**Glossary**

Terms with an “ **\*** ” are most exam-worthy!

**Note to Students:**

While the Glossary is an often-overlooked element of a course, these terms are an integral element of your success in the study of radon science and the ability to apply attained knowledge in the field. In other words, don’t bypass the Glossary in your studies!

**Absorbed Dose -** Theenergy deposited by ionizing radiation per unit mass of material. Units of absorbed dose are the gray (GY) and the rad.

**\*Accuracy –** The correlation between the measured value and the original target or “true” value. The degree of agreement of a measurement (X) with an accepted reference or true value (T); usually expressed as the difference between the two values (X – T), or the difference as a percentage of the reference or true value (100[X – T]/T), and sometimes expressed as a ratio (X/T).

**\*Activated Carbon -** A material manufactured from the combustion of fibrous materials such as coconut shells or wood under low oxygen conditions. This process makes "sites" within the material upon which radon can be adsorbed. This material is used in activated carbon measurement devices and in activated carbon adsorption units for removing radon from water.

**Active radon/radon decay product measurement device -** A radon test or radon decay product measurement system which uses a sampling device, detector, and measurement system integrated as a complete unit or as separate, but portable, components. Active devices include continuous radon monitors, continuous working level monitors, and grab radon gas and grab working level measurement systems, but does not include devices such as electret ion chamber devices, activated carbon or other adsorbent systems, or alpha track devices.

**Active Mitigation System** or **Active Soil Depressurization** or **ASD** – A family of radon mitigation systems involving mechanically driven soil depressurization, including sub-slab depressurization (SSD), drain tile depressurization (DTD), block wall depressurization (BWD), and sub-membrane depressurization (SMD).

**Activity** - Synonymous with RADIOACTIVITY

**Acute Effect -** An effect that becomes apparent after a discrete brief exposure, rather than being manifested only long after exposure.

**Adsorption** - The adhesion of atoms, ions, or molecules from a gas, liquid, or dissolved solid to a surface, i.e., where radon molecules are retained on the surface of the charcoal in a charcoal canister.

**The Agency –** Inline reference to “The Agency”, known as the Illinois Emergency Management Agency, Division of Nuclear Safety.

**Aggregate** - Stone, crushed stone, or other inert material having hard, strong, durable pieces. When used in house construction, it forms the uppermost surface on which the slab is poured, just below the vapor barrier.

**Air Changes per Hour (ACH)** - The number of times within 1 hour that the volume of air inside a house would nominally be replaced, given the rate at which outdoor air is infiltrating the house. If a house has 1 ACH, it means that all of the air in the house will be nominally replaced in a 1-hour period.

**Air Exchange Rate** - The rate at which the house air is replaced with outdoor air. Commonly expressed in terms of air changes per hour.

**\*Air Pressure Differentials -** Differences in air pressure that exist over short distances, e.g. between the interior of a home and below slab or between inside and outside the building shell. Air moves from areas of higher pressure to lower pressure. Air flow caused by pressure differentials is a major force for radon entry into buildings.

**Alarm** - As used here, a device which gives a visual or auditory signal (such as a light or a buzzer) when the suction or air flow in an ASD system moves outside the acceptable operating range for that system. An alarm may or may not also include a gauge to provide a reading of the actual suction or air flow in the system.

**\*Alpha Decay** - The radioactive decay of an atom in which the nucleus loses two protons and two neutrons.

**\*Alpha particle -** Two neutrons and two protons bound as a single particle that is emitted from the nucleus of certain radioactive isotopes in the process of decay.

**\*Alpha Track Detector -** A long-term detector for radon. It consists of a plastic material or celluloid film, in which alpha radiation leaves damage tracks that can be counted under a microscope after the plastic material is etched in NaOH (sodium hydroxide) solution.

**Anchor Bolt** - A threaded rod used to fasten the sill plate to the foundation.

**Asbestos or Asbestos-Containing Material (ACM)** - A fire-proofing material used extensively in general building construction up until its use was severely restricted by the U.S. EPA in 1972 due to exposure concerns. Asbestos fibers target the respiratory system and exposure can increase risks in developing asbestos, lung cancer, and mesothelioma. Radon related diagnostic and mitigation activity might inadvertently release asbestos fibers into the air.

**\*Atom** - The smallest particle of an element that exhibits the same chemical properties of the compound itself. Consists of a nucleus (a mass of protons and neutrons) surrounded by electrons.

**\*Atomic Number** - The number of protons (positively charged particles) found in the nucleus of an atom. Each element has a distinct atomic number.

**\*Atomic Weight** - The weight of an atom, which is approximately the number of protons and neutrons in the nucleus. This sum is also called the atomic mass.

**Back-Drafting** - A condition where the normal movement of combustion products up a flue, resulting from the buoyant forces on the hot gases, is reversed, so that the combustion products can enter the house. Back-drafting of combustion appliances (such as fireplaces and furnaces) can occur when depressurization in the house overwhelms the buoyant force on the hot gases. Back-drafting can also be caused by high air pressures at the chimney or flue termination.

**Backer Rod -** A semi-rigid foam material resembling a rope of various diameters used to fill around pipes, etc., and to assist in making a sealed penetration. For example, where a pipe is inserted through a concrete slab, a length of backer rod is jammed into the opening around the pipe. Caulking is then applied to the space above the backer rod and between the outside of the pipe and the slab opening. The purpose of the backer rod is to hold the semi-fluid caulk in place until it sets or hardens. It is most important that a sealant only adhere to the two sides of the joint and not the base of the joint (third side). Adhesion to all three sides will prevent the sealant from elongating properly and will cause sealant failure. (Adopted Rule 422.20)

**Backfill** - Earth replaced around a foundation.

**Background Count Rate -** Omit

**\*Background Measurements** - Background measurements are made with instruments exposed to very low radon concentration environments (such as outdoor air), or can be "blanks", unexposed passive detectors. Background levels are subtracted from samples before calculating sample concentrations.

**\*Background Radiation -** Radiation arising from radioactive material other than that under consideration. Background radiation due to cosmic rays and natural radioactivity is always present; background radiation may also be due to the presence of radioactive substances in building materials.

**Balloon Frame** - A type of building frame in which the studs extend from sill to eaves without interruption or cross bracing.

**Baseboard** - The finishing board covering a wall where it meets the floor.

**Basement** - A type of house construction where the bottom livable level has a slab (or earthen floor) which averages 3 feet or more below grade level on one or more side of the house.

**Bearing Partition** - Omit

**Bearing Plate** - Omit

**Becquerel (Bq) -** The International System of Units (SI) definition of Activity. 1 Bq = 1 disintegration per second.

**\*BEIR -** Biological Effects of Ionizing Radiation - A report by the National Research Council that provides the basis for determining lung cancer risks for individuals from the Uranium Miner data.

**\*Beta Decay -** Radioactive decay in which a nucleus is transformed by the emission of an electron or positron. In either case, the atomic mass remains unchanged, but the atomic number either increases or decreases by 1.

**\*Beta Particles** - High-energy, high-speed electrons or positrons emitted by certain types of radioactive nuclei. The beta particles emitted are a form of ionizing radiation also known as beta rays. The production of beta particles is termed beta decay.

