Chapter 6 Errata
(when reading the pdf file, please substitute the following corrections in bold)

Section 6.2 Requirements and Qualifications

Manufacturer's Training (page 43)

In most states, operators must be trained by the manufacturer or receive equivalent training. Syracuse staff took a one-day free training course on the use of the XRF instrument offered by the manufacturer, Niton. The course met New York state requirements and covered radiation safety, XRF theory, worker exposure, as well as hands-on analysis of dust wipes**, soils and paint**.

Costs for the Instrument (page 44)

In addition to investing in trained, licensed, and certified staff, those seeking to implement an extensive lead dust monitoring program may want to buy their own field-portable XRF. Syracuse purchased a Niton Model **XL-309**, which costs about $21,000, making it the most substantial expense the project faced. **This model costs less than other Niton instruments (mainly the XL-700 series) that test for a wide range of metals, yet more than instruments that only analyze for lead-based-paint**. The same model with soil analysis capability would cost an additional $**2500**. Programs will face an additional expense to replace the instrument's radioactive source once every two years, if not more frequently. **NITON's 40mCi Cd-109** source costs $7,300.

Section 6.3 Quality Control

EPA Verifies Use of XRF for Measurement of Lead in Dust (Highlighted Box, Page 44)

In the fall of 2002, EPA's Environmental Technology Verification (ETV) program published a report verifying the use of five field-portable XRF technologies for the measurement of lead in dust. The Niton XL-300 and XL-700 series XRF instruments were among the five brands tested. ETV evaluated overall performance of the Niton **XL-300 series as " . . . having a slight negative bias (but one with an acceptable range of bias) precise, and comparable to the NLLAP [National Lead Laboratory Accreditation Program] laboratory results."**

XRF Usage and Radiation Exposure (Highlighted Box, Page 46)

State regulations concerning the use of dosimetry vary, however, it is typically recommended that an XRF operator wear a dosimetry badge, which monitors exposure to radiation. Even though no radiation dosimetry is required for some isotopes, users should wear a dosimetry badge for the following reasons:.....

Safe Operating Distance (Highlighted Box, Page 47)

XRF instruments used in accordance with manufacturer's instructions will not cause significant exposure to ionizing radiation. But the instrument's shutter should never be pointed at anyone,

even if the shutter is closed. Also, the operator's hand should not be placed on the end plate during a measurement.

The safe operating distance between an XRF instrument and an individual depends on the radiation source type, radiation intensity, quantity of radioactive material, and the density of the materials being surveyed. As the radiation source quantity and intensity increases, the required safe distance also increases. Placing **dense** materials, such as a wall, **between the user and others and a source of radiation, further help to ensure that the possible exposure to radiation is minimal.**

According to NRC rules, a radiation dose to an individual in any unrestricted area must not exceed 2 millirems per hour. One of the most intense sources currently used in XRF instruments is a 40-millicurie **^{109}Cd (Cd-109)** radiation source. Other radiation sources in current use for XRF testing of lead-based paint generally produce lower levels of radiation. Generally, an XRF operator following manufacturer's instructions would be exposed to radiation well below the regulatory level. Typically, XRF instruments with lower gamma radiation intensities can use a shorter safe distance, provided that the potential expo-sure to an individual will not exceed the regulatory limit.....

Section 6.5 Maintaining Equipment (Page 48)

Day-to-day maintenance of the XRF is generally not difficult or costly. Operators should clean the instrument's display window with cotton swabs, clean the case with a soft cloth, and charge the batteries as directed in the owner's manual. Beyond that, operators usually just need to take care not to drop the instrument, get it wet, or neglect the calibration checks recommended by the manufacturer.

Over the long term, however, XRF owners face the very significant isotopes decay at a fixed rate. The half-life of **^{109}Cd** (cadmium-109), for example, is about **15** months. After that, the XRF can still be used, but the instrument becomes progressively less efficient. Readings that once took 30 to 60 seconds take progressively longer. Eventually the wait becomes burdensome, and the isotope must be replaced. Syracuse sends its instrument back to the manufacturer, which disposes of the spent radioactive source, installs the new source, upgrades the instrument's software, and provides whatever preventive maintenance is needed. See Chapter 7, Section 7.3 for more information on managing and disposing of hazardous wastes generated in a lead dust monitoring and mitigation program.