Santa Fe Inspection Service, Inc.

Residential Maintenance Guide

Professional Home Inspections By Don Gocek

Buying a home is one of the biggest decisions you will ever make. By referring to this guide you can maintain your home and increase the comfort and value of the home.

STRUCTURE

WALL CRACKS

Regardless of their construction, walls crack because they are overloaded or because the structure has settled or heaved. Vertical and angled cracks are usually caused by settlement or heaving. Horizontal cracks are more likely to be load induced or caused by side pressure.

Surface cracks that do not pierce the wall and are not accompanied by displacement are not structural in nature and should be distinguished from the cracks discussed here.

VERTICAL CRACKS: If a wall has an upwards overload adjacent to a downwards overload, it may crack vertically so that one side rises or sinks with respect to the other. Vertical cracks are usually caused by settlement, compaction, or soil eroding under the footing. Overloading from above can occur when framing members fail forcing loads to areas that were not designed for them. Similar cracks can also be caused by overloads from below, such as frost or hydraulic expansion of the soil

ANGLED CRACKS: When up and down loads are applied so the forces are offset from one another, cracks are likely to occur at an angle. Cracks of this type may be found when there is a major discontinuity in the soil or if a building is built on expansive clays.

HORIZONTAL CRACKS: When a wall is overloaded from the outside, as from frost, soil pressure, or improper backfill, it may bow inward and crack horizontally. In a block wall, the crack is usually in a mortar joint and is wider on the inner face. An additional cause of horizontal cracking may be settlement of the foundation. If a foundation is laid on top of unstable soil, the wall, which lacks the proper support could drop resulting in a horizontal crack without vertical displacement of the wall surface.

- ❑ Surface effects such as poor grading or improperly located downspouts can increase the amount of water pushing against the basement wall.

CATASTROPHIC FAILURES: Walls are strongest in compression. As a result, they prevent a catastrophic failure, which occurs from vertical loading in the absence of a horizontal component. Failure generally occurs when a horizontal component of the load causes the center of gravity of the wall to move beyond its base. The center of gravity is the midpoint of the mass of the wall. Unless it is specifically constrained, an object will overturn if its center of gravity moves outside its base.

- ❑ Signs of possible foundation failures include:

- Horizontal cracking or wall out of plumb.
- Excessive bowing inward or outward.
- Large vertical cracks (in excess of ¼ inch).

ROOFING

ROOFING MATERIALS

ASPHALT SHINGLE: Used on about 80% of all homes, the asphalt shingle is by far the most common type of roofing material found during a home inspection. These shingles are made of a layer of asphalt impregnated felt paper covered with an additional layer of asphalt. The granular material that gives a shingle its color is embedded into this top layer of asphalt. This type of roofing has a life expectancy of 15 to 20 years (less with multiple layers), and requires very little maintenance.

In the past, asphalt shingles were classified by weight, the most common being 210 pounds per square. (The term "square" is the expression a roofer uses for the amount of material required to cover 100 square feet). They have an average life expectancy of 15 to 20 years. Heavier shingles such as 225s, 235s, and 320s have life expectancies of up to 30 years.

Today, shingles are not classified by the manufacturer's warranty. They would now be known as 10 year, 15 year, 20 year, 25 year, and 30 year shingles. The reason for this change was the use of lighter fiberglass matting.

ASPHALT ROLLED ROOFING: Asphalt rolled roofing is made of the same material as asphalt shingles. It typically comes in rolls that are 18 or 36 inches wide.

Rolled roofing is usually installed on sloped or flat roofs. It can also be found in roof valleys. The material is considered to be of low quality with a life expectancy of 5 to 15 years. Warping and buckling due to expansion of the material is a common problem. The granular coating tends to break down quickly in the wrinkled areas resulting in localized wear and deterioration.

- ❑ Periodically inspect rolled roofing for granular deterioration.
- ❑ If installed in roof valleys, check for cracking, tearing, and deterioration.
- ❑ Be sure all overlaps, edges, and surface nails stay well sealed.

SINGLE PLY MEMBRANE: Single ply membrane roofing is usually modified bitumen asphalt, plastic, or rubber. The roofing can be torched, tarred, glued, or mechanically fastened with strips or buttons.

The life expectancy of this material has not yet been time tested. It has been installed in the U.S. since the early eighties. Some manufacturers provide a ten-year warranty and claim thirty-year expectancies. Most of the problems associated with this material have been with installation and not the products themselves.

WOOD SHINGLES & SHAKES: A wood shingle is cut with a machine, whereas a wood shake is hand split or mechanically split. A wood shake is much thicker than a wood shingle and has an uneven surface. The two most common woods used for making shingles are cedar and redwood.

The life expectancy of a wood shingle (or shake) is thirty to forty years. Many factors affect the life span of the material such as exposure (the amount of shingle exposed to the weather), the quality of wood, the pitch of the roof, and exposure to the sun and shade. Too much sun will cause the shingle to become brittle and crack. Too much shade will promote moisture and rot.

TAR & GRAVEL: Tar and gravel, or built-up roofs are designed for flat roof applications. They consist of two to five layers of roofing felts with a mopping of asphalt between layers. A coat of asphalt is then applied to the top and embedded with gravel. The gravel is intended to reflect the sun's damaging rays and protect the roof from mechanical damage.

Two-ply roofs have a life expectancy of 5 to 10 years while four ply roofs typically last 15 to 20 years.

SLATE: Slate roofing installed after the 1940's are rare. The life expectancy of a high quality slate roof is 60 to 200 years. The most common problem with this type of roof is not the slates themselves, but the nails securing the slates. Eventually the nails will rust and allow the tiles to slide out of place.

Spring and fall are typically the best time to perform the routine maintenance required for your roof.

- ❑ Check for loose, damaged, or missing shingles.
- ❑ On flat roofs, check for cracking and blistering.
- ❑ Inspect flashings around chimneys, skylights, plumbing stacks, etc.
- ❑ Check vents, louvers, and chimneys for bird or insect nests.
- ❑ Keep all debris cleared from roof, especially in the valleys.
- ❑ Check facia and soffit boards for water penetration or decay.
- ❑ Trim back tree limbs growing over roof.

The Most Common Causes of Roof Leaks:

1. Improper flashing around chimneys, plumbing stacks, skylights, etc.
2. Missing or broken shingles.
3. Tears in roof valleys.
4. Improperly hung gutters or drip edge.
5. Improperly installed or wrong type of roofing.
6. Cracking or deteriorated chimney caps.

EXTERIOR

MASONRY

There are several types of brick, the two most common being clay and cement. The characteristics of each type vary dramatically. Some have very soft, porous surfaces while others are extremely hard.

