

Ice Dams

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What is an ice dam?

An ice dam is a ridge of ice that forms at the edge of a roof and prevents melting snow (water) from draining off the roof. The water that backs up behind the dam can leak into a home and cause damage to walls, ceilings, insulation, and other areas. **Figure 1** shows a cross section of a home with an ice dam.

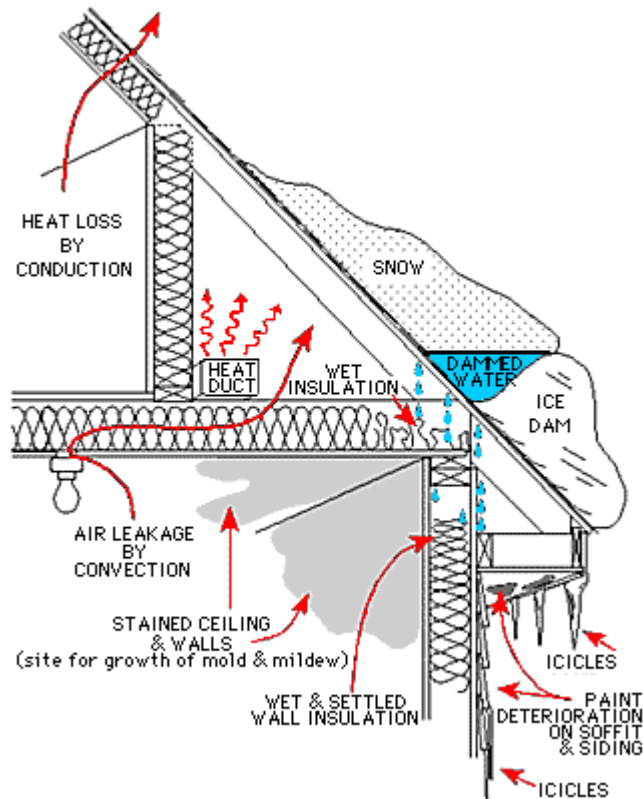


Figure 1. Cross section of a one-and-a-half story house with an ice dam.

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What causes ice dams?

There is a complex interaction among the amount of heat loss from a house, snow cover, and outside temperatures that leads to ice dam formation. For ice dams to form there must be snow on the roof, and, at the same time, higher portions of the roof's outside surface must be above 32° F while lower surfaces are below 32°F. For a portion of the roof to be below 32°F, outside temperatures must also be below 32°F. When we say temperatures above or below 32°F, we are talking about average temperature over sustained periods of time.

The snow on a roof surface that is above 32°F will melt. As water flows down the roof it reaches the portion of the roof that is below 32°F and freezes. Voila!—an ice dam.

The dam grows as it is fed by the melting snow above it, but it will limit itself to the portions of the roof that are on the average below 32°F. So the water above backs up behind the ice dam and remains a liquid. This water finds cracks and openings in the exterior roof covering and flows into the attic space. From the attic it could flow into exterior walls or through the ceiling insulation and stain the ceiling finish.

Non-uniform roof surface temperatures lead to ice dams.

What causes different roof surface temperatures?

Since most ice dams form at the edge of the roof, there is obviously a heat source warming the roof elsewhere. This heat is primarily coming from the house. In rare instances solar heat gain may cause these temperature differences.

Heat from the house travels to the roof surface in three ways: **conduction**, **convection**, and **radiation**. **Conduction** is heat energy traveling through a solid. A good example of this is the heating of a cast iron frying pan. The heat moves from the bottom of the pan to the handle by conduction.

If you put your hand above the frying pan, heat will reach it by the other two methods. The air right above the frying pan is heated and rises. The rising air carries heat/energy to your hand. This is heat transfer by **convection**. In addition, heat is transferred from the hot pan to your hand by electromagnetic waves and this is called **radiation**. Another example of radiation is to stand outside on a bright sunny day and feel the heat from the sun. This heat is transferred from the sun to you by radiation.

In a house, heat moves through the ceiling and insulation by conduction through the slanted portion of the ceiling (**Figure 1**). In many homes, there is little space in regions like this for insulation, so it is important to use insulations with high R-value per inch to reduce heat loss by conduction.

The top surface of the insulation is warmer than the other surroundings in the attic. Therefore, the air just above the insulation is heated and rises, carrying heat by convection to the roof. The higher temperatures in the insulation's top surface compared to the roof sheathing transfers heat outward by radiation. These two modes of heat transfer can be reduced by adding insulation. This will make the top surface temperature of the insulation closer to surrounding attic temperatures directly affecting convection and radiation from this surface.

There is another type of convection that transfers heat to the attic space and warms the roof. In **Figure 1**, the winding arrow beginning inside the house and going through the penetration in the ceiling, from the light to the attic space, illustrates heat loss by air leakage. In many homes this is the major mode of heat transfer that leads to the formation of ice dams.

Exhaust systems like those in the kitchen or bathroom that terminate just above the roof may also contribute to snow melting. These exhaust systems may have to be moved or extended in areas of high snow fall.

Other sources of heat in the attic space include chimneys. Frequent use of wood stoves and fireplaces allow heat to be transferred from the chimney into the attic space. Inadequately insulated or leaky duct work in the attic space will also be a source of heat. The same can be said about kneewall spaces.

Photograph 1 shows a single story house with an ice dam. The points of heat loss can be clearly seen as those areas with no snow. The ceiling below this area needs to be examined for air leakage, missing or inadequate insulation, leaky or poorly insulated ductwork, and the termination of a kitchen or bathroom exhaust into the attic space.



Photograph 1. A single-story house with an ice dam. The areas without snow are the points of heat loss.

Photograph 2 illustrates unusually high heat loss from the roof. There is very little snow left on the roof and at its edge is both an ice dam and a "beautiful" row of icicles.



Photograph 2. The unusually high heat loss on this roof has caused both an ice dam and icicles.

So it is primarily heat flowing from the house that is causing the nonuniform temperatures of the roof surface leading to ice dams.

Preventing ice dams

In all Minnesota communities it is possible to find homes that do not have ice dams. Ice dams can be prevented by controlling the heat loss from the home.

Dealing with ice dams

Immediate action:

- Remove snow from the roof. This eliminates one of the ingredients necessary for the formation of an ice dam. A "roof rake" and push broom can be used to remove snow, but may damage the roofing materials.
- In an emergency situation where water is flowing into the house structure, making channels through the ice dam allows the water behind the dam to drain off the roof. Hosing with tap water on a warm day will do this job. Work upward from the lower edge of the dam. The channel will become ineffective within days and is only a temporary solution to ice dam damage.