**\*Bias** - A systematic (consistent) error in test results. Bias can exist between test results and the true value (absolute bias, or lack of accuracy), or between results from different sources (relative bias). For example, if different laboratories analyze a homogeneous and stable blind sample, the relative biases among the laboratories would be measured by the differences existing among the results from the different laboratories. However, if the true value of the blind sample were known, the absolute bias or lack of accuracy from the true value would be known for each laboratory. See **Systematic Error**.

**\*Blank sample -** A control sample in which the detector is unexposed and submitted for analysis. Often used to determine detector background values.

**\*Blind Spikes** - Detectors exposed to known values and submitted for analysis without being labeled as such. Used to evaluate the accuracy of a laboratory's analytical process.

**Blocking** - Small wood framing members placed between wall studs to facilitate hardware attachment.

**Blower Door** - A device consisting of an instrumented fan, which can be mounted in an existing doorway of a house. By determining the air flows through this fan required to achieve different degrees of house depressurization, the blower door permits determination of the tightness of the house shell, and an estimation of the natural filtration rate.

**Bonding Agent** - A material added to adhesive or on a surface to be bonded to enhance adhesion characteristics of the bonding material.

**Brick Veneer** - A brick facing laid in front of frame construction.

**Bridging** - Cross-bracing between floor joists to add stiffness to the floors.

**British Thermal Unit (BTU)** - Basic heat measurement, equivalent to the amount of heat needed to raise 1 pound of water 1 degree Fahrenheit.

**Bronchial Epithelium** - The surface layer of cells lining the conducting airways of the respiratory system.

**Built-Up Roof** - A roof composed of several layers of felt and asphalt, pitch, or coal tar.

**Calibrate -** To determine the response or reading of an instrument relative to a series of known values over the range of the instrument; results are used to develop correction or calibration factors.

**Calibration** - The determination of deviation from standard of measurement instrument to determine necessary correction factors (calibration factor).

**Canal Drain** - A means for collecting water in a basement by means of a large gap or channel between the concrete floor and the wall. Collected water may flow to aggregate beneath the slot "French Drain" or to a sump where it can be pumped away.

**Cantilever** - A beam or girder fixed at one extremity and free at the other. To "cantilever" is to employ the principle of the lever to carry a load.

**Cavity Wall** - A masonry wall having an air space of about 2".

**Channel Drain** - A void area between the concrete floor and foundation wall that remains open to collect surface water; typically 2-inches wide (See Canal Drain).

**Chases** - Open areas that run horizontally or vertically through a structure to accommodate installation of pipes, duct, and electrical wire.

**Check Valve** - A device installed on an effluent plumbing line to only allow flow discharge in one direction.

**Check source:** A radioactive source, not necessarily calibrated, which is used to confirm the continuing satisfactory operation of an instrument.

**Chemical Smoke** - A sensitive smoke generated from the reaction of titanium tetrachloride and air.

**Chronic Effect** - An effect that becomes apparent only sometime after exposure, as opposed to an acute effect, which develops with a one-time or short-term exposure.

**Circuit** - The path for an electric current.

**Closed House Conditions -** During any short-term test, closed-house-conditions should be maintained as much as possible while the test is in progress. In tests of less than 4 days duration, closed-house-conditions should be maintained for at least 12-hours before starting the test and for the duration of the test. While closed-house-conditions are not required before the start of tests that are between 4 and 90-days, closed-house-conditions should be maintained as much as possible.

**\*Coefficient of Variation** - The standard deviation of a number of samples divided by the average value of those of samples. See **Relative Percent Difference**.

**Cold Air Return** - The registers and ducting which withdraw house air from various parts of the house and direct it to a central forced-air furnace or heat pump. The return ducting is at low pressure relative to the house because the central furnace fan draws air out of the house through this ducting.

**Column** - A vertical member, generally a beam or post, that supports some of the weight of a building.

**\*Concentration Gradient Diffusion** - One of the methods by which radon moves through a material (soil) by diffusion from a higher concentration (source) to areas of lower concentration. The rate of diffusion is generally determined by the porosity of the soil.

**\*Controlled Calibrations -** A controlled calibration refers to measurements made in a known radon environment (calibration chamber). Generally, detectors that require laboratory analysis (e.g., charcoal canisters and alpha track detectors) are placed in a calibration chamber for a known period of time and then sent to a laboratory for analysis. The laboratory result may then be compared with the known chamber concentration value to check the accuracy of the laboratory, (a "blind calibration"), or used to derive or verify the conversion factors for the detectors (a "spiked sample"). Real-time radon and RDP measuring instruments must be operated in a chamber on a regular basis to calculate the calibration factor.

**\*Convective Movement** - As used here, the bulk flow of radon-containing soil gas into the house as the result of pressure differences between the house and the soil. Distinguished from diffusive movement.

**Concrete** - A masonry mixture of Portland cement, sand and aggregate, and water in proper proportions.

**Concrete Masonry Unit (CMU)** - Composite material fabricated in modular units, typically used to fabricate foundation walls in conjunction with mortar. Sometimes referred to as block, cinder block, and concrete block.

**Condensation** - Water formed by warm, moist air contacting a cooler surface.

**Conductor** - A material permitting passage of electric current.

**Conduit** - A pipe or trough that carries water, electrical wiring, cables, and so forth.

**Cornice** - That part of a roof which extends or projects beyond the wall; the architectural treatment thereof, as a "box cornice."

**Counterflashing** - A flashing used under the regular flashing.

**Course** - A horizontal row of bricks, tile, stone, building blocks, or similar material.

**Crawl Space** - An area beneath the living space in some houses, where the floor of the lowest living area is elevated above grade level.

**Cubic Feet per Minute (cfm)** - A measure of the volume of a fluid (liquid or gas) flowing within a fixed period of time.

**\*Curie (Ci)** - A standard measurement for radioactivity, specifically the rate of decay for a gram of radium -- 37 billion decays per second. A unit of radioactivity equal to 3.7 x 1010 disintegrations per second.

**Curtain Wall** - An exterior wall which provides no structural support.

**Damper** - A movable plate to regulate the air flow in a duct.

**Daylight Drains** - A drain pipe that is laid horizontally around the foundation to collect sub-surface water. The drain pipe will continue from the building until it breaks grade and reaches daylight.

**De-Gassing** - As used here, the release of dissolved radon gas into the house air when radon-containing well water is used in the house.

**\*Decay -** Decrease in activity of a radioactive substance due to the disintegration of an atomic nucleus resulting in the release of alpha or beta particles or gamma radiation.

**\*Decay Product** - Radioactive materials degrade to give rise to decay products, often referred to informally as "daughters" or "progeny." The radon decay products of most concern from a public health standpoint are polonium-214 and polonium-218.

**Decay Series** - The consecutive members of a family of radioactive isotopes formed by sequential radioactive decay.

**Degree Day (dd)** - The degree day is a unit of heat measurement equal to one degree variation from the standard temperature in the average temperature of one day. If the standard is 65 degrees F and the average outside temperature is 50 degrees F for two days, then the number of degree days is 30, i.e., 15o x 2 days = 30 dd.