The most common maintenance issue discovered is missing or deteriorated mortar. Missing mortar can lead to water penetration behind the brick surface. In cold temperatures this may cause a freeze-thaw situation. The result is spalling (crackling or flaking) of the brick surface.

- ❑ Periodically inspect for cracked or spalled brick.
- ❑ Check for missing, loose or deteriorated mortar and patch as required.
- ❑ Keep all trees and shrubbery trimmed back from masonry.

GUTTERS

Gutters and downspouts are necessary for two major reasons: 1) They prevent rain water from running down the side of the building causing possible water damage to its components, and 2) this also prevents erosion of the ground at grade level.

The most important reason to have a gutter system is to divert water away from the building's foundation. Regardless of the type of foundation wall that is present, the possibility for moisture penetration still exists. Therefore, the less water there is around the foundation wall, the less likelihood for water penetration.

Gutters are responsible for collecting all water run off from the roof, and downspouts should discharge the water into proper drains or on to the ground surface well away from the foundation.

- ❑ Keep debris cleared from gutters and downspouts.
- ❑ Check gutters for damage, looseness, leakage, and misalignment.
- ❑ Be sure downspout extensions are diverting water well away from the foundation.
- ❑ Check for peeling or blistering paint.

SIDING

WOOD: There are several types of wood siding. Whether installed vertically, horizontally or in sheets, all are prone to the same maintenance problem – moisture and decay. Paint or stain should be applied every three to five years. Wood sided homes generally have wood trim. Make sure that all appropriate areas are well sealed with a quality exterior caulk. Wood/soil contact should be avoided to prevent rotting and possible insect infestation.

METAL: The most common material used for metal siding is aluminum. A baked on enamel finish is usually applied to the siding and tends to hold up well. Improperly secured siding and the lack of trim and molding pieces are two common problems. If nailed too tightly, the siding will not be able to expand and contract and buckling may occur. Metal sidings are prone to denting, especially aluminum. Damaged sections can be replaced on an individual basis.

VINYL: Vinyl sidings and metal sidings are very similar in that the majority of the problems are associated with installation as opposed to the material itself. A lack of proper securing and improper detailing at the corners and edges are the most common deficiencies. The color of some vinyl siding may fade with age. As with metal siding, individual pieces can be replaced.

ASBESTOS CEMENT: Asbestos cement siding comes in a shingle form. This type of siding is very brittle and is subject to physical damage. This material does contain asbestos, therefore proper care must be observed when handling.

HARDBOARD/PLYWOOD: There are a variety of sheet type materials on the market today. The two most common are simulated wood siding and stucco panels. Water penetration behind the trim pieces tends to deteriorate the trim and the siding. It is essential to keep all horizontal joints well sealed with caulk. The buckling of hardboard siding can be eliminated with proper nailing to the building studs.

- ❑ Paint or stain wood siding every 3 to 5 years.
- ❑ Keep all horizontal and vertical trim pieces well caulked.
- ❑ Inspect wood siding for splitting, looseness and decay.
- ❑ Make sure that aluminum and vinyl sidings are properly secured.
- ❑ Check sheet type siding for buckling and secure as necessary.
- ❑ Keep trees and shrubbery trimmed away from siding.

*When matching new brick mortar to old, try patting the new joint with a wet tea bag.

ATTIC

INSULATION

With the exception of newer housing, almost every home can benefit from improving the insulation. Saving money on fuel costs is perhaps the best motivation for upgrading. There are usually some areas of the home where it makes financial sense to upgrade. In some older homes certain types of upgrades do not make economical sense, such as, insulating solid masonry exterior walls. Be sure to weigh the cost savings vs. the cost of improvement.

The thermal resistance of insulation is measured in R-values. The higher the number, the greater the resistance to heat transfers. Different types of insulation have different R-values per inch of thickness. The same type of insulation can have a different R-value depending on its form. For example, fiberglass has a higher R-value in batt form than it does in a loose form.

Types of Insulation:

- **Fiberglass**: Probably the most common insulation used, this material is made from threads of glass glued together with phenolic resins. It is available in batt form, loose form, and rigid board. It is resistant to moisture, mildew, fungus, and vermin. Fiberglass can cause irritation to eyes, skin and the respiratory system. R-value is 2.9-4.2 per inch.
- **Cellulose Fiber**: The low cost of this material makes it a very popular choice. Cellulose is made from shredded paper treated with chemicals to make it resistant to fire, moisture, and vermin. This gray material is typically blown into the attic. R-value is 3.4-3.6 per inch.
- **Mineral Wool**: Mineral wool (or rock wool) is very similar to fiberglass in that it has good resistance to fire and rot. This type of insulation is made from mineral waste products. It is available in loose or batt form. R-value is 3.0-3.2 per inch.
- **UFFI**: Urea-formaldehyde foam insulation was banned in the United States by the Consumer Product Safety Commission (CPSC) in 1982. Although the ban was overturned by a federal court, few homes have installed the product since 1982. New installations of UFFI is not advised due to potential health problems, but homes that are already insulated with UFFI should no longer have formaldehyde levels that present a significant health risk. The color and texture of UFFI varies but it can be distinguished from other foams by its frail, crumbly structure and powdery residue. Positive identification can only be made by laboratory testing.

Over the years, there have been many types of material used for insulating. The above mentioned are the most common materials found during a home inspection.

- ❑ Look for signs of water staining on the underside of the roof boards. Indications of high humidity are rotting, mildew, and fungus.
- ❑ Gable and roof vents should be checked for obstructions such as bird nests.
- ❑ Check for evidence of pests (squirrels, raccoons, etc.)
- ❑ Be especially careful when walking around the attic – Don't fall through!

VENTILATION

Having proper ventilation in your attic will help prevent damage to the structure, increase the life expectancy of the roofing, reduce energy use, and improve the living conditions below the attic.

The two main reasons for attic ventilation are heat and humidity. In the summer the temperature in a poorly ventilated attic can reach 150 degrees! Excessive heat cannot only damage roofing materials, but it can make the living area under the attic uncomfortable and difficult to cool. Humidity will naturally drift upward to the attic from several sources including showers, clothes, dryers, cooking, and even breathing. Excessive humidity can cause damage to the roof structure, insulation, and even interior surfaces.

The requirements for proper ventilation will vary depending on which part of the country you live in. The minimum recommendation is one square foot of free vent area for each 150 square feet of attic floor (if there is not a vapor barrier under the insulation). With a vapor barrier you need half the amount. In older homes these requirements are usually not met.

Good ventilation will usually be provided with the use of louver vents in the gable ends of the home, ridge or box vents at the top of the roof, and soffit venting under eaves.