Long-term action:

- First, make the ceiling air tight so no warm, moist air can flow from the house into the attic space.

- After sealing air leakage paths between the house and attic space, consider increasing the ceiling/roof insulation to cut down on heat loss by conduction.

Both of these actions will increase the snow load that your roof has to carry because it will no longer melt. Can your roof carry the additional load? If it is built to current codes, there should not be a structural problem. Roofs, like the rest of the home, should have been designed to withstand expected snow loads. In Minnesota, plans showing design details to meet expected snow loads are usually required to receive a building permit. The plans for your home may be on file at your local building inspection office. To help you understand the plans, or if you cannot find plans for your home, you may want to contact an architectural engineering firm. A professional engineer should be able to evaluate the structure of your home and answer your questions about the strength of your roof.

- Natural roof ventilation can help maintain uniform roof temperatures, but if the long-term actions described here are done effectively, then only small amounts of roof ventilation are needed to maintain uniform roof surface temperatures. If heat transfer has been reduced substantially, then snow will build up on the roof and cover natural roof ventilation systems, reducing attic ventilation rates. Natural attic ventilation systems are needed to dry the attic space and remove heat buildup during the summer.

Mechanical attic ventilation IS NOT a recommended solution to ice dams in Minnesota. It can create other attic moisture problems and may cause undesirable negative pressure in the home.

WARNING!

- Any person on the roof during the winter or performing work on the roof from below is risking injury and risking damage to the roof and house. It is important to contact professionals to carry out this job.
- Whenever a house is tightened up, ventilation systems, exhausting devices, and combustion devices must have enough air to operate safely and effectively!

Weatherization contractors, who may be listed under *Energy Management and Conservation Consultants* or *Insulation Contractors* in the Yellow Pages, are professionals who can deal with the heat transfer problem that creates ice dams. A blower door test should be used by the contractor you hire to evaluate the airtightness of your ceiling. In addition, they may have an infrared camera that can be used to find places in the ceiling where there is excessive heat loss.

Interior damage should not be repaired until ceilings and walls are dry. In addition, interior repair should be done together with correcting the heat loss problem that created the ice dam(s) or the damage will occur again.

Preventing ice dams in new homes

The proper new construction practices to prevent ice dams begin with following or exceeding the state code requirements for ceiling/roof insulation levels.

The second absolutely necessary practice is to construct a continuous, 100% effective air barrier through the ceiling. There should not be any air leakage from the house into the attic space!

Recessed lights, skylights, complicated roof designs, and heating ducts in the attic will all increase the risk of ice dam formation.

Mold, mildew, and air quality

Moisture entering the home from ice dams can lead to the growth of mold and mildew. These biologicals can cause respiratory problems. It is important that the growth of mold and mildew be prevented. This can be done by immediately drying out portions of the house that are wet or damp. See [immediate action](#) steps listed earlier to get rid of the water source. Action needs to be taken to clean the home environment and maintain its air quality.

Additional sources of information that address these issues are listed below.

- The Minnesota Office of Energy Security - Energy Information Center has publications available online at <http://www.state.mn.us/portal/mn/jsp/home.do?agency=Energy> or can be contacted by phone at (651) 696-5175 or (800) 657-3710.
- INFO-U Consumer Line scripts are available at www.extension.umn.edu/info-u/ (search for topics such as mildew).

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NEWS from CPSC

U.S. Consumer Product Safety Commission

Office of Information and Public Affairs

Washington, DC 20207

FOR IMMEDIATE RELEASE

January 21, 2010

Release # 10-118

Firm's Recall Hotline: (800) 701-5230

CPSC Recall Hotline: (800) 638-2772

CPSC Media Contact: (301) 504-7908

BSH Home Appliances Corp. Expands Recall of Thermador® Built-In Ovens Due to Fire Hazard

WASHINGTON, D.C. - The U.S. Consumer Product Safety Commission, in cooperation with the firm named below, today announced a voluntary recall of the following products. Consumers should stop using recalled products immediately unless otherwise instructed.

Name of Product: Thermador® Built-In Ovens

Units: About 37,000 (42,000 built-in ovens were [previously recalled](#) in June 2007)

Manufacturer: BSH Home Appliances Corp., of Huntington Beach, Calif.

Hazard: The ovens can have gaps in the insulation where overheating can occur and when used in the self-cleaning mode it can cause nearby cabinets to catch fire. This poses a fire hazard to consumers.

Incidents/Injuries: BSH Home Appliances has received three additional reports of incidents, including two that resulted in fires that damaged surrounding cabinets. No injuries have been reported.

Description: The recall involves Thermador Brand built-in double ovens with model numbers C272B, C302B, SEC272, SEC302, SECD272 and SECD302 and serial numbers between FD8403 through FD8701. Model and serial numbers are located on the underside of the control panel.

Sold at: Appliance and specialty stores nationwide from June 2004 through July 2007 for between \$3,000 and \$4,400.

Manufactured in: United States

Remedy: Consumers should immediately stop using the oven's self-cleaning mode and contact the firm to schedule an inspection and free repair, if necessary.

Consumer Contact: For additional information, contact Thermador at (800) 701-5230 24 hours/day, 7 days/week, or visit the firm's Web site at www.thermador.com



C272 and C302



SEC,SECD 272 and 302



Model and Serial Number Location

CPSC is still interested in receiving incident or injury reports that are either directly related to this product recall or involve a different hazard with the same product. Please tell us about it by visiting <https://www.cpsc.gov/cgibin/incident.aspx>

The U.S. Consumer Product Safety Commission is charged with protecting the public from unreasonable risks of serious injury or death from thousands of types of consumer products under the agency's jurisdiction. The CPSC is committed to protecting consumers and families from products that pose a fire, electrical, chemical, or mechanical hazard. The CPSC's work to ensure the safety of consumer products - such as toys, cribs, power tools, cigarette lighters, and household chemicals - contributed significantly to the decline in the rate of deaths and injuries associated with consumer products over the past 30 years.

U.S. Consumer Product Safety Commission

FOR IMMEDIATE RELEASE

January 27, 2010

Release # 10-122

Firm's Recall Hotline: (877) 337-2653

CPSC Recall Hotline: (800) 638-2772

CPSC Media Contact: (301) 504-7908

Liebherr Recalls Built-In Refrigerators Due to Injury Hazard; Door Can Detach

WASHINGTON, D.C. - The U.S. Consumer Product Safety Commission, in cooperation with the firm named below, today announced a voluntary recall of the following products. Consumers should stop using recalled products immediately unless otherwise instructed.