**\*Depressurization** - In houses, a condition that exists when the air pressure inside the house is slightly lower than the air pressure outside or the soil gas pressure. The lower levels of houses are essentially always depressurized during cold weather, due to the buoyant force on the warm indoor air (creating the natural thermal stack effect). Houses can also be depressurized by winds and by appliances which exhaust indoor air. Radon-containing soil gas is drawn more rapidly into a house under the depressurized condition.

**Diagnostic Measurements** - A variety of different types of tests that can be conducted prior to or following the installation of a radon reduction system, in order to aid in: deciding which radon reduction technology to utilize; designing the selected system; or evaluating the reasons why an installed system is not performing as anticipated.

**Differential Pressure Gauge** - A gauge which has two parts. The gauge measures the difference in pressure between the two parts. If one part is left open and the other part is connected via a tube to beneath a concrete slab, the resultant measurements provides the difference in pressure from beneath the slab of the interior of the home. Such gauges can be obtained with large ranges of measurements to thousandths of an inch of meter column as in the case of a micromanometer.

**\*Diffusive Movement** - The random movement of individual atoms or molecules, such as radon atoms, in the absence of (or independent of convective movement). Atoms of radon can diffuse through tiny openings, or even through unbroken concrete slabs. Distinguished from convective movement ( See Concentration Gradient Diffusion).

**Downspout** - A vertical drain pipe for carrying rain water from the gutters.

**Draftstop** - Fire retardant materials placed around openings through floor and sealing systems to prevent the flow of gases.

**Drainage Board -** A board with grooves or an open mesh material that is installed next to exterior foundation walls from just below grade line to the footing during construction. The purpose of which is to provide a pathway for surface water to easily run down the side of the wall to the exterior foundation drainage system.

**Drain-Tile Depressurization (DTD)** - A variation of the ASD technology, where the area around the foundation is depressurized by drawing suction on drain tiles.

**Driver** - In the context of this document, driver indicates the element that generates negative pressure to power and ASD system. These are fans or blowers.

**Dry Core Drill** - An electric-powered drill that usually can be used like a small jackhammer, a hammer drill, or a core drill. This type of drill usually does not use cooling water. Generally, a chisel bit is used in the jackhammer mode, a screw bit in the hammer drill mode, or a core bit in the core drill mode.

**Ductwork** - Any enclosed channel(s), which directs the movement of air or other gas.

**Duplicates** - Two measurements made side-by-side as a quality control measure. The primary objective is to determine how close the resulting values are to each other, i.e. their precision.

**Dura-Wall** - Horizontal reinforcing for CMU walls typically placed every sixth course and imbedded in mortar.

**Dynamic Equilibrium** – The steady-state in which the entry rate of radon gas and its RDPs become equal.

**Eave** - The border of a roof that overhangs any wall. (Adopted Rule 422.20)

**Effective Leakage Area** - A parameter determined from blower door testing, giving a measure of the tightness of the house shell. Conceptually, this leakage area reflects the square inches of open area through the house shell, through which air can infiltrate or exfiltrate.

**\*Efficiency -** The relationship between the number of events recorded (counts, voltage lost, tracks) and the number of radioactive particles incident up on the sensitive element of the detector per unit time. Efficiencies for radon detectors are commonly expressed in terms of the calibration factor, which is the number of events (counts) per time (our or minute) per radon concentration (pCi/L). Methods with high efficiencies will exhibit more counts (signal) per time in response to a given radon level than will a method with a low efficiency.

**Elbow** - An L-shaped pipe fitting. A 90o fitting.

**\*Electret Ion Chamber** - A device for measuring radon. Radon diffuses into the chamber where it goes through its normal decay process emitting ionizing radiation. The ions created alter the charge on an electret surface. Measurements of the charge on the electret surface before and after deployment of the device can be used to calculate the radon concentrations in the room in which the detector was placed.

**Electron** - An elementary constituent of an atom that orbits the nucleus and has a negative charge. Beta decay is radioactive decay in which an electron (or a positron) is emitted from a nucleus.

**Electron Volt (ev)** - The energy assumed by an electron as it is accelerated through an electric potential difference of one volt. One electron equals 1.6 x 10-19 Joules.

**Emanation –** The emission of radon gas from building materials containing high volume of Naturally Occurring Radioactive Material (NORM) such as granite, gypsum and shale.

**Entry Routes** - Openings through the flooring and walls where the house contacts the soil, providing pathways by which soil gas can flow into a house.

**\*Epithelium** - Omit

**Equilibrium Ratio** – A total concentration of radon decay products (RDPs) present divided by the concentration that would exist if the RDPs were in radioactive equilibrium with the radon gas concentration, which is present. At 100% equilibrium (i.e., at an equilibrium ratio of 1.0), 1 WL of RDPs would be present when the radon concentration was 100 pCi/L. The ratio is never 1.0 in a house. Due to ventilation and plate-out, a commonly assumed equilibrium ratio is 0.5 in which case 1 WL corresponds to 200 pCi/L. However, equilibrium ratios vary with time and location, and ratios of 0.3 to 0.7 are commonly observed. Large buildings, including schools, often contain equilibrium ratios less than 0.5.

**\*Equilibrium, Secular -** Omit.

**Exfiltration** - The movement of indoor air out of the house.

**Exhaust Fan** - A fan oriented so that it blows indoor air out of the house.

**Expansion Joint** - A joint between a concrete slab or two adjacent slabs that allows the concrete to move independently from the adjacent slab or wall. It is typically a 1/2 inch fibrous board which is impregnated with an asphaltic material. It is laid either between the first and second slab or between the wall and the adjacent floor.

**Exposure time -** The length of time a specific mail-in device must be in contact with radon or radon decay products to get an accurate radon measurement. Also called exposure period, exposure parameters, or duration of exposure.

**Facade** - The front or face of a building.

**Fan Curve** - A plot of the airflow that a specific fan can produce with a given amount of pressure drop. When there is no flow, the fan will exert the maximum suction or pressure it can attain. The maximum airflow the fan can produce exists when there is no resistance (free air), and no pressure drop across the fan. The collection of points representing the airflow at any intermediate pressure produces the fan curve for that fan.

**Fascia** - A flat banded projection on the face of the cornice.

**\*Field Blank -** A quality control measurement made using a detector which has not been exposed to radon or progeny. The purpose of this procedure is to determine the bias associated with the storage and shipping of devices.

**Fieldstone** - Building stone found loose on the ground (field) regardless of its exact variety.

**Fill Soil** - The soil that has been graded, placed, and packed directly under where the slab will be poured. Fill soil may be brought from another site or may be native to the area. For a stem wall construction, the fill soil is used to "fill" the space inside the stem walls up to the level at which the bottom of the slab will be poured. In the monolithic construction, the fill soil is the soil into which the footings and onto which the slab will be poured.

**Fire Stopping** - Obstructions across air passages in buildings to prevent the spread of hot gases and flames; horizontal blocking between wall studs.

**Fire Wall** - A wall system installed to separate areas to protect from fire and smoke.

**Flashing** - The sheet metal work used to prevent leakage over windows and doors, around chimneys and other roof penetrations, and at the intersections of different wall surfaces and roof planes.

**Floor Plan** - A diagram of a floor of a building.

**Flowable Caulk** - Refers to caulks (often urethane caulks) which are sufficiently fluid such that they will tend to flow like a viscous liquid prior to curing. Flowable caulks have the advantage of flowing into cracks and irregularities in the opening being sealed, thus forming an effective seal.