INTERIORS

INTERIOR FINISHES:

The two most common materials used for interior surfaces are plaster and drywall. Plaster and drywall are essentially the same material. Drywall is pre-manufactured while plaster on the other hand, is hand mixed and applied on site.

Older plaster systems were applied over boards that were roughly one inch wide by one-quarter inch thick. This is called a wood lath system. The plaster was applied in two or three coats. The first coat would ooze between the boards forming a bond to the wall surface. The next step(s) would be the finish coats.

Gypsum lath systems became popular in the 1930's. Sheets of pre-manufactured plaster, roughly 16" by 48", were applied to the wall or ceiling framing. The finish coats would then be applied over the panels. This system replaced wood lath because it was quicker and less expensive to install.

Drywall became very popular in the 1960's and is used almost exclusively today. Drywall usually comes in sheets that are four feet wide by eight, ten, twelve or fourteen feet long. Sheets are applied directly to the wall or ceiling framing with screws or nails. The joints or seams are then taped and finished with drywall compound.

Water damage is a common problem associated with interior finishes. Sources of water damage include roof leaks, plumbing leaks, and condensation. Water damage often appears more serious than it is. Plaster or drywall is easily damaged by water, but short-term exposure will not damage most building materials. It is uncommon to have extensive building damage caused by water, which appears at an interior finish. This problem can be diminished if promptly addressed.

WINDOWS:

There are many styles and types of windows. They may be single hung with one sash that goes up and down or double hung with two movable sashes. If the sash moves sideways it is called a slider. Hinged on the side and opening out is called a casement. Hinged at the top is an awning, and hinged on the bottom is a hopper.

There are a wide variety of glass options available today including:

- Single Pane: Used almost exclusively until about 1950. Only one pane of glass is used in this type of window.
- Double Pane: Double glazed windows have two panes of glass. The space in between is filled with a dried air or an inert gas such as "Argon". If the seal in between the glass is lost, condensation may develop between the two panes and make the glass difficult to see through. Defective seals cannot be repaired. Discolored glass must be replaced.
- Tempered Glass: Tempered glass is made three to five times stronger than regular glass by heating it and then cooling it very quickly. When the surface layer of tempered glass is broken, the entire pane shatters into small rectangular pieces.
- Laminated Glass: A layer of plastic is sandwiched between two layers of glass to prevent broken pieces from being released if a pane is cracked or shattered.
- Low Emissivity: Low-E glasses accept radiation from the sun but inhibit the heat from escaping back through the window unit. The cost savings of cooling your home can be substantial when using this type of glass.

- ❑ Periodically inspect the exterior of the windows for physical damage or signs of water damage.
- ❑ Check for broken, cracked, loose, or missing glass. Check double paned units for signs of seal failure (fogging between the glass).
- ❑ Regularly check the windows for drafts and smooth operation.
- ❑ Check for peeling paint.

SAFETY DEVICES:

Smoke Alarms: Most communities require at least one smoke detector in a home. Some communities require multiple detectors. Whether or not it is legislated in your territory, there should be at least one detector on every level of your home. Detectors can either be battery operated or hard wired. There are three different types of smoke detectors: 1) ionization alarms to detect fast-flaming fires, 2) photoelectric alarms detecting smoldering fires, and 3) thermal alarms, which react to heat. There is little difference in how effective any of these devices are, but a homeowner may prefer one to the other for some locations.

Carbon Monoxide Detectors: Hundreds of lives could be saved every year in this country with the use of carbon monoxide detectors. **It is highly recommended that at least one CO detector be installed in your home.**

Periodically check all smoke and carbon monoxide alarms for operation. Change the batteries at least once a year.

BATHROOMS

TOILETS:

Most toilets are made of vitreous china, although other materials are occasionally used. There are many different styles of toilets, the most common being the two-piece. This type of toilet has two separate components, the bowl and the tank. For the most part, these units are generally inexpensive and replacement parts are readily available.

One-piece toilets, or siphon action toilets, are usually somewhat expensive. When flushed, the entire bowl surface is covered with water; however, a quiet and smooth operation is associated with these units.

- ❑ Check for any signs of leakage at the water supply, the tank connection, the bowl, and the toilet connection to the drain.
- ❑ Make sure the toilet is tightly secured to the floor.
- ❑ Inspect the flush mechanism for proper operation.
- ❑ Be sure the toilet is adequately caulked to the floor.

VENTILATION:

If a bathroom does not have an operable window, an exhaust fan is usually required. Although fans are not required when a window is present, they are beneficial. It is unlikely that a person would open a window every time they took a shower. Heavy concentrations of moisture in an un-vented bathroom can lead to mildew damage on the walls and ceilings.

The exhaust from the fan should discharge to the exterior of the building to prevent excessive moisture built-up in the attic.

SINKS & FAUCETS:

Bathroom sinks can be made of stainless steel, enameled steel, cast iron, vitreous china, plastic, marble, simulated marble, or a variety of other materials. All of these sinks are fairly reliable and each has their strengths and weaknesses. Leakage is the most common deficiency found with a faucet.

- ❑ Periodically inspect under the sink for signs of leakage from the water supply lines and the drain piping.

Faucets come in a variety of styles and quality. Regardless of the style, leakage is the most common problem discovered.

The popular compression faucet uses a washer to turn off the water when the washer is compressed against a seat. If water leaks out of the faucet this is usually an indication of a deteriorated washer. If water leaks from the handles it usually indicates deteriorated packing. Both of these problems are considered minor and are inexpensive to repair.

Modern faucets use a valve cartridge, or ball to direct the flow of water. These mixing valves allow the control of hot and cold water and the volume of water with a single handle.

Your drain plunger can become a more effective tool by smearing a little petroleum jelly around the edge of the suction cup. The jelly will create a better seal between the drain and the cup.

BATHTUBS:

Bathtubs can be either built-in or free standing. Typically they are made of enameled cast iron or steel, fiberglass or plastic. Some of the problems associated with bathtubs are leaking water supply or drain connections, corrosion, and chipping of the enamel finish.

One option for providing an old tub with a new look is reglazing. This is a relatively new process and the results do not appear to be long lasting. The advantage of reglazing is that it can be done in place and is much less expensive than replacing the fixture.

Another common source of leakage is the intersection where the tub meets the enclosure. The enclosure may be ceramic tile, plastic, or simulated marble. Modern, one-piece fiberglass or acrylic enclosures are also available. If properly installed, all of these materials are acceptable. To avoid problems, it is critical to keep the area where the tub meets the enclosure well sealed. Loose ceramic tile at the tub rim may be a sign of water penetration.