Name of Product: Liebherr Built-In 24-Inch Wide Single Door Refrigerators

Units: About 2,700

Importer: Liebherr-Canada Ltd of Ontario, Canada

Manufacturer: Liebherr-Hausgeraete Ochsenhausen GmbH, of Germany

Hazard: The refrigerator's door can detach, posing an injury hazard to consumers.

Incidents/Injuries: Liebherr has received 13 reports of doors detaching, including two reports of injuries involving bruising and strains.

Description: This recall involves Liebherr built-in 24-inch wide single door refrigerators with model numbers R1400, RI1400, RB1400, and RBI1400 sold individually or as a component of side-by-side refrigerators. The refrigerators come in stainless steel and various custom finishes and are built into the kitchen cabinetry. "Liebherr" is written on the top interior control panel. The model number can be found on a label located behind the bottom drawer on the left interior side of the single door refrigerator. The side-by-side refrigerators were marketed as model numbers SBS240, SBS24 I0, SBS245, SBS24I5. This model number is not found on the product.

Sold by: Appliance and specialty retailers nationwide from January 2005 through November 2009 for between \$2,500 and \$3,200.

Manufactured in: Germany

Remedy: Consumers with recalled refrigerators should contact Liebherr immediately to schedule a free in-home repair. Consumers should check their refrigerator immediately to see whether the door hinge pin has become loose (see below). If the hinge has not become loose and the door is functioning properly, consumers may continue to use the refrigerator until it is repaired.

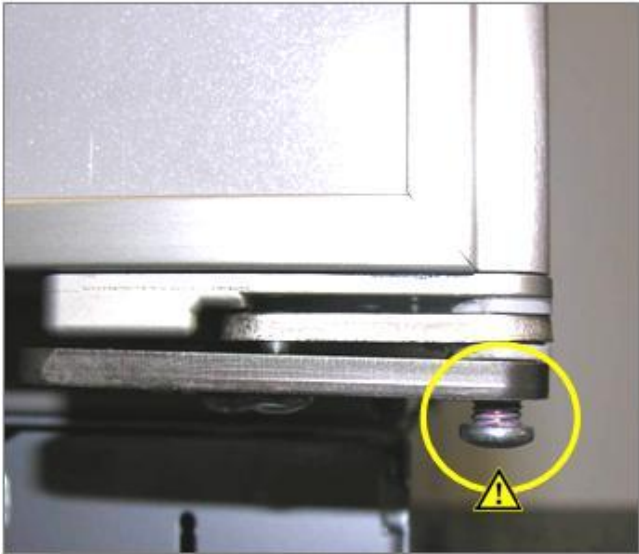
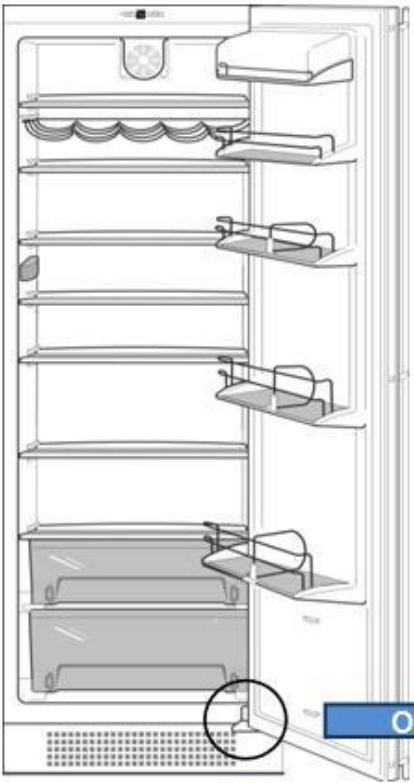
Consumer Contact: For additional information, contact Liebherr toll-free at (877) 337-2653 Monday through Friday 8 a.m. to 5 p.m. MT or visit Liebherr's Web site at www.liebherr-appliances.com



Individual Unit

Individual Unit in Side-By-Side Installation

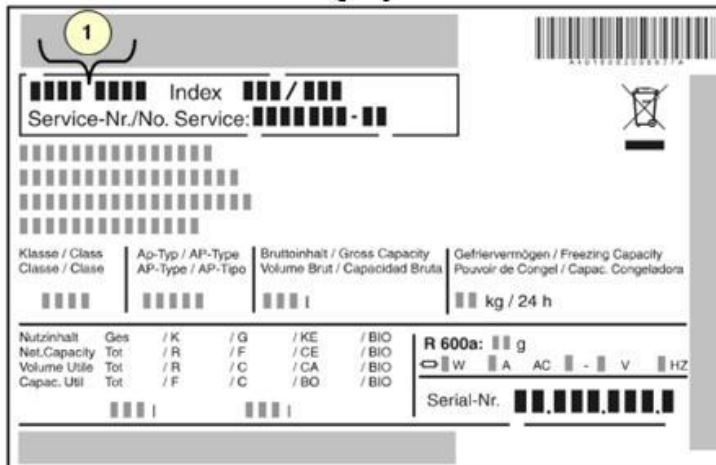
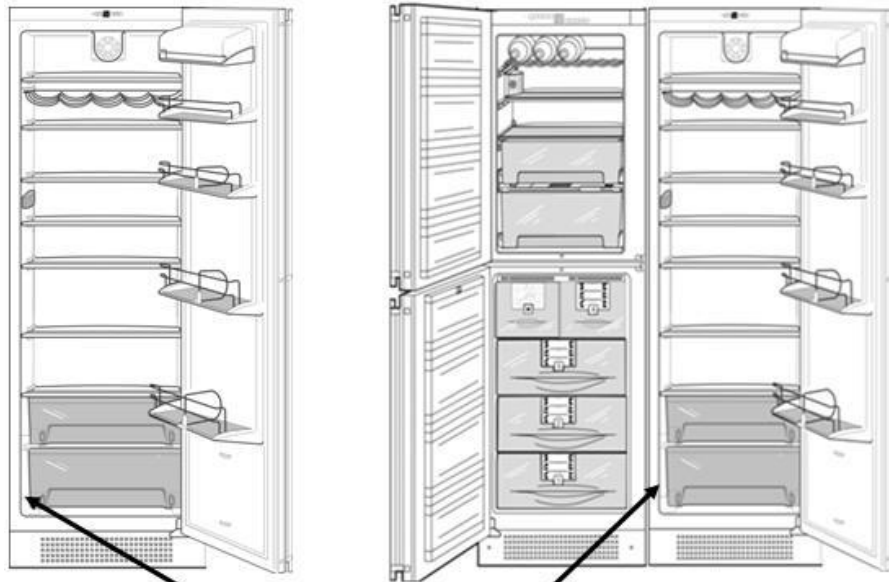
Inspection of door hinge pin




Stop using the unit
If the hinge pin is
loose or missing!