**Flue** - A passage in the chimney to convey smoke to the outer air.

**Follow-Up Measurements** - Measurements made to evaluate typical long-term radon concentrations. They are conducted after an initial measurement indicates the potential for unacceptable radon levels.

**Footing(s)** - A concrete or stone base which supports a foundation wall and which is used to distribute the weight of the house over the soil or subgrade underlying the house. The bases upon which the foundation and posts rest.

**Forced-Air Furnace (or Heat Pump**) - A central furnace or heat pump that functions by recirculating the house air through a heat exchanger in the furnace. Distinguished from a central hot-water space heating system or electric resistance heating.

**Foundation** - The supporting wall of a building below the first-floor level.

**French Drain** - A means for collecting drainage water around a house for the purpose of diversion. In its early forms, this was a trench of large aggregate along or below a foundation that would allow water collected in the trench to soak down through the soil. More modern improvements on this design lead to "canal" or "channel drains" inside of a basement to facilitate interim water to flow to the aggregate or a sump. Another improvement was to place perfected pipe in a rock-filled trench around the inside or outside of the footing to collect and divert water.

**Frost Line** - The depth of frost penetration in soil.

**Furring** - Wood strips fastened to a wall or ceiling for the purpose of attaching wallboards or ceiling tile.

**Gable** - See eave. (Adopted Rule 422.20)

\***Gamma Radiation** - Short-wavelength electromagnetic radiation of nuclear origin, with energies between 10 keV to 9 MeV. Smaller and faster than Alpha Radiation but not as damaging to lung tissue. Often referred to as photons of energy or pure energy.

**\*Gamma Rays -** Gamma rays are an example of electromagnetic radiation, as is visible light. Gamma rays originate from the nucleus of an atom. They are capable of traveling long distances through air & most other materials. Gamma rays require more "shielding" material, such as lead or steel, to reduce their numbers than is required for alpha & beta particles.

**Geiger Counter -** A device for detecting beta and gamma radiation.

**\*Grab Sampling** - The collection of a sample over a very short period of time (usually a few minutes). Is essentially an instantaneous measurement, and only indicates values existing at the time of sampling. Generally useful only for diagnostic purposes. See Kusnetz Method.

**Grade (above or below)** - Term describing the level of the ground surrounding a house. In construction, typically refers to the surface of the ground. Things can be located at grade, below grade, or above grade relative to the surface of the ground.

**Grade or Grade Line** - The level of the ground around a building.

**\*Activated Carbon (AC)** – Omit from this area.

**Gross Alpha** - A measure of the total alpha activity of a water sample, excluding radon. It can serve as a rough indication of the radium and uranium concentrations present in a water sample.

**Ground Fault Interrupter Switch** - A switch which is installed in the power cord leading to masonry drills, which are being used to drill or core holes through concrete slabs. If the drill bit touches anything metal beneath the slab (such as a gas line), the switch opens, shutting off the power to the drill before further damage can be done to the sub-slab line. A GFI circuit is also found in areas where water may be present, such as a garage or bathroom.

**Grout** - Cementitious material with non-shrink properties placed under a member resting on a concrete wall to provide a flat bearing surface.

**Gutter** - A trough or depression for carrying off water.

**Gypsum Board** - Board made of plaster with a covering of paper. Also plaster board.

**\*Half-Life** - The time required for half the atoms of a radioactive substance present at the beginning to be disintegrated. For instance, beginning with 100 units, there would be 50 units not disintegrated at the end of the first half-life, 25 at the end of the second, and so forth.

**Header** - A beam perpendicular to the joists into which they are framed.

**Headjoint Area** - The vertical joint located between two CMUs.

**Heat Exchanger** - A device used to transfer heat from one stream to another. In air-to-air heat exchangers for residential use, heat from exhausted indoor air is transferred to incoming outdoor air, without mixing the two streams.

**Heat Recovery Ventilators** - Also known as air-to-air heater exchangers or heat exchangers.

**Heat Transfer Efficiency** - The efficiency at which heat can be transferred from one medium to another. In the context of this manual it is the percentage of heat (expressed in BTUs/pound) which can be recovered from an air stream exhausted from a home through an air to air heat exchanger to the incoming air supply stream.

**Henry's Constant** - The ratio of air to water concentrations of a gas or volatile compound.

**IEMA** – Illinois Emergency Management Agency

**\*Indoor Radon Abatement Act** - Passed in 1988 as Title III of the Toxic Substances Control Act, this law establishes as a national goal - but not as a requirement - that air within buildings "should be as free of radon as the ambient air outside of buildings." The law directed EPA to conduct a variety of activities, and to fund three-year programs for States and Regional Radon Training Centers.

**Infiltrations** - The unwanted admittance of air through cracks and pores. The movement of outdoor air or soil gas into a house. The infiltration, which occurs when all doors and windows are closed, is referred to in this document as the natural closed-house infiltration rate. The reverse of exfiltration.

**Interior Footing Drains** - A perforated pipe located on the interior of the foundation typically in a porous fill material. The pipe runs continuously around the interior foundation and terminates in a sump or may travel to the exterior and be connected to a daylight drain.

**Investigatory Measurements** - Measurements of various types made to determine the sources and entry routes of radon into a structure.

**\*Ion** - An electrically charged atom in which the number of electrons does not equal the number of protons. The ion can have either a positive or negative electrical charge depending on whether it has an excess or a deficit number of electrons.

**\*Ionization -** The process whereby a neutral atom or molecule becomes negatively or positively charged by acquiring or losing an electron.

**\*Ionizing Radiation** - Any type of radiation capable of producing ionization in materials it contacts; includes high-energy charged particles such as alpha and beta rays, and nonparticulate radiation such as gamma rays and X-rays. In contrast to radiation (e.g., visible light and micro-radio waves) in which the waves do not ionize atoms.

**\*Isotope** -An atom of an element characterized by the number of neutrons in the nucleus. All atoms of a given element have the same number of protons, but the number of neutrons can vary among isotopes of the same element.

**\*Kusnetz Method** - A method of determining radon decay product concentrations (working level measurements) in air from grab samples. The decay products from a known volume of air are collected on a filter, and the alpha activity on the filter counted at specified time intervals. The results are in working levels, and do not provide concentrations of the individual decay products.

**\*Lab Blank** - A quality control measurement made to determine the counts that would be reported by an analytical system without the detector having been exposed.

**Lally Column** - A structural steel column which can be hollow or filled with concrete.

**Lifetime Risk** - The lifetime probability of dying of a specific disease.

**Linear Dose Model** - The dose-risk model that assumes that the excess risk is linearly proportional to the dose.

**Lintel** - The horizontal member supporting the wall over an opening such as a window or doorway.

**Liter (L)** - A metric unit of volume equal to 1000 cubic centimeters, or 1.057 quarts.

**Lognormal Distribution** - A distribution of measurements which does not exhibit a normal (Gaussian) distribution, but whose logarithms exhibit such a distribution.

**\*Lower Limit of Detection (LLD)** - The smallest amount of sample activity that will yield a net count, for which there is confidence at a predetermined level that activity is present.