- ❑ Occasionally check the underside of the bathtub for any signs of leakage or wood decay.
- ❑ Periodically inspect the tub surround for any signs of failure (loose tile, etc.).
- ❑ Keep the intersection of the tub and surround well sealed.

FLOORING:

- ❑ Check for loose, cracked or missing ceramic tile.
- ❑ Inspect for deteriorated or missing tile grout.
- ❑ Be sure the edges of resilient flooring are kept well sealed.
- ❑ Keep the joint between the tile and the tub/shower well sealed to prevent water damage to the sub floor.

ELECTRICAL

SERVICE ENTRANCE

Your local utility company supplies electricity to your home by means of the service entrance cable. The cable can be brought in overhead or underground. The size of the cable determines how much electricity is available to the home. The minimum service size on new construction is 100 amps. There are many houses with a 60-amp capacity that still provide adequate service. Normal household lighting and most small appliances will usually draw under 60 amps. The addition of electric stoves, electric clothes dryers, or AC units may push the system to capacity. At this point, updating to 100 amps should be seriously considered.

- ❑ Periodically inspect the service cable for fraying or cracking.
- ❑ Be sure that the service cable and meter are well secured to the home.

Ever wonder how the utility company calculates your energy consumption?

Power is measured in watts, and is calculated by multiplying the voltage times the current. For example, a 1200-watt dishwasher, when subjected to 120 volts, will allow 10 amps to flow through it. A house with a 240-volt supply and 100 amp main fuses may have the capability of 24,000 watts. 1000 watts is referred to as a kilowatt.

If 1000 watts are used continuously for one hour this is referred to as a kilowatt-hour. This is how electricity is purchased from the utility company. The electric meter records kilowatt-hours used in the house. If one kWh cost ten cents and 1000 kWhs are used in a month, the electric bill would be $100.00.

SERVICE PANEL

Electricity is carried from the service cable to the service panel, through the fuse or circuit breaker, and distributed to the individual branch circuits. Fuses and breakers serve the same function; they both protect against overload situations. The advantage of a circuit breaker is it can be reset after an overload situation occurs whereas a fuse has to be replaced.

FUSES: Two common types of fuses used today are the Time Delay, type D and the type S.

Type D fuses are time-delayed devices that do not blow immediately. They will, for a short time, allow more than the rated current to flow through the circuit. Some devices will draw extra current upon start-up. The time delay feature can prevent nuisance blowing during these brief electrical loads.

Type S fuses are screw-in type fuses that are not interchangeable. This means that the wrong size fuse will not fit into the fuse holder. This provides added safety over the older fuses, which could be interchanged.

The most common deficiency found in many homes is an inadequately sized fuse for the circuit wire. **This is an unsafe situation and should be corrected promptly.**

CIRCUIT BREAKERS: Most circuit breakers can be tripped by moving the switch to the middle position, others to the off position. Generally, it is easy to determine which breaker has tripped. To reset, simply switch the breaker to the "off" position then back to the "on" position.

- ❑ Annually inspect the inside of the panel for signs of rust, water penetration, and scorched wires.
- ❑ Trip the circuit breakers once a year. Ground fault breakers once a month. If fuses are used, be sure they are screwed in tightly.

OUTLETS

Until about 1950, most electrical outlets were ungrounded. The outlets had only two slots; one connected to the black wire and one connected to the white. After 1960, grounded outlets (three slots) became popular and are now mandatory. Rather than flowing through a person, the ground wire is a safety path for electricity to follow in case of a malfunction in the system.

There are many two-slotted outlets that have been upgraded to three-slot without providing a ground wire. This has no benefit, and may be misleading when plugging a three-pronged device into an upgraded but ungrounded outlet.

GFCI outlets, or ground fault circuit interrupters, are special devices that turn the power off to a circuit when a voltage leak is detected. If there is a defect in the system, electricity may flow to a dangerous place and may not be enough to trip a breaker or blow a fuse. If a person becomes the path for stray current, it can be potentially hazardous. A ground fault circuit interrupter prevents this from happening by measuring the current going out against the current coming in. If the difference is more than .005 amps, the system will be shut off.

It makes sense to install GFCI outlets wherever water and electricity come close together. Currently, GFCI outlets are required at all exterior outlets, bathrooms, kitchens, and pool equipment.

- ❑ Periodically inspect outlets and switches for damage, scorching, and looseness.
- ❑ Trip all GFCI outlets monthly.

Many homeowners feel confident they can handle electrical repairs. It is always safest to hire a professional electrician for all but the most basic repairs. Keep yourself and your family safe!

PLUMBING

WATER HEATERS

There are basically three types of water heaters: gas, electric, and oil. All three tanks operate in a similar manner. When hot water is removed from the tank, cold water enters which activates the thermostat. The water is then heated to a pre-set temperature, usually 120 degrees. To save energy and avoid burns, consider setting the temperature between 100 and 115 degrees.

Water heaters should be of adequate size to satisfy the needs of the home. A family of four will often find that a forty-gallon system is adequate. Many experts in the industry recommend draining a gallon or two of water from the tank monthly to avoid sludge build-up. (Check your manufacturers recommendations.)

The life expectancy of a water heater is typically 15 to 20 years, although there are exceptions on both sides.

GAS PIPING:

Any gas leak is a life-threatening situation. If you smell gas, all occupants should leave the home immediately and contact the gas company from a neighbor's house. Do not operate switches, doorbells, telephones or anything else that may cause a spark.

SUMP PUMP:

The sump pump is used to lift storm or drain tile water from a low point in the home to a discharge point that extends away from the building.

The sump pump is electric, therefore susceptible to interruptions or failure. Since power failures often occur during heavy storms this could be a problem. A water driven or battery back-up system should be considered.

SUPPLY LINES

GALVANIZED STEEL:

Galvanized steel piping was used almost exclusively prior to 1950. The life expectancy, depending on several conditions, is typically forty to sixty years.

One of the most common problems with this material is corrosion. Rust may accumulate on the inside of the pipe, resulting in poor water pressure and flow. Eventually the pipe will rust through, usually at the joints first, resulting in leakage. One of the oddities with steel piping as it corrodes, is that it may rust through in one spot and begin to leak. The rust may then form a scab over the leak and seal itself. This generally means that the piping is near the end of its useful life.

COPPER:

Copper piping has been used residentially since about 1950 and almost exclusively since the mid-1950's. The life expectancy of copper piping is indefinite unless unusual water conditions or manufacturing defects are present.

PLASTIC:

Most plastic pipe applications have been made by the do-it-yourselfer. The pipe is easy to work with and connections can be made without soldering.

The two most common types of plastic used are: polybutylene (PB) and chlorinated poly vinyl chloride (CPCV). PB piping uses press-on fittings and CPCV uses solvent welded or glued fittings.