Location of Model Number

R1400, RI1400, RB1400, and RBI1400



1 Model Number

CPSC is still interested in receiving incident or injury reports that are either directly related to this product recall or involve a different hazard with the same product. Please tell us about it by visiting <https://www.cpsc.gov/cgibin/incident.aspx>

Radon Training Coming to Connecticut in March!

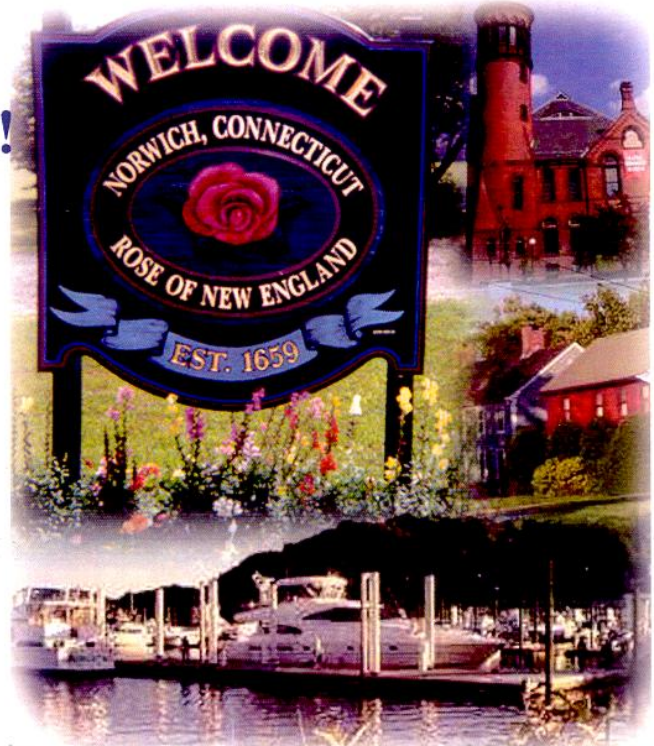
**Affordable Radon Training
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Valuable Credit Hours
Award-Winning Instructor**

**Residential Radon Measurement
March 4-5, 2010
Certification Exam March 6**

2-Day Course for:

- Residential Radon Measurement certification prerequisite
- 16 NEHA-NRPP & NRSB Category I CE Credits
- 2 Renewal ASHI MRCs
- 16 NAHI CEUs
- 16 CT Home Inspector CE Hours
- 2 MA Home Inspector CE Hours

Prepares you for and is a prerequisite to the optional certification exam, which will be available following course completion.



Course Location: **Three Rivers Community College
Thames Valley Campus
574 New London Turnpike
Norwich, CT**

Register Now!

**Residential Radon Measurement
March 4-5 (exam March 6)
at
Three Rivers Community College
Norwich, CT**

Course Fee: \$299.00

Certification Exam: \$95.00

Registration and Information

To register for the course, please call Three Rivers Community College Office of Continuing Education: (860) 885-2608.

To register for the certification exam or for more information regarding the Radon Measurement course, call Spruce Radon Training: (800) 355-0901 or email training@spruce.com

This professional radon training course is presented by Spruce Environmental Technologies, Inc. in conjunction with:

AccuStar & RadonAway



EPA

Top Green Home Terms

Active solar heating: Mechanical or electrical systems that collect and absorb solar radiation, then transfer the solar heat to the interior space or to a storage system, from which the heat is distributed in the home.

Advanced framing: see optimum value engineering

Aerator: The screw-on tip of the faucet that determines the flow rate. Aerators are inexpensive to replace and they can be one of the most cost-effective household water conservation measures.

Annual fuel utilization efficiency (AFUE): The measure of seasonal or annual efficiency of a residential heating furnace or boiler. Specifically, it is the ratio of heat output of the furnace or boiler compared to the total energy consumed by a furnace or boiler. An AFUE of 90% means that 90% of the energy in the fuel becomes heat for the home and the other 10% escapes up the chimney and elsewhere.

Boiler: A vessel or tank where heat produced from the combustion of fuels such as natural gas, fuel oil, or coal is used to provide either hot water or steam for home heating. Steam is distributed via pipes to steam radiators, and hot water can be distributed via baseboard radiators or radiant floor systems, or can heat air via a coil.

Btu: Btu stands for British thermal unit and is the amount of energy needed to raise the temperature of one pound (about a pint) of water one degree Fahrenheit.

Building envelope: - Elements of the building, including all external building materials, windows, and walls, that enclose the internal space.

Coefficient of performance (COP): Indicates the heating efficiency of ground-source and water-source heat pumps. More specifically, it is the ratio of heat energy delivered or extracted to the work supplied to operate the equipment. The higher the COP, the more efficient the heat pump.

Combustion efficiency: A measure of how effectively the heat content of a fuel in a combustion appliance (i.e. furnace or boiler) is transferred into usable heat.

Compact fluorescent lamps (CFLs): Small fluorescent light bulbs that use 75% less energy (electricity), and last up to 10 times longer than a traditional incandescent bulb, and can be screwed into a regular light socket. ENERGY STAR qualified CFLs cost little up front, and provide a quick return on investment. However, all CFL contain a small amount of mercury and must be handled properly and recycled when they burn-out.

Composting: A controlled biological decomposition of organic wastes (i.e. certain kitchen wastes, yard trimmings) into a stable product that can be used as a natural soil amendment.

Construction and Demolition (C&D) Materials: Construction and demolition (C&D) materials consist of the debris generated during the construction, renovation, and demolition of buildings, roads, and bridges. C&D materials often contain bulky, heavy materials, such as concrete, wood, metals, glass, and salvaged building components.

Cool roofs: Roofing material that has high solar reflectance, and absorbs only small amounts of heat, which can reduce heat transfer to the indoors and enhance roof life and durability.

Deconstruction: The careful and systematic dismantling of a building structure to maximize the recovery of valuable building materials. Deconstruction is an environmentally friendly alternative to demolition, which produces large quantities of debris requiring disposal.

Density: the amount of residential development permitted on a given parcel of land, typically measured in dwelling units per acre - the larger the number of units permitted per acre, the higher the density; the fewer units permitted, the lower the density. Well-designed neighborhood density can help achieve local economic development goals, provide housing options, create walkable neighborhoods, and protect their air, water and open space.

Design for Deconstruction: Designing buildings to facilitate future renovations and eventual dismantlement, including designing for durability and adaptability; using fewer adhesives and sealants; using fewer materials; and re-useable components.