**\*Lowest Level suitable for occupancy -** The lowest level currently lived in or a lower level not currently used, such as a basement, which a prospective buyer could use for living space without renovations. This includes a basement that could be used regularly, as for example a recreation room, bedroom, den, or playroom.

**\*Lowest lived-in level -** The lowest level or floor of a home that is used regularly, including areas such as family rooms, living rooms, dens, playrooms, and bedrooms.

**Magnehelics Gauge** - A pressure gauge manufactured by the Dwyer Instrument Co., which displays pressures on a calibrated face. Such gauges are sometimes used as permanently-mounted pressure gauges on ASD installations.

**Make-Up Air; Outdoor source of draft air (to address combustion appliance back-drafting)** - As used here, an outdoor supply of fresh air provided into the house to provide the required draft air (and combustion air) needed for proper movement of products of combustion up the flues of combustion appliances. Such make-up air may be needed in cases where an ASD system is found to be creating back-drafting of combustion appliances through depressurization of the house. The term "make-up air" can also be used to describe the supply of outdoor air into the house in general, to prevent house depressurization by combustion appliances and exhaust fans, in cases where an ASD system has not been installed. "Make-up air" can also be used to refer to fresh air drawn into the cold air return of forced-air furnace systems, to ventilate and perhaps even pressurize the house.

**\*Manometer** - A pressure-sensing device that displays pressure differences between two locations by the level of a colored liquid. Two types of such manometers (including a U-tube and a curved inclined manometer) are commonly used as pressure gauges and permanently mounted on ASD installations.

**Material Safety Data Sheets** - Informational documents required by law from manufacturers. They detail hazardous aspects and first aid information regarding the material.

**Masonry** - Material such as stone, brick, and block.

**Mass Number** - The sum of the number of protons and neutrons in the nucleus of an atom.

**Maximum Contaminant Level -** The maximum concentration allowed in air or water as required by statute.

**Medium** - A substance regarded as the means of transmission of a force or effect. (In this manual, medium refers to the sub-slab fill material).

**Micromanometer** - A differential pressure measurement device that reads in the thousandths of an inch of meter column.

**Microrem** - A unit of measure of "dose equivalence," which reflects the health risk resulting from a given absorbed dose of radiation. A microrem (urea) is one millionth of a rem (roentgen equivalent man).

**Mitigation** - means the act of repairing or altering a building or building design for the purpose in whole or in part of reducing the concentration of radon in the indoor atmosphere. [420 ILCS 44/15]

**Modified Tsivoglou Technique** - A method of determining radon decay product concentrations (working level measurements) in air from grab samples. The decay products from a known volume of air are collected on a filter, and the alpha activity on the filter counted at specified time intervals (different intervals than for the Kusnetz method). Results are then used to calculate concentrations of three radon decay products and the working level.

**Mortar** - A mixture of cement, sand, and water, used as a bonding agent for masonry components.

**\*Neutral Pressure Plane** - A roughly horizontal plane through a house, defining the level at which the pressure indoors equals the pressure outdoors. During cold weather, when the thermal stack effect is occurring, indoor pressures below the neutral plane will be lower than outdoors, so that outdoor air and soil gas will infiltrate. Above the neutral plane, indoor pressures will be higher than outdoors, so that house air will exfiltrate.

**Neutron** - One of the two major components of the atomic nucleus. The neutron weighs about as much as the proton, the other major component, and is electrically neutral.

**New Residential Construction** – Any original construction of a single-family home or a dwelling containing two or fewer apartments, condominiums, or townhouses. [420 ILCS 52]

**Non-Flowable Caulk, Gun-Grade Caulk** - Refers to caulks which are sufficiently viscous, such that the caulk bead will tend to retain its shape prior to curing. They are distinguished from flowable caulks. Non-flowable caulks are less effective at settling into cracks and irregularities in the opening being sealed, but are required in cases where the opening does not provide a channel to contain the fluid movement of the flowable caulks, or where the opening is on a vertical surface.

**Non-Ionizing Radiation -** Low energy radiation such as radio and television waves.

**NORM** - Naturally Occurring Radioactive Material

**Nucleus** - The central portion of an atom where the protons and neutrons are found.

**Nuclide** - A specific type of atom characterized by its nuclear properties (i.e., the number of protons and neutrons, and the energy state).

**Organization (RMP)** - An individual, sole proprietorship, partnership, corporation, college or university, government agency, laboratory, or institution. The RMP Program treats separate address locations and separate applications are required for each.

**Overhang** - The horizontal distance that a roof projects beyond a wall.

**Parging (pargeting)** - Cement mortar applied to a masonry wall.

**Partition** - An interior wall (Wall: an exterior wall).

**Pascal** - A unit of pressure. 1000 pascals (Pa) are equivalent to 4.0219 inches of water column pressure at 20 degrees C.

**Passive** **Device** – A measurement tool that does not provide hourly readings and does not require external power or batteries to operate, such as charcoal detectors, alpha track detectors, or liquid scintillation vials.

**Passive New Construction Pipe** or **PNC [aka Radon Resistant New Construction]** – A pipe installed in new construction that relies solely on the convective flow of air upward for soil gas depressurization and may consist of multiple pipes routed through conditioned space from below the foundation to above the roof.

**\*Percent Difference** - The difference between two measurements with similar devices divided by the average of the two measurements--expressed as a percentage.

**Performance Audit –** An examination of a program, function or operation or of the management systems, procedures and records of a radon contractor to assess whether the entity is complying with the radon Industry Licensing Act [420 ILCS 44], this Part and its Quality Assurance Program.

**Perimeter Drain -** A water drainage system that is routed around a footing either inside or outside the perimeter of a house. Typically refers to a perfected pipe laid in a rock filled trench designed to collect and drain water off a hillside or to a sump. Highly effective drain tile depressurization system that utilizes these to create a negative pressure field around and beneath the home.

**Permeability (sub-slab)** - A measure of the ease with which a fluid (liquid or gas) can flow through a porous medium. Sub-slab permeability generally refers to the ease with which soil gas can flow underneath a concrete slab. High permeability facilitates gas movement under the slab, and hence generally facilitates the implementation of sub-slab depressurization systems for remediation.

**Picocurie (pCi)** - A Curie is a standard measurement for radioactivity, specifically the rate of decay for a gram of radium--37 billion decays per second. A picoCurie (pCi) is one trillionth of a Curie.

**\*Picocurie per Liter (pCi/L)** - means 2.2 disintegrations per minute of radioactive material per liter of air. (Adopted Rule 422.20)

**PicoCurie per liter (pCi/L) -** A unit of radioactivity corresponding to one decay every 27 seconds in a volume of one liter, or 0.037 decays per second in every liter of air.

**Pier** - A rectangular masonry support, either free standing or built into a wall.

**Pilaster** - A rectangular support or pier projecting partially from a wall and treated architecturally as a column, with a base, shaft, and capital.

**Pitch** - A term applied to the amount of roof slope. It is found by dividing the height by the span. Also a liquid material used in roofing.

**Pitot Tube** - A device for measuring air velocity.

**Plank** - Lumber 2" and over in thickness.

**Plate** - A horizontal member in a wall framework, which rafters, joists, studs, and so forth, rest on or are secured to, as in "sole plate," "sill plate," "topplate."

