



Sole Source Application and Determination Form

A sole source determination is not effective until the sole source application for determination has been posted on the Purchasing website for thirty (30) calendar days without protest and is subsequently approved in writing by the Vice President of Administration and Finance.

1. Name of Department: NM Bureau of Geology
Contact Name: John Rakovan
Phone: 575-835-7625
Email: John.Rakovan@nmt.edu
2. Name of Prospective Vendor: Rigaku Americas, A Division of Rigaku Americas Holding
Contact Name: Al Larsen
Phone: 346-386-5761
Email: al.larsen@rigaku.com
Estimated Cost: \$164,235
Duration (for Services or Professional Services – limited to four years):
3. Purpose/need for purchase and detailed list of items of tangible property, services, or professional services:

A Powder X-ray Diffractometer (PXRD). This will replace a failing instrument, in the Bureau's X-ray diffraction laboratory, that was purchased in 1994.

4. Detailed explanation of criteria developed for this purchase:

The Bureau of Geology has a long history of X-ray diffraction for NMT research and teaching, and as a service center for outside institutions and customers. We have both powder and single crystal diffraction instruments; which have complimentary capabilities and uses. Our current PXRD was purchased in 1994 and has been a true workhorse, being one of the most highly utilized pieces of major instrumentation on the NMT campus over its lifetime. That instrument is failing (currently not functional) and we have a significant need to replace it. The criteria for the instrument requested for sole source purchase is based on 1) the needs of our many different users, students, faculty researchers,

outside clients, 2) on my 35 years of X-ray diffraction experience using many different instruments, including those considered and tested for the purpose of this purchase 3) best integration into our current diffraction facility including compatibility and ease of dual use with our current single crystal diffractometer; A Rigaku Synergy-S.

5. Provide a detailed, sufficient explanation of the reasons, qualifications or unique capabilities of the prospective vendor that make that prospective vendor the one source for providing the items of tangible property, services, or professional services:

The prospective vendor, Rigaku Americas, A Division of Rigaku Americas Holding, is the sole manufacturer of the desired instrument, the uniqueness of which and reason for this request is outlined in the next section.

6. Provide a detailed, sufficient explanation of how the items of tangible property, services, or professional services is/are unique and how this uniqueness is substantially related to the intended purpose of the department/grant:
 - a) Benchtop XRD system must be capable of operating at a minimum of 600 Watts of X-ray power using a Cu XRD x-ray tube. Dimensions must be less than 22in (W) x 19in (D) x 28in (H) and weigh less than 180 lbs to minimize lab space. Must have an integrated chiller that uses only water, not specialty chemicals, for the purpose of cooling the X-Ray tube. Heat exchange will only be water to air, no external liquids.
 - b) The system must include a seamless pixel array detector with a maximum of 340eV energy resolution at 8keV. Must have at least 180mm² active area and a maximum of 75 x 75 micron pixel size. The detector must perform 2-dimensional measurements as well as 0- and 1-dimensional measurements.
 - c) The system must have a continuously variable divergence slit that keeps the irradiated area of the sample constant throughout the entire 2-theta measurement range. System will also include matching incident and receiving soler slits.
 - d) The optics must include a continuously variable knife edge for use with the pixel array detector to provide low angle protection of the detector and open automatically as the detector is moved to higher 2-theta ranges.
 - e) System must include an eight-position (or more) sample changer with spinning capability that can be easily removed or added by the user for exchanging with other devices such as high temperature stages or operando stages. Will include a sample holder for each position of the changer.
 - f) The system must be equipped with a stand-alone external PC running a Windows 11 operating system for data collection and analysis. Must include at least 10 perpetual licenses for the data collection and analysis software. The XRD hardware manufacturer must also make the software for complete responsibility of the instrument and its use. Software to include: data collection,

basic graphics analysis package including RIR quant and Scherrer equation for crystallite size, additional package for percent crystallinity, crystallite size using a fundamental parameter method, and cell refinement. In addition, a search/match module must be included as well as a Rietveld package for quant and structure refinement. The COD database must be included and must work with the search/match software provided. The data format must be easily compatible with the powder data components of the CrysAlisPro software package.

- g) 3 days of online or onsite training by application scientists must be included. A one-year warranty on the system including onsite repair including labor and parts must be included. After the warranty has expired free over the phone trouble shooting service (with the capability of remotely connecting to the instrument for help with diagnosis) for the lifetime of the instrument.

- h) Please provide a narrative description department's due diligence in determining a basis for the procurement. Include:

- a. method used to research and review other available sources (i.e. list of potential vendors from Purchasing, internet, state pricing agreements, purchasing cooperatives)

The PI has personally used (tested) instruments, and previously purchased instruments from Bruker Malvern Panalytical', and Rigaku. He has looked at and compared all of the options currently offered by these and other companies including Proto Manufacturing. He has also discussed the experiences of trusted colleagues at other Universities (e.g. Texas A&M, University of VT, Notre Dame University, etc.). I have been looking at different instruments to replace our current PXRD since arriving at NMT on 9/2022.

- b. list of vendors contacted, the date and method of contact (i.e. email, phone call)

Bruker; phone call 4/2024

Malvern Panalytical'; phone calls and emails 5/2023

Rigaku, phone calls, personal visit to the company headquarters, personal visits by company employees since 5/2023

Proto Manufacturing. numerous phone call and emails since 4/2023

- c. documentation explaining why:
 - i. those vendors cannot provide the required items of tangible property, services, or professional services
 - ii. other similar items of tangible property, services, or professional services cannot meet the intended purpose of department/grant:

The only vender who can meet the listed requirements in part 6 is Rigaku. Several of the most important criteria in that list including b, c, and f can only be met by Rigaku.

The PI on this request has a long history of working with several of the other PXRD manufacturers in service, upkeep and troubleshooting various of their manufacture. Regrettably, those companies have

proven to be poor partners, especially with their pricing, communication, and timeliness of service. My experience with Rigaku, and the solicited opinions of colleagues, who have also owned Rigaku instruments and the instruments of other manufacturers, put this company on the top of my list for standing behind their product, and helping to maintain it at reasonable costs.

I certify I have performed thorough and diligent research and analysis to determine that Rigaku Americas, A Division of Rigaku Americas Holdings, is the only source capable of providing the required goods. I understand that violations of the New Mexico Procurement Code (Chapter 13, Article 1 NMSA 1978) can carry severe penalties. I affirm that the information provided in this Sole Source Determination is true and accurate to the best of my knowledge and belief.

Name, Title:

John Rakovan, Mineralogist and Senior Museum Curator

AdobeSign/Date

John Rakovan
Digitally signed by John Rakovan
Date: 2025.07.31 13:18:55 -06'00'

Review: Purchasing Services (Name, Title): *Meradeth Montoya*
Assistant Director of Purchasing

AdobeSign/Date 7/31/2025

Website Posting Date: *8/4/25*

Posting Expiration Date: *9/4/25*

Protested (Yes/No):

Approval: Delilah A. Walsh *Delilah A. Walsh*
Vice President of Administration and Finance

AdobeSign/Date

04-Aug-2025