Embodied energy: The amount of energy consumed to produce a product, in this case building materials. This includes the energy needed to mine or harvest natural resources and raw materials, and manufacture and transport finished materials.

Energy-efficiency ratio: A measure of how efficiently a cooling system (i.e. air conditioner, heat pump) operates when the outdoor temperature is at a specific level (i.e. 95°F). It represents the ratio of heat removed (Btu/hour) to the electricity required to run the system (watts). The higher the EER, the more efficient the system is.

Energy efficiency: Reducing the amount of energy required to heat and cool homes, and to power appliances and electronics.

EnergyGuide: Yellow label that manufacturers are required to display on many appliances, which shows how much energy the appliance uses, compares its energy use to similar products, and lists approximate annual operating costs. Manufacturers must use standard test procedures developed by the U.S. Department of Energy (DOE) to verify the energy use and efficiency information reported on the EnergyGuide label.

Energy Star: A joint program of the U.S. Environmental Protection Agency and the U.S. Department of Energy helping to save money and protect the environment through promotion of energy efficient buildings, homes, products and practices. ENERGYSTAR labeled products have met Federal energy efficiency standards.

Engineered wood: Products made from lumber, veneers, strands of wood, or from other small wood and sometimes recycled plastic elements that are bound together with structural resins to form lumber-like structural products. They are designed for use in the same structural applications as conventional lumber, and allow production of large-lumber substitutes from small lower-grade logs.

Geothermal energy: Heat from the earth. Resources of geothermal energy range from the shallow ground to hot water and hot rock found a few miles beneath the earth's surface, and down even deeper to the extremely high temperatures of molten rock.

Green mortgage: Mortgages that provide benefits to homeowners who reduce their impacts on the environment and minimize household energy or transportation costs, while potentially increasing their homes' future value and selling potential.

Green power: Electricity produced from renewable and non-polluting energy resources such as solar, wind, geothermal, biogas, biomass, and low-impact small hydroelectric sources.

Green roof: Roof of a building that is partially or completely covered with vegetation and soil, planted over a waterproofing membrane.

Greenwashing: The practice of advertising a product or process as "green" or environmentally friendly, when the product really is not, or does not achieve the advertised marketing claims. A false or misleading picture of environmental friendliness used to conceal or obscure damaging activities.

Grey water: Non-drinkable water that can be reused for irrigation, flushing toilets, and other purposes.

Ground-source geothermal system: A type of heat pump that uses the ground, ground water, or ponds as a heat source and heat sink, rather than outside air.

Heat island effect: Localized increase in ambient urban air temperatures resulting primarily from the replacement of vegetation with buildings, roads, and other heat-absorbing infrastructure. The heat island effect can result in significant temperature differences between rural and urban areas and contributes to global warming.

Heating seasonal performance factor: The measure of seasonal or annual efficiency of a heat pump operating in the heating mode. It takes into account the variations in temperature that can occur within a season and is the average number of Btu of heat delivered for every watt-hour of electricity used by the heat pump over a heating season.

Heating, Ventilation, and Air Conditioning (HVAC) system: Controls a home's internal environment (temperature, humidity, air flow, and air filtering).

Home Energy Rating System (HERS) index: A nationally recognized energy rating system that gives homeowners, sellers, buyers, builders, mortgage lenders, and secondary lending markets a precise evaluation of home energy efficiency in the form of a score. A home built to the specifications of the International Energy Conservation Code scores a HERS Index of 100, while a net zero energy home scores a HERS Index of 0. The lower a home's HERS Index, the more energy efficient it is.

Impervious surfaces: Surfaces such as paved streets, parking lots, and building rooftops that prevent precipitation from soaking into the ground. Different surfaces can have different degrees of imperviousness.

Indoor air quality (IAQ): The healthiness of the air inside homes. Indoor air pollution sources that release gases or particles into the air and/or a lack of proper ventilation are the primary causes of indoor air quality problems in homes.

Infiltration: Unintended air leakage, or infiltration, occurs when outside air enters a house through cracks and openings around doors, windows, and ducts. Properly sealing these cracks and openings in a home can significantly reduce heating and cooling costs, improve building durability, and help prevent pests from entering your home.

Insulating concrete forms (ICF): Forms for poured concrete walls that remain part of the wall assembly, adding to the insulation of a home because of their high thermal resistance.

Integrated Design: A design approach where all the members of the building stakeholder community, technical planning, design, construction, and maintenance & operation teams evaluate the project objectives collectively, and make design decisions for building materials, systems, and assemblies to meet the project goals. This approach is a deviation from the typical planning and design process of relying on the expertise of specialists who work in their respective specialties somewhat isolated from each other.

Kilowatt: A standard unit of electrical power equal to one thousand watts, or to the energy consumption at a rate of 1000 joules per second.

LEED rating system: A building certification process, established by the U.S. Green Building Council, which looks at various aspects of "green building" and awards recognition to buildings that meet certain standards. Users of the LEED process earn credits in several categories, which can vary by LEED certification type but generally include: sustainable sites, water efficiency, energy & atmosphere, materials & resources, indoor environmental quality, and innovation.

Light emitting diodes (LEDs): Small light sources that become illuminated by the movement of electrons through a semiconductor material. LED lighting is more energy efficient, durable, versatile and longer lasting than incandescent and fluorescents lighting.

Lifecycle impacts: Environmental impacts, including energy consumption, over the course of the product's lifespan from raw material harvesting, manufacture, transport, use, and maintenance, to disposal.

Low-emissivity (low-e) coating: A film or thin coating applied to the surface of glass to reduce heat transfer through a window. Low-e coatings reduce solar heat gain through windows in the summer and heat loss during the winter.

Native plants: Plants that have evolved over thousands of years to be able to survive in a particular region, and have adapted to the geography, hydrology, and climate of that region. A community of native plants provides habitat for a variety of native wildlife species; and will be hardy and resistant to the local conditions, thereby usually requiring less maintenance when used in landscaping.

Natural lighting/daylighting: The use of windows and skylights to bring more natural light into a home. Can also refer to architectural design that makes significant use of natural light.

Net metering: The practice of using a single meter to measure consumption and generation of electricity by a small energy generation facility (such as a house with a solar photovoltaic system). Net metering allows a homeowner to sell surplus electricity back to the utility.

Non-renewable resources: Natural resources that cannot be regenerated or grown at a sustainable rate to meet demand, including fossil fuels, metals, and minerals.

On-demand hot water systems: Tankless or instantaneous water heaters that provide hot water only as it is needed. On-demand water heaters heat water directly without the use of a storage tank, avoiding the heat losses associated with hot water storage tanks.