Polybutylene piping was removed from the Uniform Plumbing Code in the US in 1989 as an approved water distribution material. In some instances, fitting failure has occurred possibly resulting from faulty installation. In some cases, the piping manufacturer will repair or replace the PB piping at no cost to the homeowner.

DRAIN PIPING

The three most common materials used for drain piping are cast iron, copper, and plastic.

Cast iron was used prior to the 1950's. Cast iron piping generally fails in one of two ways. The pipe can rust through, typically in a pinhole pattern or you may notice splitting along the seams (especially horizontally). The life expectancy is fifty years and up.

Copper drain piping was used primarily from the mid 40's until the mid 1960's. In residential use it has become rare. This is due to the fact that plastic piping is much less expensive to purchase and install. The life expectancy is indefinite.

Plastic waste piping has been used almost exclusively since the 1960's. The piping is inexpensive, easy to work with and, very durable.

- ❑ Know the location of the main water and gas shut-off valves.
- ❑ Periodically inspect the water supply and drain lines for leakage.
- ❑ Drain a small amount of water from the water heater per manufacturer's recommendations.
- ❑ Occasionally inspect the sump pump for proper operation.
- ❑ Make sure all plumbing fixtures are firmly secured.
- ❑ Have your septic tank checked annually and cleaned if necessary.

Tips for Winterizing:

- Outdoor faucets should be shut off from the interior and drained.
- Be sure piping in areas such as crawl spaces are protected from freezing.
- Drain sprinkler systems.
- Drain pools and spas.

HEATING

FURNACE

There are several types of heating systems used throughout the country. The most common is the gas, forced air furnace, which will be discussed below.

The heat exchanger is the most critical part of the furnace. It separates the air in the house from the flames and exhaust gases that are generated in the furnace. A heat exchanger can fail in one of two ways: 1) it rusts through, or 2) it cracks. The result of either condition is the products of combustion may escape into the air in your home. A crack or hole in the heat exchanger is usually not visible and typically can only be identified by a heating and cooling specialist.

Heat exchangers have an average life expectancy of fifteen to twenty-five years. The cost of replacing a heat exchanger is almost as much as replacing the entire furnace. Typically, in most cases, the entire furnace is replaced.

Performing maintenance on a regular basis may increase the life span and help maintain the efficiency of your furnace.

- Check for signs of corrosion, especially around flue pipes, humidifiers, and air conditioning coils.
- Consider an annual cleaning and service call from a qualified technician.

For safety reasons, it is strongly recommended that you install at least one quality carbon monoxide detector in your home.

FILTERS

Conventional: There are several types of conventional air filters and each performs the same function – filtering the air before it travels into the furnace and out of the registers. Some are disposable while others you can clean. Most are rectangular and about 1" thick. Some manufacturers use a basket type filter that hangs in the blower compartment. Conventional filters are inexpensive and usually easy to replace.

- Be sure to check, replace or clean filters monthly.

Be sure to turn the power off to the filter and the furnace fan prior to servicing. Follow all manufacturers recommendations carefully.

Electronic: Electronic filters clean the air to a much greater extent than conventional filters. They help to remove pollen and cigarette smoke particles. The units have a mechanical filter to help remove larger debris. The smaller particles that pass through the filter are electrically charged and collected on plates of opposite polarity. If you hear an intermittent sparking or popping noise, the unit is functioning properly.

Electronic filters tend to become dirty quickly due to their efficiency.

- Filters should be checked or cleaned at least once a month.

COOLING

AIR CONDITIONING

There are several types of air conditioning systems. They all work on the same basic principal – they move heat from a cool space to a warm space. All the systems take advantage of the basic scientific laws of liquid and gases. When liquids evaporate into gases, they absorb a considerable amount of heat. When gases are condensed back into a liquid state, they give off heat. In addition, if the pressure of a gas is increased, the temperature will also increase. Most systems use refrigerants called "Freon" and "Puron", substances that change state at temperatures and pressures that are well suited for this application.

AIR COOLED:

Air-cooled air conditioning systems typically work together with a forced-air furnace. The systems have two main components, an evaporator unit located in the ductwork right above the furnace, and the condenser unit located outdoors. The refrigerant enters the evaporator as cold liquid and absorbs heat from the house air to boil the liquid and turn it into a gas. The reduction of air temperature causes water in the house air to condense, reducing humidity levels.

The refrigerant, which is now a gas, moves outdoors to the condensing unit. The compressor squeezes the gas into a smaller volume. All of the heat, which is contained in the gas, is also squeezed into a smaller volume, and consequently, the gas becomes hotter than the outside air. The hot gas then enters the condenser coil. A fan in the condenser unit blows outdoor air across the coil and cools the gas. As it cools, it condenses into a liquid. The liquid then passes through a pressure-reducing device, which causes the temperature of the liquid to drop below that of the house air. The liquid passing through the evaporator coil is evaporated into a gas again, stealing more heat and humidity from the house and the cycle continues.

Your air conditioner can be severely damaged if it is operated when the outside temperature is below 60 degrees.

The life expectancy of an air conditioner is based on the failure of the major component of your system – the compressor. The typical life expectancy of a compressor is ten to fifteen years, although many units operate well beyond this time.

An annual inspection from a heating and cooling specialist and performed maintenance will maximize the life span of your system.

- During the cooling season, periodically inspect the condensate drain line (directly above the furnace) for signs of leakage.
- Be sure to inspect, clean or replace your furnace filter during the cooling season as well as the heating season.
- Make sure the exterior unit remains level.
- Inspect the refrigerant lines for missing or damaged insulation.
- Keep the exterior unit free of debris and vegetation.
- To prevent corrosion, most manufacturers recommend that the unit stay uncovered during the winter months.
- Wall units should be removed for the winter.

EVAPORATIVE COOLERS

Evaporative cooling systems are most common in the southwest parts of the country. Evaporative coolers consist of a blower that pulls air from the exterior into the house usually through a wet cooling pad. The moisture on the pad absorbs heat from the air and cools it as it enters the home. A pump draws water out of a tray to keep the pad moist. The water to the tray is generally supplied from the house plumbing system. A float valve is used to regulate the water level.

Two variations of this system include a drip type cooler and a rotary type cooler.

A drip type system allows water to drip into the airflow supplied by the blower. Cooling pads are not used in this system.

The rotary type cooler is much like a humidifier. A screened drum rotates through a tray of water as the blower air passes over the upper part of the rotor.

- Periodically clean or replace the cooling pads.
- Electric motors and blower bearings are common failure points. Be alert for any unusual noises.
- Inspect for any leakage or corrosion around the unit.
- Units should be drained and cleaned seasonally.