**\*Plating Out** - The process whereby small particles or dust attach to walls, carpets, furniture, lung tissue, and so forth.

**Plenum** - A cavity of air space through which air is moved. Plenum may be used to evenly distribute heat.

**Plumb** - Vertical.

**Polyvinyl Chloride (PVC)** - A polymeric plastic material which is resistant to deterioration (e.g., by soil chemicals) and used in a wide variety of products. It is used to make rigid piping that is commonly used e.g., in residential sewer lines, and as the piping for ASD systems. Flexible PVC couplings can be used to join section of rigid PVC piping.

**Porosity** - A surface that has the ability to allow air or fluids to pass.

**Post and Beam** - A type of building frame in which cross beams rest directly upon vertical posts.

**Poured Concrete Wall** - A foundation wall constructed by pouring concrete within forms that are removed after construction. The most common alternative to hollow-block walls.

**\*Precision** - Degree of mutual agreement among individual measurements made under prescribed conditions, e.g., standard deviation among replicate measurements.

**\*Precision Error** - The uncertainty associated with the ability of a given instrument to provide the same results with repeated measurements.

**\*Pressure Driven Airflow (Convective Movement)** - One of the methods by which radon moves through soil from areas of higher to lower air pressure.

**Pressure Field Extension (PFE)** - means the distance that a pressure change is induced in the sub-slab area, measured from a single or multiple suction points. (See also Communication Test.) (Adopted Rule 422.20)

**Pressure Field Mapping** - Process of annotating pressures beneath a slab.

**Primer** - A transitional material application that prepares the surface for subsequent bonding or coating.

**Proton** - A fundamental unit of matter having a positive charge and a mass number of one.

**Purlin** - A horizontal roof framing member, laid perpendicular to main trusses and supporting the roof.

**\*Quality Assurance** - A complete program designed to produce results which are valid, scientifically defensible, and of known precision, bias, and accuracy.

**\*Quality Control** - Measurements made to ensure and monitor data quality.

**R-Value** - Capacity of a substance to impede the flow of heat. The term is used to describe insulative properties of construction materials (also see Thermal Resistance).

**Rad (Radiation Absorbed Dose) -** A measurement of the energy deposited in any material by ionizing radiation. One rad is equal to the absorption of 100 ergs of energy in every gram of the material exposed to the radiation.

**Radiant Heating** - Heating by radiating rays without air movement.

**Radiation -** The emission and propagation of energy by means of electromagnetic waves or sub-atomic particles.

**Radioactive Decay Series** - A series of isotopes that result following the decay of a parent radionuclide. There are three natural radioactive decay series, uranium-238, uranium-235, and thorium-232.

**Radioactivity** - The release of particles of energy from an atom as it decays. Units of activity are the Becquerel (Bq) and the Curie (Ci).

**Radionuclide** - Any naturally occurring or artificially produced radioactive element or isotope; i.e., one which will release subatomic particles and/or energy, transforming into another element.

**Radium -** An element often found in uranium ore. It has several radioactive isotopes. Radium-226 decays to Radon-222. It emits alpha particles and gamma rays to form radon.

**Radon** **(Radon Decay Products) -** means a gaseous radioactive decay product of uranium or thorium. [420 ILCS 44/15]

**\*Radon (Rn) -** A colorless, odorless, naturally occurring, radioactive, inert, gaseous element formed by radioactive decay of radium (Ra) atoms. The atomic number is 86. Although other isotopes of radon occur in nature, radon in indoor air is primarily Rn-222.

**Radon chamber -** An airtight enclosure in which operators can induce and control different levels of radon gas and radon decay products. Volume is such that samples can be taken without affecting the levels of either radon or its decay products within the chamber.

**Radon Progeny -** Radioactive decay products of radon-222.

**\*Radon Resistant Construction** – The installation of passive new construction pipe during new residential construction.

**Radon Source Strength** - The intensity, power, or concentration of radon action from its point of origin.

**\*Random error -** Variations of repeated measurements that are random in nature and not predictable individually. The causes of random error are assumed to be indeterminate or non-assignable. The distribution of random errors is assumed generally to be normal (Gaussian).

**\*Range -** The difference between the maximum and minimum values of a set of values. When the number of values is small (i.e., eight or less), the range is a relatively sensitive (efficient) measure of variability. As the number of values increases above eight, the efficiency of the range (as an estimator of the variability) decreases rapidly. The range, or difference between two paired values, is of particular importance in air pollution measurement, since in many situations duplicate measurements are performed as part of the quality assurance program.

**\*Re-entrainment** - means the unintended re-entry into a building of radon that is being exhausted from the vent of a radon mitigation system. (Adopted Rule 422.20)

**Reading Prong -** A geographical area stretching throughout Pennsylvania, New Jersey, and New York known to have a large number of homes with high radon concentrations.

**Reinforced Concrete** - Concrete containing more than 0.2 percent of reinforcing steel.

**Reinforcing Rod** - A steel bar used to reinforce concrete and CMU construction. Bar size is indicated in eighth-inch increments, i.e., No. 3 bar is 3/8" diam. Commonly referred to as Rebar.

**\*Relative Bias** - The estimated bias divided by the true or reference value and expressed as a percentage.

**Relative Humidity** - Ratio of the amount of water vapor in air to the maximum possible amount at the same temperature.

**\*Relative Measurement Error** - The standard deviation of a sample of individual measurement errors.

**\*Relative percent difference (RPD) -** A measure of precision, calculated by: Difference ÷ Average x 100

The relative percent difference (RPD) and coefficient of variation (COV) provide a measure of precision, but they are not equal. Below are example duplicate radon results and the corresponding values of relative percent difference and coefficient of variation:

**\*Relative Precision (or Coefficient Variation)** - The estimated precision/standard deviation divided by the sample mean and expressed as a percentage. Also called relative standard deviation.

**Relative standard deviation** - See Coefficient of variation.

**Rem -** A unit of exposure to ionizing radiation in human tissue; an estimate of the health risk that exposure to ionizing radiation could have on human tissue.

**Residential Building Code –** An ordinance, resolution or law that establishes standards applicable to new residential construction. [420 ILCS 52]

**Residential Building Contractor** – Any individual, corporation or partnership that constructs new residential buildings. [420 ILCS 52]

**Ribbon** - A wood strip let into the studding to provide a bearing surface for joists.

**Ridge** - The top edge of the roof where two slopes meet.

**Rim Joist** - The perimeter horizontal timber or beam supporting a floor or a ceiling.

**Roll Roofing** - Roofing material of fiber asphalt.

**Roof Boards (Roofers)** - The rough boarding over the roof framework, over which is laid the roof covering.

**Rotary Hammer Drill** - An electric-powered drill that usually uses solid bits (rather than core bits). Its action may be a piston-driven action like a lightweight jackhammer or as a drill with the hammer-like action.

**Scaling Baseline Hole** - A hole within about 12 in. of a suction test hole (during a diagnostic test) at which a pressure measurement can be taken. During a vacuum cleaner diagnostic test procedure, the vacuum is adjusted such that the negative pressure on the sealing baseline hole is at the midpoint of the operating range of the proposed ASP fan.

