The removal of the manipulator shall be accomplished as a one piece without removal of any significant components from the manipulator. The area the manipulators are installed does not have overhead handling to aid in removal.
- 2.1.3. Equipment necessary for manipulator removal/installation shall be identified.
- 2.1.4. General procedures for removal and installation of the manipulator shall be provided.
- 2.1.5. The manipulator slave arm shall be fully booted. The boot shall seal to the interior of the wall tube.

- 2.1.6. Boot replacement shall be capable from outside the cell through the manipulator port. The old boot shall be ejected into the cell during installation of the new boot.
- 2.1.7. General procedures for boot replacement shall be provided.
- 2.1.8. The manipulator shall be sized for handling approximately a 20 lb. load. Occasional lifting of 50 lbs. should be possible. The heavier loads are pick and place only; wrist rotation/tong is not necessary during heavy manipulator handling.
- 2.1.9. Indexing functions X & Y are required. Z-motion/slave extension is desirable.
- 2.1.10. The manipulator shall be ergonomically design such that all controls are accessible to the operator standing flat footed on the ground. The master handle accommodate a large range of hand sizes.
- 2.1.11. The manipulator shall be dexterous to reduce operator fatigue for fine motions performed by the operators.
- 2.1.12. The manipulators shall be capable of operators having a wide range of hand sizes.
- 2.1.13. The manipulator shall have approximately 9 inches of lead shielding. Five inches and four inch sections shall be separated by approximately 9 inches. The shielding should be located in the wall section. The effectiveness of the shielding will be evaluated by the INL.
- 2.1.14. The manipulator slave arm shall be capable of repair through suited entry. Tooling/fixtures requirements for repair shall be provided.

3. **SUBMITTAL REQUIREMENTS:**

- 3.1. Submittals from both small and large business will be evaluated.
- 3.2. Submittals must be brief (10 pages or less).
- 3.3. Submittal content must include, but not limited to:
  - 3.3.1. Overview of the company including name, phone number, and e-mail address of a representative who can be contacted regarding this Request for Expression of Interest.
  - 3.3.2. Description of previous experience supplying similar manipulators, together with a current contact name and telephone number for each reference provided.
  - 3.3.3. Provide a copy of the Offeror's quality assurance manual or such other information explaining the details of its quality assurance program.
  - 3.3.4. Information, data, plans, procedures or drawings necessary to explain the Offeror's manipulator design, specifications, approach, and capability to meet the requirements in Section 2.0.
  - 3.3.5. Budgetary pricing, milestone Chart Schedule, showing the Offeror's estimated delivery schedule for the manipulator design, manufacture and delivery.
  - 3.3.6. Identification of the company's primary North American Industry Classification System (NAICS) Code. The associated business size (small or large), and any additional small business socio-economic classification(s).

Please provide your expression of interest by email to **Cody Haycock** (cody.haycock@inl.gov) by 2:00 pm on **Thursday, September 28, 2017**. Please contact Cody Haycock (via email) with questions. All questions submitted prior to the due date and time will be compiled, with answers provided to all interested parties.

