DRAFT PA POLICY FOLLOWS AS DISCUSSION ITEM:

PA DEP, Bureau of Radiation Protection
Radon Division

Radon Chamber Policy

A policy is set forth stating the requirements for both the listing of radon chambers and their use by the Pennsylvania Department of Environmental Protection (DEP) certified radon community. All PA certified radon testers and laboratories shall use only DEP-approved and listed radon/radon progeny chambers to meet their Quality Assurance (QA) requirements. These QA requirements in part, include spikes and calibrations.

There are two organizations that provide for the approval of radon chambers, the National Environmental Health Association (NEHA), and the National Radon Safety Board (NRSB). These organizations help to assure adequate quality assurance/quality control (QA/QC) and radon/radon progeny traceability among the approved chambers.

This policy may be amended as industry consensus standards on radon/radon decay product chambers, calibration procedures, device proficiency testing, spikes, and new device evaluations become available.

Radon Chambers

All radon chambers listed by the DEP for providing calibration, spiking, proficiency testing or initial device evaluation services shall maintain listing from either NEHA or NRSB as a secondary or tertiary radon/radon progeny chamber. The chamber(s) shall continue to meet the on-going requirements of the NEHA or NRSB programs.

A secondary chamber meets all of the requirements of the listing agency as well as maintaining an annual intercomparison program with the US EPA Las Vegas Radon Chamber. A tertiary chamber does likewise, except its annual intercomparison program is with a secondary chamber. For listing agency requirements see either web site at: www.nrsb.org or www.radongas.org.

All DEP listed chambers shall also participate in intercomparison programs initiated by the Department. These intercomparison programs would be separate from the intercomparisons of the above paragraph. They will be scheduled as determined by the Department and most likely would employ either continuous radon monitors or grab scintillation cells to verify chamber concentrations.

Device Calibration

Calibration is the process of determining the response of an instrument (or measurement system) to a series of known values over the range of the instrument (or measurement system). Calibration is often regarded as including the process of **adjusting** the output or indication on a measurement instrument to agree with the value of the applied standard, within a specified accuracy.

The calibration process must be traceable to a national standard, at this time the US EPA Radiation and Indoor Environments National Laboratory, Las Vegas, NV. A National Institute of Standards and Technology (NIST) Radium-266 or Radon-222 standard could also be used to provide traceability.

Calibration of continuous radon monitors (CR) and continuous working level monitors (CW) shall only be performed by the manufacturer of the device or by a secondary or tertiary radon/radon progeny chamber, with written approval by the manufacturer to calibrate their devices, where that manufacturer has a proprietary calibration procedure. This written approval may be revoked at the discretion of the manufacturer.

Device calibration frequency shall continue to follow the Indoor Radon and Radon Decay Product Measurement Device Protocols, EPA 402-R-92-004, July 1992; until such time that these protocols are superseded.

Device calibrations shall follow at a minimum, manufacturer calibration procedures as found in the device specific literature from the manufacturer.

The calibration frequency shall be at a minimum, annual, and include a background determination. At least **one** two-point calibration shall be performed on the instrument and documented. Thereafter the two-point calibration is recommended but not required, unless the manufacturer stipulates the two-point calibration. The CR/CW shall be calibrated in the range of radon/radon progeny concentrations typically encountered in the field, approximately 4 to 20 pCi/L (0.016 to 0.08 WL). Additional ranges may be included as deemed necessary. The background determination shall be a combination of the electronic noise as well as the inherent radioactivity of the instrument or device.

All device calibrations shall include a calibration certificate and a sticker attached to the device listing the date of calibration, the due date of next calibration, the initials of the person performing the calibration, the laboratory, chamber, or manufacturer where the device was calibrated, and the calibration factor. The calibration certificate shall be provided to the user for their QA records.

Proficiency Testing

New certification applicants who analyze radon/radon progeny measurement detectors, read electret ion chambers, or read continuous radon/ radon progeny monitors shall provide evidence of device proficiency within the past two years from a Department-approved program for each device utilized.

The requirements at this time for a proficiency test are that:

- Any Department certified individual who reads or analyzes devices must participate using a Department approved chamber. This would include charcoal, alpha track, or electret ion chamber laboratories, electret ion chamber testers, and CR/CW testers.

- Five passive devices or one active device must be submitted for the proficiency test.

- The exposure conditions must remain "blind" to the participant until results have been reported.

- Chamber exposure conditions shall be in the range of 4 to 20 pCi/L, 30 to 70% RH, and 55 to 75 degrees Fahrenheit, and 48 hour minimum exposure duration. For long-term integrating devices a minimum exposure of 300 pCi-days/L shall be provided.

- The participant's device must be a previously approved device.

- The results of the test must produce an individual relative error (IRE) of less than +/- 25% for continuous monitors and an IRE of less than +/- 25% for <u>each</u> of the five passive devices submitted.

- A precision requirement of the five passive devices requires that the Coefficient of Variation (COV) of all five simultaneously exposed devices be less than or equal to 10%, where the COV is the standard deviation divided by the mean of the five devices.

- Failure of a proficiency test would require that the laboratory or certified individual examine their equipment and procedures to resolve the poor performance, prior to re-submitting devices for a second proficiency test. A second failure would require Department investigation.

- The proficiency test is only required once for initial certification, unless the tester or laboratory becomes certified for a new device or the laboratory acquires a new certified individual to perform analysis.

- Submit written evidence of successful participation in the proficiency program for each device used to the Department.

- NJ requires the CR/CW operator to go to the chamber

Chamber requirements to be listed for providing device proficiency testing services:

- Submit a written request to the Department. This written request must provide documentation that the chamber is a NEHA or NRSB secondary chamber, and it must specify whether it will be providing proficiency tests for radon gas, radon progeny, or both.

- Be Listed with NRSB as a secondary radon/radon progeny chamber or NEHA as certified for performance testing (~equivalent to a NRSB secondary).

- If the chamber operators believe that there is a potential for a conflict of interest during the proficiency test they should recuse themselves from providing this service and recommend to the client that they use another chamber.

- An approved chamber may not perform proficiency testing on any device(s) that they may happen to be certified to use in the Commonwealth.

Spikes

All PA certified testers and laboratories shall use only NEHA/NRSB approved secondary or tertiary chambers for providing spikes to meet their QA requirements. Spikes need to be performed on a routine basis throughout the measurement process year. Spikes should be exposed to the various conditions that may be reasonably expected in the home environment.

Spike frequency shall continue to follow the Indoor Radon and Radon Decay Product Measurement Device Protocols, EPA 402-R-92-004, July 1992; until such time that these protocols are superseded.

Initial New Device Evaluation

Any NEHA/NRBS approved chamber shall be able to provide initial evaluation of new radon/radon progeny devices that may come onto the market. Final device approval and listing has now been privatized and goes through either NRSB or NEHA. The US EPA radon/radon progeny chamber in Las Vegas, Nevada, is used for the new device evaluation in a chamber setting. This is done in cooperation with NRSB and/or NEHA.