HEAT PUMPS

A heat pump is an air conditioner, that when reversed, can heat your home as well as cool it. Like any other air conditioner, during the cooling season it collects heat from the interior of the home and discharges it to the exterior. By reversing the flow of refrigerant in the unit, heat is collected from an outside source and is released to the interior of the home. The roles of the evaporator and the condenser become reversed.

In the northern climates, heat pumps are unable to meet the entire heating demands of a home efficiently. During the coldest parts of the winter there is not enough heat in the outside air to be collected economically. The heat pump is then shut down and the central heating system takes over.

A heat pump is able to collect heat from three different sources – the air, ground, or water.

It is not advisable to operate a heat pump in the cooling mode when the outside temperature is below 65 degrees, nor should it be operated in the heating mode when the temperature is above 65 degrees.

Air Source: Heat pumps collect heat from the outside air. They look very much like a conventional air conditioner. On the exterior of the home is the unit that is used to collect heat during the heating season and expel heat during the cooling season.

- ❑ Keep the cooling fins on the exterior unit free of dust, debris, and vegetation.
- ❑ Periodically inspect for signs of moisture around the interior unit.
- ❑ Check for any unusual sounds.

Ground Source: Heat pumps have piping that runs through the ground to collect or expel heat. The piping can be installed in the ground one of two ways – horizontally, which is usually a shallow installation, or vertically, which is deep below the ground surface.

Water Source: Heat pumps are able to extract heat from a large body of water such as a lake or deep pond (at least 12 feet). During the cooling season the opposite is true. The heat pump will expel the heat collected from the home into the water source.

The advantage of a water or ground source heat pump is that the temperature below the frost line is ambient or constant. Due to the fact that the temperature is constant, there is always a steady supply of heat to be collected at these levels.

One of the disadvantages of these systems is that if a leak develops underground, or under water, the source can be difficult to locate and costly to repair.

BASEMENTS

CRAWL SPACES:

Any area under a home with less than full headroom is called a crawl space. According to many codes, there must be at least eighteen inches of clearance between the bottom of the floor joists and the ground and twelve inches under beams.

Crawl spaces should be dry. The crawl space floor should be protected against moisture entry with a vapor barrier. Plastic sheeting, felt paper or concrete are common materials used. Proper steps should be taken to allow ventilation within the crawl space. Typically, one square foot of ventilation per 1500 square feet of crawl floor is adequate, provided a vapor barrier has been installed. If a vapor barrier is not present, one square foot of ventilation per 500 square feet of crawl space is suggested. Good ventilation and a vapor barrier will significantly affect the moisture levels in the crawl space. It reduces the likelihood of structural damage, pest infestations, and a musty odor in your home.

- ❑ Periodically inspect the crawl space for signs of moisture.
- ❑ Open the crawl vents in the warmer months.
- ❑ Close the crawl vents in the winter months.

BEAMS & COLUMNS:

The purpose of a support beam is to carry the weight of the floor and walls horizontally to the foundation or columns. Typical materials for support beams are steel, wood, or laminated plywood. Steel beams can be much stronger than wood and are much more resistant to rot and insect and mechanical damage. Steel beams should rest on steel or masonry columns. The newer, laminated plywood beams can be stronger than the solid wood type. These beams are lighter and less expensive than steel beams. Wood beams can rest on wood columns.

The purpose of a support column is to carry the weight of a beam down to a footing. Typical materials for support columns are steel, brick, concrete block or wood. Every support column should have a concrete footing underneath.

- ❑ Any abnormal slanting, sloping or leaning of your floors, walls, or ceilings should be promptly investigated.
- ❑ Periodically inspect wood beams or columns for moisture damage, pest infestation or warping (especially in crawl spaces).

LIFE CYCLES & REPLACEMENT COSTS

INTRODUCTION

The following replacement costs and life expectancies are based on a three-bedroom home and are meant to be estimates and not actual figures. Costs can vary substantially based on the quality of the materials used, the contractors submitting bids, and the region you live in. Life expectancies can vary depending on regional weather conditions, the quality of the materials and workmanship, and the level of maintenance performed on the item.

ROOFING & CHIMNEY

Install standard asphalt shingles over existing shingles.	$1.25 - $2.00 per sq. ft.	10 to 15 years
Strip existing and install standard asphalt shingles.	$2.00 - $3.50 per sq. ft.	10 to 20 years
Strip existing and install quality asphalt shingles.	$2.75 - $4.00 per sq. ft.	20 to 35 years
Install roll roofing.	$1.00 - $2.00 per sq. ft.	5 to 10 years
Strip and install single-ply membrane.	$4.00 - $6.50 per sq. ft.	Not time tested
Strip cedar shingles and install same.	$4.00 - $7.00 per sq. ft.	15 to 40 years
Strip cedar shake and install same.	$5.50 - $8.50 per sq. ft.	25 to 50 years
Strip and replace tar & gravel built-up roof.	$3.00 - $6.00 per sq. ft.	10 to 20 years
Install new slate roof.	$10.00 - $20.00 per sq. ft.	35 to 80 years
Install concrete tile roofing.	$4.00 - $7.00 per sq. ft.	40 to 60 years
Install new roof sheathing.	$4.00 - $6.00 per sq. ft.	
Install flashing on a standard chimney.	$300.00 - $600.00	
Rebuild standard chimney above roof line.	$150.00 - $250.00 per lin. Ft.	

EXTERIOR

Install galvanized gutters & downspouts.	$5.00 - $7.00 per lin. Ft.	20 to 30 years
Install aluminum gutters & downspouts.	$2.00 - $4.00 per lin. Ft.	15 to 25 years
Install copper gutters & downspouts.	$15.00 - $20.00 per lin. Ft.	40 to 90 years
Install aluminum or vinyl siding.	$3.00 - $5.00 per sq. ft.	indefinite
Install aluminum soffits and facia.	$8.00 - $12.00 per lin. Ft.	indefinite
Install wood siding.	$3.00 - $6.00 per lin. Ft.	10 to 40 years
Tuckpoint existing brick.	$2.00 - $4.00 per sq. ft.	
Install new deck.	$10.00 - $15.00 per sq. ft.	15 to 30 years
Install concrete slab work (sidewalk, driveway, etc.)	$4.00 - $10.00 per sq. ft.	25 to 40 years
Resurface asphalt driveway.	$2.00 - $4.00 per sq. ft.	10 to 20 years
Seal asphalt driveway.	$100.00 minimum	
Construct detached garage, single car.	$6000.00 minimum	
Install overhead garage door, single car.	$600.00 - $1000.00	
Install overhead garage door, double.	$1000.00 - $1500.00	
Install garage door opener.	$250.00 - $400.00	8 to 15 years
Install lawn sprinkler system.	$1000.00 minimum	