Optimum value engineering (OVE): Lumber layout and usage techniques that minimize the amount of lumber used to construct a house without compromising its structural integrity. OVE can improve a home's energy efficiency and durability, reduce construction costs, and avoid waste. In addition, optimizing the amount of lumber used to frame homes creates more space for insulation in exterior walls. Also known as advanced framing.

Passive cooling: Cooling buildings without the use of mechanical equipment, by using natural ventilation.

Passive solar heating: Designing a home's windows, walls, and floors to collect, store, and distribute solar energy in the form of heat in the winter and reject solar heat in the summer. Unlike active solar heating systems, passive solar design doesn't involve the use of mechanical and electrical devices, such as pumps, fans, or electrical controls to move the solar heat.

Pervious surface: Porous surface with spaces in the material, such as landscaping, gravel, and alternative pavers. Pervious surfaces allow rainwater or snowmelt to pass through into the ground, thereby reducing runoff and filtering pollutants.

Photovoltaic (PV): A system that converts sunlight directly into electricity using cells made of silicon or other conductive materials. When sunlight hits the cells, a chemical reaction occurs, resulting in the release of electricity. Solar panels are an example of a photovoltaic system.

Porous pavement: Special type of pavement that allows rain and snowmelt to pass through it, thereby reducing the runoff from a site and surrounding areas. In addition, well-maintained porous pavement filters pollutants from runoff.

Post-consumer content: Material from products that were used by consumers and would otherwise be discarded as waste. These materials are recovered through consumer recycling, and include items such as newspapers, cardboard, aluminum, glass, and plastics.

Pre-consumer content: Excess byproducts, or damaged materials, generated during manufacturing processes that are recovered and used as inputs in a manufacturing process, for instance rejected materials or packaging trimmings.

Radon: A colorless, odorless, naturally occurring, radioactive, inert, gaseous element formed by radioactive decay of radium atoms. Radon typically moves up through the ground to the air above and into a home through cracks and other holes in the foundation. Radon testing is recommended for most homes, because radon is the second-leading cause of lung cancer.

Rain barrel: Mosquito-proof container used to collect and store rainwater that would otherwise wind up in storm drains and streams. The rain collected provides free "soft water" to homeowners-containing no chlorine, lime, or calcium-that can be used to water gardens and houseplants, or for car and window washing.

Rain garden: a planted depression that allows rainwater runoff from impervious urban areas like roofs, driveways, walkways, and compacted lawn areas the opportunity to be absorbed. This reduces rain runoff by allowing stormwater to soak into the ground (as opposed to flowing into storm drains and surface waters which causes erosion, water pollution, flooding, and diminished groundwater). Native plants are recommended for rain gardens because they generally don't require fertilizer and are more tolerant of one's local climate, soil, and water conditions.

Reclaimed materials: Waste materials and byproducts that have been recovered or diverted from the waste stream for reuse.

Reclaimed Water: Treated wastewater that can be used for beneficial purposes, such as irrigating certain plants.

Recycled-content materials: Materials that contain pre- or post-consumer recycled content. Purchasing recycled products creates markets for the recovered materials, conserves natural resources and energy, and reduces waste.

Renewable energy: Energy and electricity supplied from continually replenished energy sources, such as wind and solar power, geothermal, hydropower, and various forms of biomass.

Resource conservation: Conserving natural resources and energy use by managing materials more efficiently. Three primary strategies for effectively managing materials and waste are to "reduce, reuse, and recycle."

R-value: A measure of insulation. The higher the R-value, the better walls and roofs will resist the transfer of heat.

Seasonal energy efficiency ratio (SEER): A measure of seasonal or annual efficiency of a central air conditioner or air conditioning heat pump. It takes into account the variations in temperature that can occur within a season, rather than a single temperature, and is the average number of Btu of cooling delivered for every watt-hour of electricity. The higher the SEER, the more energy efficient the system.

Smart Growth: Development, transportation and conservation strategies that help protect the natural environment and make communities more attractive, economically stronger, and more socially diverse.

Solar panels: see photovoltaics

Stormwater: Stormwater is water from precipitation and snowmelt events. Stormwater runoff is generated when precipitation flows over land or impervious surfaces and does not percolate into the ground. In the process of flowing over the land or impervious surfaces, stormwater can accumulate debris, chemicals, sediment or other pollutants that can adversely affect water quality if the runoff is discharged into streams or lakes untreated.

Structurally insulated panels (SIPs): Prefabricated insulated structural elements for use in home walls, ceilings, floors, and roofs, which provide enhanced insulation compared to more traditional construction methods.

Sustainability: A popular definition is "Meeting the needs of the present generation without compromising the ability of future generations to meet their own needs." Sustainable development marries two important themes: that economic development must be ecologically viable now and in the long run, and that environmental protection does not preclude economic development.

Therm: A unit of heat containing 100,000 British thermal units (Btu).

Thermal mass materials: Materials that retain or store heat produced by sunlight or other sources. These are typically dense materials such as stone, concrete, or metal, and are often an important component of solar heating systems and other high efficiency systems.

U-factor: U-factor measures the heat transfer through a window, door, or skylight and tells you how well the product insulates. The lower the U-factor, the greater resistance to heat flow (in and out) and the better its insulation value.

Ventilation: The intentional exchange of indoor air with outdoor air to reduce indoor pollutants, moisture, and odors.

Water factor: The number of gallons per cycle per cubic foot that a clothes washer uses.

Watt: The rate of energy transfer equivalent to one ampere under an electrical pressure of one volt. One watt equals 1/746 horsepower, or one joule per second. The amount of light, or the energy output, of light bulbs is measured, in part, in watts. The higher the wattage level, the more energy is output and consumed.

Weatherization: Energy efficiency improvement measures for homes, including a wide variety of measures that encompass the building envelope, its heating and cooling systems, its electrical system, and electricity consuming appliances. Examples of weatherization include adding insulation, storm windows, or weather stripping to your home.

Zero-net energy home/net-zero energy home: A home that produces, on average, as much energy as it uses. Zero net energy use is achieved through a combination of energy efficiency measures to reduce the overall energy load of the house (i.e., super insulated building envelope, passive solar strategies, efficient heating/cooling systems) along with renewable energy (i.e., solar power, wind power), that offsets any non-renewable energy consumed.