**Schedule** - In this context, it refers to the wall thickness of a pipe used for radon venting.

**School Screening Measurement –** A measurement of radon performed by school district staff in accordance with the School Code. [105 ILCS 5]

**\*Scintillation Cell -** A metal cylinder or flask coated with a material that will fluoresce or scintillate (give of a light flash) when contacted by alpha radiation. This device is used to measure radon concentrations in air samples collected in the cell.

**Screening Measurement -** A short-term measurement made under worst case conditionsto determine whether a home is likely to have a radon problem. A screening measurement is not intended to define average exposures and, therefore, should not be the basis for mitigation decision, unless confirmed with a second screening measurement or followed up with a long-term measurement.

**\*Secular Equilibrium -** A state in which the formation of atoms by decay of a parent radioactive isotope is equal to its rate of disintegration by radioactive decay.

**\*Sensitivity -** The ability of a radon or WL measurement method to produce reliable measurements at low concentrations. This ability is dependent upon the variability of the background signal (counts not due to radon or WL exposure), which the method records, as well as its efficiency. Methods with stable background rates and high efficiencies will be able to produce reliable measurements at lower concentrations than methods with variable background rates and low efficiencies. Sensitivity can be expressed in terms of the lower limit of detection or minimum detectable activity.

**Sensitivity Checks** - Sensitivity checks are used in the RMP Program to determine the lower limit of detection for a particular measurement system. Background radiation and inherent instrument design often limit the ability to measure very low concentrations of radon.

**Signal-to-noise ratio -** For radon and WL detectors, this term expresses the proportion of the number of counts due to exposure to radon or WP (signal) to the number of counts due to background (noise). Measurement methods with high signal-to-noise ratios will produce more counts due to radon or WL exposure (signal) in proportion to the background counts (noise) than will methods with low signal-to-noise ratios. A method with a high signal-to-noise ratio is more likely to exhibit good sensitivity, i.e., be able to produce reliable measurements at low concentrations.

**Sill** - The stone or wood member across the bottom of a door or window opening. Also the bottom member on which a building frame rests (sill plate).

**Sill Sealer** - A compressive material placed between the masonry foundation wall and the wood plate to reduce air infiltration.

**\*Slab-on-grade** - A type of house construction in which the bottom floor of a house is a concrete layer (typically about 4 in. thick and in direct contact with the underlying aggregate or soil), which is no more than 1 ft. below grade level on any side of the house.

**Sleeper** - A wood member placed over or imbedded in the concrete or earthen floor to provide a nailing base for a wood floor.

**Smoke Stick** - A small tube, several inches long, which releases a small stream of non-thermal smoke when a rubber bulb at one end of the tube is compressed. Can be used to visually define bulk air movement in a small area, such as the direction of airflow through small openings in slabs and foundation walls.

**Soak Away** - See Daylight Drain.

**Soffit** - The undersurface of a cornice, molding, or beam.

**Soil Gas -** means the gas mixture present in soil, which may contain radon. (32 IL Admin. Rule 422.20)

**Soil Gas Retarder** – A continuous membrane of 6 mil (3 mil cross-laminated) polyethylene or equivalent flexible material used to retard the flow of soil gases into a building.

**Sole** - The horizontal framing member directly under the studs.

**\*Spiked Samples** - Quality control measurements in which the detector or instrument is exposed to a known concentration and submitted for analysis. Used to evaluate accuracy. **See Blind Spikes**.

**Split Level House** - Designation of a type of house with floor levels so staggered that each level is about a half story above or below the adjacent one, with stairs between.

**Stack** - A vertical pipe.

**\*Stack Effect** - means the overall upward movement of air inside a building that results from heated air rising and escaping through openings in the building envelope, thus causing indoor air pressure in the lower portions of a building to be lower than the pressure in the soil beneath or surrounding the building foundation. ( Adopted Rule 422.20)

**\*Standard Deviation** - A measurement of the scatter of several sample values around their average.

**\*Standard Operating Procedure (SOP) -** A written document which details an operation, analysis, or action whose mechanisms are prescribed thoroughly and which is commonly accepted as the method for performing certain routine or repetitive tasks.

**Stem Wall** - The one or more courses of block (or equivalent height of poured concrete) that is placed above the buried footings comprising the foundation of the house. If the slab is poured inside the stem well, it is considered to be a "floating" slab. More typically, the top course of the stem wall is an "L" or "chair" block with a 4-in. notch cut through half of the thickness of the block so that the slab is poured into forms that cover the entire top of the stem wall.

**Stringer** - The sides of a flight of stairs, the supporting member cut to receive the treads and risers.

**Studs** - Vertical members which form the framework of a partition or wall.

**Subfloor –** A concrete slab and other approved permanent floor system that directly contacts the ground and is within the walls of the living spaces of the building.

**\*Sub-Slab Communication** - The effect of creating vacuum beneath a slab and being able to detect the vacuum at various locations under the slab.

**\*Sub-Slab Depressurization (Active) or SSD (Active)** - A radon control technique designed to achieve lower sub-slab pressure relative to indoor air pressure by use of a fan-powered vent drawing air from beneath the concrete slab.

**\*Sub-Slab Depressurization (Passive) or SSD (Passive)** - A radon control technique designed to achieve lower sub-slab air pressure relative to indoor air pressure by use of a vent pipe (without a fan) routed through the conditioned space of a building and connecting the sub-slab area to the outdoor air. This system relies primarily on the convective flow of warmed air upward in the vent to draw air from beneath the concrete slab.

**Sub-Slab Flow Curve** - A graph representing the functional relationship between the amount of suction applied on a soil and the flow that results from that suction. If gravel with large pore spaces is the sub-slab medium, then just a small suction will generally produce a fairly large flow; loose sand would produce less flow for the same suction; a more tightly packed soil would produce even lower flows for equivalent suction. Therefore, the sub-slab flow curve would rise more sharply for more permeable media and more gradually for more tightly packed media.

**\*Sub Membrane Depressurization** or **SMD** – (IL) A radon control technique designed to achieve lower air pressure in the space under a soil gas retarder membrane laid on the crawlspace floor and sealed, relative to air pressure in the crawlspace floor and sealed, relative to air pressure in the crawlspace by use of a vent or fan-powered vent drawing air from beneath the membrane.

**Subfloor** - The rough flooring under the finish floor.

**Suction Hole/Point** - The hole cut through a concrete slab from which either a vacuum cleaner (for diagnostic purposes) or a mitigation fan will evacuate the sub-slab soil gas.

**Sump** - A pit through a basement floor slab designed to collect water and thus avoid water problems in the basement. Water is often directed into the sump by drain tiles around the inside or outside of the footings.

**Sump Pump -** A pump to move collected water out of the sump pit to an above-grade discharge remote from the house.

**Systematic error:** The condition of a consistent deviation of the results of a measurement process from the reference or known level. The cause for the deviation, or bias, may be known or unknown, but is considered "assignable" (i.e., if the cause is unknown, it should be possible to determine the cause). See **Bias**.

**Termite Shield** - Sheet metal extending beyond the interior face of a foundation wall at the sill plate, used to block the passage of termites.

**Test Interference -** The altering of test conditions prior to or during the measurement in order to change the radon or radon decay product concentrations or the altering of the performance of the measurement equipment.

**\*Thermal Bypass** - Any opening through the floors between stories of a house (or through the ceiling between the living area and the attic), which facilitates the upward movement of house air under the influence of stack effect.