PLUMBING

Replace galvanized piping with copper, whole house.	$1500.00 minimum.	
Replace main water supply line to home.	$150.00 - $200.00 per lin. Ft.	
Install new hot water heater.	$350.00 minimum	8 to 12 years
Replace vanity and faucet.	$350.00 minimum	10 to 20 years
Replace toilet.	$250.00 minimum	20 to 40 years
Replace bathtub and faucet set.	$800.00 minimum	20 to 40 years
Retile bathtub enclosure.	$800.00 - $1200.00	Maintenance Dependent
Replace shower stall pan.	$750.00 - $1500.00	Maintenance Dependent
Retile shower stall.	$1500.00 - $2500.00	Maintenance Dependent
Install bathroom exhaust fan.	$250.00 - $450.00	5 to 15 years
Replace laundry tub.	$250.00 - $500.00	15 to 25 years
Install kitchen sink and faucet.	$350.00 minimum	15 to 25 years
Install dishwasher.	$600.00 - $1200.00	10 to 15 years
Install garbage disposal.	$400.00 - $600.00	8 to 15 years
Install kitchen exhaust fan.	$300.00 - $500.00	10 to 15 years
Replace sump pump.	$150.00 - $300.00	4 to 12 years

ELECTRICAL

Upgrade electrical service to 100 amps (with panel).	$650.00 - $1200.00
Upgrade electrical service to 200 amps (with panel).	$1200.00 - $2000.00
Install new circuit breaker panel.	$350.00 - $600.00
Install auxiliary circuit breaker panel.	$100.00 - $300.00
Replace circuit breaker.	$40.00 - $125.00
Install 120-volt circuit.	$100.00 - $250.00
Install 220-volt circuit.	$200.00 - $350.00
Install new receptacle.	$75.00 - $150.00
Provide ground for receptacle.	$75.00 - $150.00
Replace conventional receptacle with GFCI.	$40.00 - $65.00
Install standard interior light fixture.	$100.00 - $200.00
Install standard exterior light fixture.	$100.00 - $250.00
Install standard light switch.	$75.00 - $150.00
Upgrade house with aluminum compatible connectors.	$500.00 - $850.00
Rewire house during gut or renovation.	$3000.00 and up
Rewire house without gut or renovation.	$5000.00 and up

HEATING & COOLING

Install conventional or mid-efficiency forced-air furnace.	$1200.00 - $2500.00	15 to 25 years
Install high efficiency forced-air furnace.	$2000.00 - $3500.00	15 to 25 years
Replace furnace blower or motor.	$250.00 - $500.00	15 to 25 years
Install humidifier, drum type.	$125.00 - $225.00	5 to 15 years
Install electronic air filter.	$400.00 - $750.00	10 to 20 years
Clean ductwork.	$200.00 - $600.00	
Install conventional boiler.	$2500.00 - $4000.00	20 to 30 years
Install high efficiency boiler.	$5000.00 - $8000.00	20 to 30 years
Install circulating pump.	$350.00 - $600.00	10 to 25 years
Install expansion tank.	$250.00 - $350.00	10 to 25 years
Install back-flow preventer.	$125.00 - $250.00	10 to 25 years
Install chimney liner.	$300.00 - $600.00	
Install thermostat.	$100.00 - $300.00	
Install central air on existing forced air system.	$1500.00 - $3000.00	10 to 15 years
Install central air, independent system.	$5000.00 - $8000.00	10 to 15 years
Install heat pump on existing forced air system.	$3000.00 - $6000.00	10 to 15 years

INTERIOR

Install drywall, taped and finished.	$2.00 - $4.50 per sq. ft.
Remove plaster and install drywall.	$3.50 - $5.50 per sq. ft.
Install drop ceiling.	$3.00 - $6.00 per sq. ft.
Install hardwood flooring.	$10.00 - $15.00 per sq. ft.
Install parquet flooring.	$5.00 - $10.00 per sq. ft.
Sand and refinish hardwood flooring.	$1.50 - $3.50 per sq. ft.
Install ceramic tile flooring.	$10.00 and up per sq. ft.
Install sheet vinyl.	$7.00 and up per sq. ft.
Install vinyl floor tiles.	$2.00 and up per sq. ft.
Install synthetic wall-to-wall carpeting.	$25.00 and up per sq. yd.
Install wool wall-to-wall carpeting.	$30.00 and up per sq. yd.
Install carpet padding.	$3.00 and up per sq. yd.
Clean carpets.	$30.00 and up per room
Install replacement windows.	Starting at $250.00 each-Size Dependent
Install storm windows.	$100.00 - $200.00 each
Install interior hollow-core door (includes hardware).	$175.00 - $275.00 each

INTERIOR (continued)

Install custom interior wood door.	$300.00 and up
Install closet louvered doors.	$150.00 - $250.00
Install exterior solid wood door (includes hardware).	$600.00 and up
Install exterior metal door (includes hardware).	$500.00 and up
Install storm door.	$200.00 - $450.00
Replace hardware on storm door.	$50.00 - $100.00
Install skylight.	$800.00 - $1500.00
Install fireplace damper.	$200.00 - $500.00
Clean fireplace.	$75.00 - $100.00 per flue
Install kitchen cabinetry.	$200.00 and up per lin. Ft.
Install kitchen countertops.	$25.00 and up per lin. Ft.
Remodel kitchen, complete.	$6000.00 and up
Paint home interiors, complete. (walls, ceilings, doors, trim)	$1500.00 and up
Hang wallpaper.	$2.00 and up per sq. ft.
Install alarm system.	$1500.00 and up
Install central vacuum system.	$1000.00 - $2000.00

STRUCTURE/BASEMENT

Underpin corner of foundation.	$3000.00 and up
Replace main support beam (unfinished area).	$1000.00 - $3000.00
Install support column with footing.	$400.00 - $1000.00
Remove or open bearing wall (does not include redecorating).	$2000.00 and up
Remove partition wall (does not include redecorating).	$500.00 - $1500.00
Cut door opening in interior wall (does not include redecorating).	$500.00 - $1000.00
Build addition, complete.	$200.00 - $400.00 per sq. ft.
Seal foundation cracks with epoxy injection.	$200.00 - $500.00 each
Install waterproofing system (perimeter drainage).	$60.00 - $120.00 per lin. Ft.
Certified termite inspection.	$50.00 - $125.00
Chemical treatment of termites. (does not include repair of any damaged areas)	$1000.00 and up

ATTIC INSULATION

Install conventional insulation in open attic.	$1.00 - $2.00 per sq. ft.
Install blown-in insulation.	$2.00 - $3.50 per sq. ft.
Improve attic ventilation.	$50.00 - $150.00 per vent
Install new roof sheathing.	$4.00 - $6.00 per sq. ft.

