PROCEDURES FOR STORING AND SAFE-HANDLING OF NATURAL RADIOACTIVE MATERIALS
(ROCKS AND MINERALS)

The Carnegie Museum of Natural History, Pittsburgh, PA has developed guidelines that are followed in handling and storing radioactive specimens in museum collections. The documentation may be found at http://www.agiweb.org/smmp/rept-rad-cmnh.htm.

Another resource entitled “Procedures for management of radioactive mineral specimens” is presented at http://www.agiweb.org/smmp/rept-rad-csm.htm and is followed by the Colorado School of Mines Geology Museum.

Both web-sites are maintained by the Society of Mineral Museum Professionals.

First, the license at EWU does not include the management of natural materials (rocks and minerals) that are radioactive. However, it is prudent for departments handling such material to follow similar guidelines as presented at the links above. Therefore, the Radiation Safety Committee at Eastern Washington University hereby proposes to follow a similar set of guidelines for the radioactive minerals in the geology department collection. Inasmuch as certain museum-quality specimens useful for teaching purposes are necessary to have on-hand, the following items are suggested.

1. Hazards Associated with Radioactive Mineral Specimens: Three categories of hazards are associated with radioactive mineral specimens:
   - Specimens release radon gas. Radon gas and its decay products are alpha emitting radionuclide gasses which cause irradiation of sensitive lung tissues when inhaled.
   - Many specimens are highly friable and produce airborne dust when handled. Inhalation or ingestion of radioactive dust causes irradiation of sensitive tissues. Radioactive dust which enters the body may be retained for prolonged periods causing long-term exposure.
   - Radioactive specimens may release gamma radiation which causes external body exposure to penetrating radiation. Some specimens have been found to lead to a surface exposure rate at high as 80 milliroentgens per hour. Handling or being close to a specimen with an exposure rate in this range can result in a significant exposure to radiation.

2. The definition of minerals and rocks containing radioactive nuclides for the purposes of this policy includes those emitting an equivalent dose of 0.002 rem (0.02mSv) in any one hour or more when stored in an area having unrestricted access by the general public. The definition for trained workers includes those minerals and rocks emitting an equivalent dose of 0.02 rem (0.02mSv) in any one hour or more. This may be similar to a high energy gamma and beta radiation emission, as from Cs 137, of 10,000 cpm at 16 inches.

3. Acquisition and Disposal of Radioactive Mineral Specimens: No one may acquire or dispose of radioactive mineral specimens without the prior approval of the Department Chair or other member of the department aware of these guidelines or in consultation with the Radiation Safety Officer.

4. Highly reactive museum-quality radioactive mineral samples will be stored in a small, lead lined storage box. Samples will be placed in Ziploc bags and stored in box in a restricted area locked at all times. The area should be accessible by all members of the geology department as needed to remove samples to teach about radioactive minerals in the classroom. Samples should be returned to the box once demonstrations are complete. Samples should remain in the Ziploc bags during viewing so as to reduce the possibility of dust.

5. Scintillometer readings will be taken around the storage box on a quarterly basis by the Radiation Safety Officer. Excess, non-museum quality, radioactive mineral-bearing rocks specimens should be disposed of. These would include samples with no scientific or educational merit.
6. Common, but possibly radioactive, granitoids shall be stored and shielded by placing them in drawers and cupboards unless they are being used for instruction. No natural radiation materials will be brought from the field to the geology department without consideration of the points made above. Each geology faculty member who might bring such samples back to the department for study will store samples as outlined above.

7. Students attending courses which may require students to handle potentially hazardous geologic materials several times a week will be provided with information on safe-handling of those materials. For example, these materials may include arsenic-, mercury-, lead-bearing minerals. Syllabi for such courses will have a statement pertaining to safe handling of materials and the Environmental Health and Safety Officer will be open to presenting information to the class early in the quarter in which it is being taught.

8. The body external dose in any unrestricted area due to radioactive mineral and rock sources must not exceed 0.002 rem (0.02mSv) in any one hour. Radiation hazard signage will be posted conspicuously when potential human exposure exceeds 2,000 rems/hr.

9. Maximum radiation dose standards for individuals in restricted areas (such as approved radiation workers) establish a whole body limit for radiation exposure, including the lens of eyes, to 1,250 mrem per calendar quarter. Non-radiation workers (i.e. members of the general public) are allowed to receive one tenth of that exposure or 125 mrem per calendar quarter. In Title 10 of the Code of Federal Regulations Part 20 [10 CFR 20], effective on January 1, 1994, this limit was changed to an eye dose equivalent of 15 rems (0.15 Sv) per year for the general public.