**Thermal Resistance** - The ability of a substance to impede the flow of heat (also see R-Value).

**Thermo-Luminescent Detector** -A device that will absorb radiation and when heated to a specific temperature will emit an amount of light in proportion to the amount of radiation it was exposed to. This device has been used to measure quantities of radon gas.

**Threshold Hypothesis** - The hypothesis that there is a small "threshold" dose below which radiation causes no injury; the assumption is that the body can repair any damage due to doses below the threshold.

**Tight House** - A house with a low air exchange rate. If 0.5 to 0.9 air changes per hour is typical of modern housing, a tight house would be one with an exchange rate well below 0.5 ACH.

**\*Time Integrated Measurement** - Sampling conducted over a specific time period (from a few days to a year or more) with results reported as an average value for that period.

**Trap** - A device providing a liquid seal to prevent passage of air and odor.

**Truss** - A braced framework capable of spanning greater distances than the individual components.

**\*Unattached Fraction -** Refers to radon decay products which have not yet adhered to other, larger dust particles in the air (or to other surfaces, such as walls). Unattached RDPs might result in a higher lung cancer risk than will RDPs that are attached to larger particles, because they can selectively deposit in small areas of the lung.

**Uncertainty -** The estimated bounds of the deviation from the mean value, expressed generally as a percentage of the mean value. Taken ordinarily as the sum of (1) the random errors (errors of precision) at the 95% confidence level, and (2) the estimated upper bound of the systematic error (errors of accuracy).

**Uranium -** A naturally occurring radioactive element with the atomic number 92 and an atomic weight of approximately 238.

**\*Uranium-238** - The first radionuclide in the decay chain, which includes radium 226 and radon 222. Uranium-238 has a 4.5 billion year half-life and is naturally occurring in the earth's crust.

**Urethane Caulk** - See Flowable Caulk. Available in two grades of consistency: self-leveling or flowable and vertical grade.

**\*Vapor Barrier** - A product or system designed to limit the free passage of a gas (typically water vapor) through a building envelope component (wall, ceiling, or floor). Such products and systems may be continuous or noncontinuous discrete elements, which are sealed together to form a continuous barrier against air (or vapor) infiltration (most commonly, a plastic sheet under a house slab).

**\*Ventilation Rate** - The rate at which outdoor air enters the house, displacing house air. The ventilation rate depends on the tightness of the house shell, weather conditions, and the operation of appliances (such as fans) influencing air movement. Commonly expressed in terms of air changes per four or cubic feet per minute. The ventilation rate includes both natural ventilation (infiltration) and mechanical ventilation.

**Volatile Organic Compound (VOC)** - An organic compound that can slowly vaporize and enter the air at room temperature. VOCs can present hazardous conditions when used.

**Wallboard** - A large, flat sheet of gypsum or wood pulp used for interior walls.

**Wall Ties** - A small strip of metal, built into two parts of a cavity wall to bond them together (for instance, tying a brick veneer wall in with the wood frame wall).

**Warm Air Supply** - The ducting and registers which direct heated house air from the forced-air furnace, to the various parts of the house. The supply ducting is at elevated pressure relative to the house because the central furnace fan is blowing air through this ducting.

**Water Column (WC)** - A term used to describe air pressure in hydrostatic terms; i.e., the height (in in., mm) of a column of water that would exert an equivalent pressure to the pressure being measured.

**Water-Cooled Core Drill** - An electric-powered heavy drill that can be used to drill cores out of concrete slabs. Because of the heat produced by the core bit cutting through the concrete, water is sprayed or dripped onto the bit while it is cutting in order to keep it cool. To some degree, the water also acts as a lubricant between the bit and concrete.

**Weatherstrip** - A strip of metal or fabric fastened along the edges of windows and doors to reduce drafts and heat loss.

**Weep Hole** - An opening at the bottom of a masonry faced wall to allow the drainage of moisture.

**\*Wind Induced Airflow** - The movement of air that results when wind creates higher or lower air pressures around and inside a building. For example, wind can produce elevated air pressures on the windward side of a house, and lower air pressures on the leeward side. Elevated air pressure in soil can force soil gas into a building; lower air pressure in a house can draw soil gas into a building.

**\*Working Level (WL)** - means any combination of short-lived radon progeny in 1 liter of air that will result in the ultimate emission 1.3 x 105 MeV of potential alpha energy. The short-lived radon progeny are for radon-222, polonium-218, lead-214, bismuth-214 and polonium-214. (Adopted Rule 422.20)

**\*Working Level Month** - means a unit of exposure used to express the accumulated human exposure to radon decay products. It is calculated by multiplying the average working level to which a person has been exposed by the number of hours exposed and dividing the product by 170. (Adopted Rule 422.20)

**A**

**a** or **α** - alpha radiation

**AARST** - American Association of Radon Scientists and Technologists

**AC** - Activated Carbon

**ACH** - Air changes per hour

**ACM** - Asbestos containing material

**ASD** - Active soil depressurization

**ATD** - Alpha Track Detector

**b** or **β**- beta radiation

**BEIR** - Biological Effects of Ionizing Radiation

**Btu** - British thermal unit

**Ci** - Curie

**cfm** - Cubic feet per minute

**COV** - Coefficient of Variation

**CRM** - Continuous radon monitor

**CWLM** - Continuous working level monitor

**dpm** - Decays per minute

**dd** - Degree day

**DTD** - Drain tile depressurization

**EIC** - Electret Ion Chamber

**ELA** - Effective Leakage Area

**EPA** - Environmental Protection Agency

**ER** - Equilibrium ratio

**ev** - Electron vo**FAU** - Forced Air Unit, such as a forced air furnace

**g** or **γ**- gamma radiation

**GAC** - Granular Activated Carbon

**GFI** - Ground Fault Interrupter

**HRV** - Heat Recovery Ventilator

**IEMA** - Illinois Emergency Management Agency

**in** - inches

**IRAA** - Indoor Radon Abatement Act

**L** - Liter

**LLD** - Lower Level of Detection

**MCL** - Maximum Contaminant Level

**MSDS** - Material safety data sheets

**MSHA**- Mine Safety and Health Administration

**NRC** - Nuclear regulatory Commission

**NRPP** – National Radon Proficiency Program

**NRSB –** National Radon Safety Board

**NIOSH** - National Institute of Occupational Safety and Health

**OSHA** - Occupational Safety and Health Administration

**Pa** - Pascal

**pCi** - picoCurie

**pCi/L** - picoCuries per liter

**PFE** - Pressure field extension

**PVC** - Polyvinyl chloride

**QA** - Quality Assurance

**QAP** - Quality Assurance Program

**QC** - Quality Control

**Ra** - Radium

**Rn** - Radon

**RDP** - Radon Decay Product

**RVD** - Radon vent duct

**Sch** - Schedule- refers to wall thickness of pipe.

**SMD** - Sub membrane depressurization

**SOP** – Standard Operating Procedures

**SSD** - Sub slab depressurization

**U 238** - Uranium 238

**UMTRA** - Uranium Mill Tailings Recovery Act

**VOC** - Volatile Organic Compound

**WC** - Water column

**WL** - Working level

**WLM** - Working Level Month