

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
LEWIS RESEARCH CENTER
CLEVELAND, OHIO

JUSTIFICATION FOR OTHER THAN FULL AND OPEN COMPETITION

I. Description of Procurement

I recommend that GRC negotiate only with Dresser Roots for purchase of two Roots Rotary Lobe pumps or blowers located at NASA's Plum Brook Station Space Power Facility (SPF). The pumps are to be used as system spares in the event the current pumps have operational issues during critical SPF testing.

The multistage Rotary Lobe vacuum pumps are designed to work in concert to very rapidly evacuate the large SPF vacuum chamber. Pumps in the SPF vacuum system must be capable of handle the differential pressures and pressure ratios experienced when the SPF chamber is evacuated from atmosphere to 10 millitorr. The Vacuum System and Rotary Lobe Blowers at SPF are operated in a unique manner, to achieve this low vacuum environment.

General Electric Energy Roots division is the current manufacturer of record for the SPF vacuum system. The procurement is for two 20x50 Dresser Roots rotary Lobe Blowers at a unit cost of \$185,400 each. Shipping charges are calculated to be \$10,000. The total costs are estimated at \$370,810.

II. Statutory Basis for Other Than Full and Open Competition

The statutory authority permitting other than full and open competition is 10 U.S.C. 2304 (c) (1), "*only one responsible source...*".

III. Rationale for Selection of Statutory Basis

The SPF located at Plum Brook Station is the largest Thermal Vacuum Chamber in the world. It provides NASA with the capability to perform unique space environment testing. The SPF vacuum system is critical for the proper operation of the SPF to establish a space environment to conduct space flight testing.

The vacuum system consists of ten Rotary Lobe Blowers and six Beach Russ Mechanical pumps. The Rotary Lobe blowers are arranged in stages. Each stage exhausts into the next stage. The First stage consists of four 20x50 Roots High Vacuum Rotary Lobe blowers which are backed by the second stage consisting of two 20 x 50 Roots High Vacuum rotary Lobe Blowers. The second stage is backed by the third stage which has two 18 x 33 Roots High vacuum Rotary Lobe Blowers. The Third stage is backed by the fourth stage consisting of two 12 x 28 Roots high vacuum Rotary Lobe Blowers. The fourth stage exhausts into the fifth stage consisting of six Beach Russ 900 CFM Mechanical Rotary Vane pumps.

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The vacuum system allows the atmosphere in the chamber to be reduced to 10 millitorr. It is essential that individual elements of the vacuum system work as an integrated system. Over the last 6 years, I have been tasked with understanding the operation of the

vacuum system. I have not identified any system with the unique abilities of the SPF. I have discussed the operational environment, equipment capabilities, and methods employed at the SPF with equipment manufacturers and have found no other manufacturer of equipment that could be substituted for the current equipment. The criticality of the current vacuum system to the successful performance of SPF does not provide an opportunity to purchase other manufacturers equipment and trusts it will perform in concert with existing equipment. Failure of the exhausting system, during a test would adversely affect the testing environment, test results, and be a waste of time and effort to prepare for the test.

Just recently, we have performed a series of payload fairings tests for a commercial customer. During testing, we had a failure of one of our pumps. Without a spare pump, the loss required us to operate in an off normal manner. This operation required 16 hours to accomplish testing in what normally would have been 8 hours. We had to repeat this off normal operation for subsequent testing with a commercial customer. If we had a spare pump at the time, we could have replaced the failed one with the spare pump to continue testing.

General Electric Energy Roots division is the current manufacturer of record for the SPF vacuum system. They retain the original design and construction specifications, documents and operational data for the units used in the Plum Brook SPF vacuum system. Information is considered proprietary. No other source for this type of vacuum pump has been identified. In addition, no other company that sells Rotary Lobe blowers, with the expertise to design and build a system such as the SPF multistage Rotary Lobe Blower Vacuum system has been identified.

The pumps to be purchased are to be used as spare pumps for our system because of the long manufacturing time (26 weeks for a new pump, 6 to 10 weeks for a rebuild of a failed pump) and because a failure of a pump causes issues with our test schedule and that of our customers.

IV. Description and Results of Market Survey

This procurement was synopsisized and posted on FedBizOpps.gov on June 19, 2013. No other manufacturer responded to the synopsis by the June 25, 2013 close date.

V. Determination of Anticipated Cost as Fair and Reasonable

A proposal has been received and evaluated by the Government. Plum Brook Station has spent 6+ years of working with pump manufacturers and repair companies involving the

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purchase of repair services and replacement costs for Rotary Lobe Blower vacuum pumps. The previous quotes are all consistent with the latest quote, taking into account a modest mark up over the past several years. A quote in 2012 was for \$178,200 per pump, and a quote in 2008 showed the cost at \$140,000 per pump.

VI. Action to Remove or Overcome Barriers of Competition

No action can be taken to overcome barriers to competition for this procurement. The manufacturer is the only source with the original design; construction and operational documents and data to ensure that replacement pumps will operate properly in the existing Plum Brook SPF system.