



Innov-X Canada NRCAN XRF Operator Training

Morning Session

Introduction	Discussion	Introduction
XRF Experience	Discussion	General discussion on participants experience with X-ray Fluorescence.
Fundamental Properties of Matter & XRF	Lecture	Basics of an Element, Atom.
Types of Radiation, x-ray tubes vs. isotopes in XRF	Lecture	X-ray vs Gamma-ray. Alpha, Beta, Neutron, Gamma rays & x-rays. Differences in maintenance & analytical differences
The process of X-ray Fluorescence	Lecture	How x-ray fluorescence occurs. Spectral capture, characteristic x-rays and XRF data.
XRF Analyzers	Lecture	How does it work? Inside the analyzer.
Sources of Error, sample preparation & calibration & applications	Lecture	Becoming aware of the sources of error and how to manage them. Spectral issues: elemental overlap & interference.
Common analysis methods	Lecture	Fundamental parameters, Compton normalization, spectral matching, empirical calibration example.
XRF Factory Calibrations	Lecture	Soil mode, mining plus mode, mining modes. Limits of detection and calibration selection.
Using the analyzer	Lecture	Sampling, project planning, limitations of pXRF

Afternoon Session

Interaction of Radiation with Matter	Lecture	How X-rays react with different materials.
Biological Effects of Radiation	Lecture	How X-rays react with us. Maximum Allowable Canadian Radiation Dose Limits (per ICRP1990)
Radiation Detection	Lecture & Demonstration	Using a radiation survey meter and detection of x-rays.
XRF Safe Work Practices	Lecture & Demonstration	Planning for safe and effective deployment and use of XRF instruments.
XRF Analyzer Operation	Lecture & Demonstration	Demonstration of safe use and operation of handheld and bench top XRF instruments and accessories
XRF Analyzer Operation	Activity	Analyzing different sample types for hands-on component. Core, rock and soil prepared and unprepared.
Applicable Canadian Regulatory Requirements (Remainder for NRCAN Certifying participants – optional for others)	Lecture	RED Act & Health Safety Code 34 Radiation Safety Officer Administration & Registration Requirements
NRCAN Application Forms	Activity	Assistance will be provided in completing application forms for XRF Operator Certification
Questions	Discussion	Open Forum – General Q & A

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