ENVIRONMENTAL

Does this home fit my needs and those of my family? Is this a safe, secured home, free from potential hazards? Is this home a good investment? Will it retain and increase its value in the years ahead?

In ever increasing numbers, homebuyers today find it necessary to add new kinds of questions to their quest for information. Environmental concerns are becoming an element of the home-buying thought process.

The following provides **general** information about some of the environmental hazards that have the potential to affect the home environment. While this information is believed to be accurate, it is not meant to be **comprehensive or authoritative**. This publication provides introductory information to help homebuyers understand the possible risk of exposure to potentially harmful environmental hazards in and around the home.

LEAD-BASED PAINT:

According to the EPA, it is estimated that lead-based paint was applied to approximately two-thirds of the homes built in the U.S. before 1940; one-third of the homes built from 1940 to 1960; and to an indeterminate (but smaller) portion of U.S. homes built since 1960.

Lead can enter the air within a home when surfaces covered with lead-based paint are scraped, sanded, or heated with an open flame in paint stripping procedures. Once released into the home atmosphere, lead particles circulate into the air and can be inhaled or ingested through the mouth and nose. Lead particles freed in fine dust or vapors settle into carpet fibers or fabric and can be re-circulated into the air by normal household cleaning (such as sweeping or dusting) and through normal hand-to-mouth behavior of young children. The result can be the ingestion of potentially harmful lead.

It is best to leave lead-based paint undisturbed if it is in good condition and there is little possibility that children will consume it. Other procedures include: covering the paint with wallpaper, another building material, or replacing the entire painted surface.

The only way to determine if paint contains lead is to get it tested by a certified lead inspector or risk assessor.

RADON:

Radon is a colorless, odorless, tasteless gas that has been found in homes all over the U.S. Radon comes from the natural decay of uranium in soil, rocks, and ground water. Radon from surrounding soil enters a home through small spaces and openings, such as cracks in concrete, floor drains, sump pump openings, wall/floor joints in basements, and the pores in hollow block walls. It also can seep into ground water and remain entrapped there. (For more information regarding radon in ground water call the EPA's Drinking Water Hotline at 800-426-4791).

Radon generally concentrates in the areas of the home closest to the ground. Radon levels typically decrease as one moves higher up in the structure. Testing is the only way to know whether or not a home has a radon problem. Do not rely on radon results taken in other homes in your neighborhood to estimate the levels in your home. Homes located next to each other can have different radon levels. While radon problems may be more common in some areas in your local community or state, any home can have a problem.

The health risk associated with prolonged inhalation of radon decay products is an increased risk of developing lung cancer. When radon gas breaks down it releases radioactive particles that circulate in the air. As you breathe these particles, they can become trapped in your lungs. As the particles continue to break down, they release bursts of energy (radiation), which can damage lung tissue. This damage can cause lung cancer. The EPA has determined that short-term exposure to a high concentration of radon is not as severe of a risk as long-term exposure to a lower level of the gas.

There are many effective and relatively inexpensive methods of reducing radon levels in a home. The method selected will vary from house to house and from region to region. The techniques used will depend on the source of the gas, the means of entering the home, and the type of construction used in the home. Normally, the cost of installing radon reduction equipment ranges from several hundred dollars to several thousand dollars. Radon source diagnosis and mitigation normally require skills and equipment not available to the average homeowner. Therefore, the use of trained personnel should be considered.

ASBESTOS:

Asbestos is a fibrous mineral found in rocks and soil throughout the world. Asbestos has been used in architectural and construction applications because it is strong, durable, fire retardant and an efficient insulator. Alone or in combination with other materials, asbestos can be fashioned into a variety of products that have numerous applications within the building industry such as flooring, walls, ceiling tiles, exterior housing shingles, insulation, or fire retardant for heating and electrical systems. According to the EPA, homes constructed in the United States during the past twenty years probably do not contain asbestos products.

Asbestos has been identified as a carcinogen. Once ingested, asbestos fibers lodge in the lungs. Because the material is durable, it persists in tissue and concentrates as repeated exposures occur over time. It can cause caner of the lungs and stomach among workers and others who have experienced prolonged work-related exposure to it.

The health effects of lower exposures in the home are less certain. However, experts are unable to provide assurance that any level of exposure to asbestos fibers is completely safe.

The repair or removal of asbestos-containing products from a home is generally a complicated process. It depends on the amount of these products present, the percentage of asbestos they contain, and the manner in which asbestos is incorporated into the product. Total removal of even small amounts of asbestos-containing material is usually the last alternative. To assure safety and elimination of health hazards, asbestos repair or removal should be performed only by properly trained and certified contractors.

HAZARDOUS WASTES:

Hazardous wastes are those waste products that could pose short or long-term danger to personal health or the environment if they are not properly disposed of or managed. These wastes can be produced by large business or industries (such as chemical and manufacturing plants), by some small businesses (such as dry cleaners and printing plants), and by individuals who improperly apply, store, or dispose of compounds that contain potentially toxic ingredients (which can be found in chemical fertilizers, pesticides, and household products).

Concentrations of hazardous wastes occur in the environment when these wastes are handled, managed, or disposed of in a careless or unregulated manner. For many decades, hazardous industrial wastes were improperly disposed of on land, and their toxic components remained in the earth or seeped into ground water and drinking water supplies. The widespread use of pesticides and other agricultural chemicals also has resulted in the seepage and runoff of toxic compounds into land and water supplies. Generally, testing for hazardous waste involves skills and technology not available to the average homeowner or home remodeling contractor.

The specific health hazards in homes contaminated by hazardous wastes are determined by the kinds and amounts of toxic substances present. Some hazardous wastes can cause death even when ingested in small amounts. Other hazardous wastes have been linked to elevated risks of cancer, permanent damage to internal body organs, respiratory difficulties, skin rashes, birth defects, and diseases that attack the central nervous system.

ADDITIONAL INFORMATION SOURCES:

- EPA Safe Drinking Water Hotline
  800-426-4791
- National Lead Information Clearinghouse
  800-424-LEAD
- Consumer Product Safety Commission Hotline
  800-638-2772
- Home Buyer's and Seller's Guide to Radon
  U.S. EPA 402.R93-003 March, 1993
- Consumers Guide to Radon Reduction
  U.S. EPA 402.K92-003 May, 1995
- Protect Your Family from Lead in Your Home
  U.S. EPA 747-K-94-001 May, 1995
- Reducing Lead Hazards When Remodeling Your Home
  U.S. EPA 747-K-94-001 May, 1995