

ISSUES, TRANSITIONS AND COLLABORATIONS ASSOCIATED WITH USE OF HAND-HELD XRF IN NATURAL HISTORY MUSEUMS

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This presentation will provide an overview of major issues that natural history museums face as they transition their testing methods and strategies to include the use of hand-held XRF analyzers. The increased numbers of large and small institutions as well as Native American tribes that wish to use the hand-held XRF instruments are relying on their ability as a non-destructive tool to accurately analyze elements on archaeological and ethnographic objects and natural history specimens.

The analyzers have proven to be an excellent screening tool for qualitative results on inorganic and organic objects typically found in natural history collections. There is, however, a gross misconception among users that the instruments can provide quantitative results on organic materials. The ability to do so exists but until appropriate reference materials become available for use and accurate calibration curves can be determined the instruments cannot be relied on for quantification on natural history collections. The analyzers were simply never designed to be used on organic materials for the purpose of quantification using the analyzer's current modern metal alloy or soil standards.

The confusion over the qualitative and quantitative abilities of the XRF analyzer has resulted in an array of new issues and concerns among museum staff and scientists. Included in those issues are the needs for users to understand the physics of XRF, determine the limits of detection, correctly interpret the spectrum, and accurately report the results. Most museum staff do not have this sort of training, nor are museums in a position to provide resources to support it. New testing protocols must be developed based on XRF qualitative spectrum results rather than the necessary quantitative data.

The situation offers an opportunity for museums and manufacturers of the XRF analyzers to collaborate for the benefit of all parties involved. Museums can provide ample spectra taken from the collections to establish reference materials and calibration curves. Manufacturers have the resources to provide the scientists, knowledge, and materials. Collaboration may be the key to obtaining quantification for museums and a true comprehensive software package for the manufacturers.