Web site of the month:

NEWS and ARTICLES
Current and archived
material from *Environmental
Building News*

<http://www.buildinggreen.com/>



Energy Connections

API: U.S. Crude Oil Imports Decreased by 9.2% in 2009

The American Petroleum Institute (API) announced in mid-January that the imports of crude oil and related products decreased by 9.2% in 2009, falling to an average of 11.7 million barrels per day. The oil industry group attributed the drop to decreased demand due to the economic recession. API measures petroleum demand in terms of the total petroleum deliveries in the United States, which averaged 18.7 million barrels per day in 2009, a 3.6% drop below 2008 levels, which in turn were 6% below 2007 levels. U.S. crude oil production was also up 7% over 2008 production levels, averaging 5.3 million barrels per day. All of which says that the country inched closer to energy independence in 2009. However, API saw a slight increase in petroleum demand in December 2009, suggesting that economic recovery could erode some of these gains.

From the desk of T. Boone Pickens

I'm going to get straight to the point of this email. We imported 4.35 billion barrels of oil in 2009 at a cost of over half a million dollars per minute.

Yes, you read that correctly. **4.35 BILLION barrels imported in 2009.**

Over \$500,000 dollars spent per MINUTE on foreign oil. That's another **\$265 BILLION siphoned out of America's struggling economy**, and we still haven't adopted a real energy plan to reduce our dependence on foreign oil.

For this reason I'm going back on the airwaves with a new television advertisement this week. In the ad, I encourage Americans to contact their Members of Congress immediately in support of the NAT GAS Act. [You can view the new ad here](#)



[Play Video](#)

Cut & Paste: <http://www.pickensplan.com/media/video/>

If you haven't already signed the [Energy Independence NOW petition](#), I encourage you to cut & paste into your browser: <http://www.pickensplan.com/petition/> as soon as possible. If you've already signed it, forward this email to 2 of your friends and ask them to sign it. This is important. 55,000 people have signed the petition in the past week. Let's keep sending the message to Congress over and over and over again until they finally hear us and pass legislation to end our dangerous dependence on foreign oil.

We WILL get this done.

-Boone

Pickens Plan
P.O. Box 12123
Dallas, TX, 75225, UNITED STATES



NREL Study Shows 20% Wind is Possible by 2024

As much as 20% of the power connected to the grid could come from wind by 2024, according to a new study by DOE's National Renewable Energy Laboratory (NREL). The report, "Eastern Wind Integration and Transmission Study," released on January 20, is a technical review analyzing the economic, operational, and technical implications of shifting 20% or more of the Eastern Interconnection's electrical load to wind energy by the year 2024. The Eastern Interconnection is the largest of three power grids in the United States, running from the East Coast to as far west as eastern Montana (see a [map](#) from the North American Electric Reliability Corporation, and an [NREL map](#) of the study area). It

provides power to more than 70% of the U.S. population. The study concludes that 20% wind power is technically feasible, although transmission upgrades and operational changes to the system will be required, regardless of the source of the wind power. Also, while significant costs, challenges, and impacts are associated with a 20% wind scenario, substantial benefits could overcome those costs. The study also finds that reaching 20% wind power would require a major national commitment to clean, domestic energy sources.

The unprecedented report, initiated in 2008, finds that drawing wind energy from a larger geographic area makes it both less expensive and more reliable, because the aggregated wind power output is more predictable and less variable. It also finds that the relative cost of aggressively expanding the transmission grid represents only a small portion of the total annualized costs of the wind energy expansion and is more than paid for by reduced expenditures for fossil fuels. The expanded transmission grid also helps to optimize the electrical system, allowing wind power to provide a highly cost-effective means of reducing carbon emissions. While it did pose a number of avenues for future study, the report noted that the widespread adoption of plug-in hybrid electric vehicles for nighttime recharging (when wind generation is higher) could ease some of the issues associated with the integration of wind power into the grid. See the NREL [press release](#) and [Web page](#) for the Eastern Wind Integration and Transmission Study. <http://www.nrel.gov/>

News Release

U.S. Environmental Protection Agency
New England Regional Office

For Release: December 22, 2009

Contact: Nancy Grantham, (617) 918-1101

Settlement Reached at Sutton Brook Disposal Area Superfund Site in Massachusetts

(Boston—December 22, 2009) A new settlement estimated worth more than \$30 million will ensure that cleanup of the Sutton Brook Disposal Area Superfund Site in Tewksbury, Mass. will move forward, the Justice Department and U.S. Environmental Protection Agency (EPA) and the Massachusetts Department of Environmental Protection announced today.

The agreement, lodged in federal court in Boston, resolves federal and state liability claims against 49 potentially responsible parties for the cleanup of the site.

Under the settlement, 20 of the parties will be responsible for implementation of the remedy selected by EPA in 2007. These parties will also pay for the state's past response costs, oversight costs incurred by EPA and MassDEP, as well as \$1.65 million to the U.S. Fish and Wildlife Service and the state for natural resource damages claims stemming from injuries to groundwater and wetlands. The remaining

settling parties are required to make payments to two trusts to be used to perform the cleanup at the site and to pay for response costs.

The selected remedy includes excavation and consolidation of contaminated soils and sediments, construction of a multi-layered impermeable cap, capture and treatment of contaminated groundwater, institutional controls and long term monitoring. The total estimated cost for the selected remedy is estimated to be \$29.9 million.

The 20 defendants responsible for performing the cleanup include:

Ausimont Industries Inc.; BASF Corporation; Boston and Maine Corporation; Browning-Ferris Industries Inc.; Allied Waste Systems Inc.; BFI Waste Systems of North America LLC; BTU International Inc.; E.I. DuPont De Nemours and Co.; Honeywell International Inc.; Mallinckrodt LLC; M/A-COM Inc.; Raytheon Company; Sears, Roebuck and Co.; Textron Systems Corp.; Town of Tewksbury, Verizon New England Inc.; Waste Management of Massachusetts Inc.; Waste Management Disposal Services of Massachusetts Inc.; Waste Management of New Hampshire Inc. and Zeneca, Inc..

The site, also known as Rocco's Landfill, is located on South Street in Tewksbury, Mass. It contains two major source areas a 40 acre landfill, which includes a northern lobe and a southern lobe and an area of contaminated soils adjacent to the northern lobe. The site was listed on EPA National Priorities List in 2001 after state and federal site investigations revealed the presence of volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), pesticides, polychlorinated biphenyls and inorganic substances in the soil, groundwater, surface water and sediments samples on and off the Site. SVOCs and VOCs were also found in air samples.

Waste disposal activities at the Site can be traced back to 1957. Until approximately 1988, the Rocco's Landfill accepted municipal, commercial, and industrial wastes from both inside and outside of the Town of Tewksbury, including unknown quantities of hazardous substances.

The consent decree, lodged in the U.S. District Court for the District of Massachusetts, is subject to a 30-day public comment period and approval by the federal court. A copy of the consent decree is available on the Justice Department Web site at http://www.usdoj.gov/enrd/Consent_Decrees.html.

More information on the Sutton Brook Disposal Area Superfund Site can be found at <http://www.epa.gov/region1/superfund/sites/suttonbrook>.

FOR IMMEDIATE RELEASE

December 22, 2009

CONTACT:

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EPA Seeks to Disclose Pesticide Inert Ingredients

WASHINGTON — The U.S. Environmental Protection Agency is requesting public comment on options for disclosing inert ingredients in pesticides. In this anticipated rulemaking, EPA is seeking ideas for greater disclosure of inert ingredient identities. Inert ingredients are part of the end use product formulation and are not active ingredients. . Revealing inert ingredients will help consumers make informed decisions and will better protect public health and the environment.

“Consumers deserve to know the identities of ingredients in pesticide formulations, including inert ingredients,” said Steve Owens, assistant administrator for EPA’s Office of Prevention, Pesticides and Toxic Substances. “Disclosing inert ingredients in pesticide products, especially those considered to be hazardous, will empower consumers and pesticide users to make more informed choices.”

EPA believes public disclosure is one way to discourage the use of hazardous inert ingredients in pesticide formulations. The agency is inviting comment on various regulatory and voluntary steps to achieve this broader disclosure.

Pesticide manufacturers usually disclose their inert ingredients only to EPA. Currently, EPA evaluates the safety of all ingredients in a product’s formulation when determining whether the pesticide should be registered.

On October 1, 2009, EPA responded to two petitions (one by Northwest Coalition for Alternatives to Pesticides, and a second by several state attorneys general), that designated more than 350 inert pesticide ingredients as hazardous. The petitioners asked EPA to require that these ingredients be identified on the labels of products that include them in their formulations.

EPA will accept comments on the advance notice of proposed rulemaking for 60 days after it has been published in the Federal Register.

More information: <http://www.epa.gov/opprd001/inerts/index.htm>Note: If a link above doesn't work, please copy and paste the URL into a browser..

News Release

**U.S. Environmental Protection Agency
New England Regional Office
December 18, 2009**

Contact: Stacy Greendlinger (617) 918-1403

Asbestos and Other Hazards Removed from Walpole, Mass. Superfund Site

(Boston, Mass. – Dec. 18, 2009) – EPA completed a short-term cleanup removing asbestos from the former mill building and hazardous substances in drums and containers on the Blackburn & Union Privileges Superfund Site, in Walpole, Mass.

Nearly 30 tons of asbestos and asbestos containing debris, as well as over 2,700 pounds of hazardous materials and waste oils were removed from the site. The removal work, conducted by EPA’s contractor with EPA oversight, began in June 2009 and concluded in October 2009.

Although EPA found the former mill building structurally adequate, the lack of a fire suppression system coupled with the disrepair of the roof and many windows and the presence of asbestos and hazardous substances in drums and containers presented a health threat to anyone on the site and may have posed additional risks in the event of a fire. All visible friable asbestos and asbestos-containing material was removed and trucked in sealed containers to a licensed landfill. The abandoned drums and containers containing lead, volatile organic compounds, semi-volatile organic compounds and ignitable and corrosive wastes were removed and disposed of at a licensed facility.

EPA conducted air monitoring throughout the removal effort to ensure the safety of its workers and the surrounding community. No asbestos fibers were detected outside of the former mill building by the air monitors during the removal action.

The Blackburn & Union Privileges site was added to the Superfund “National Priority List” in 1994. Industrial and commercial processes on the site date back to the 1600s. Between 1891 and 1915, the site was used for manufacture of tires, rubber goods, and insulating materials. The crushing of raw asbestos in the manufacture of brake and clutch linings occurred at the site between 1915 and 1937. Various cotton and fabric production processes were conducted at the site from 1937 until 1985.

After considering public comments, in September 2008 EPA decided on an overall site cleanup plan. The cleanup plan includes these major components: removal of Neponset River and Lewis Pond contaminated sediment; cleanup of contaminated on-site soil; cleanup of on-site groundwater which could pollute local surface water; restriction on future uses of the South Street on-site properties. EPA is currently negotiating with the potentially responsible parties that owned facilities and or operated at the site for the performance of the cleanup work.

More information: Blackburn & Union Privileges Superfund site
(<http://www.epa.gov/region1/superfund/sites/blackburn>)

News Release

U.S. Environmental Protection Agency
New England Regional Office
December 18, 2009

Contact: Paula Ballentine, EPA Public Affairs (617) 918-1027

Cleanup Work Completed at Agawam, Mass. Site

(Boston, Mass. – Dec. 18, 2009) – Cleanup of the Agawam Sports club was recently completed by the U.S. EPA and contractors from Guardian Environmental Services.

The site, a shooting range with both indoor and outdoor ranges, has been out of operation and vacant for over five years. The site consists of a 5,000 square foot, single-story, building for the indoor shooting range and an outdoor range approximately 100 feet from the building.

Work began at the 5.5 acre site in July. The area is adjacent to Town-owned wooded land, which is bordered by a stream. The main contaminate at the site was lead, but also present were traces of arsenic, which derived from its use in the manufacturing of pellets. The site first needed to be cleared of brush and debris before the cleanup could begin. The bulk of cleanup work was completed in late-October.

Some of the key activities accomplished in the removal action were to clear and “grub” approximately 102,000 square feet of land, excavate hot spots covering approximately 65, 640 square feet, and the installation of erosion control devices adjacent to the stream and around the trees which remained. Over eight days, 72 truckloads hauled away more than 2300 tons of treated soil from site to the City of Albany Solid Waste Management Facility.

FOR IMMEDIATE RELEASE

December 10, 2009

CONTACT:

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EPA Releases Final Specification for WaterSense New Homes

This will help homeowners increase water efficiency and save on their utility bills

WASHINGTON—The U.S. Environmental Protection Agency (EPA) released its final WaterSense single-family new homes specification today, creating the first national, voluntary, water-efficiency specification for an entire new home.

“Home builders can now partner with EPA and earn the WaterSense label for their newly built homes, helping to create livable communities and quality homes that are easy to maintain,” said Peter S. Silva, assistant administrator for EPA’s Office of Water. “These homes will save homeowners as much as \$200 a year on utility bills compared to their current homes.”

EPA worked with hundreds of stakeholders over the past three years to develop this specification, which was designed to complement existing green building programs. WaterSense labeled new homes, which will be 20 percent more efficient than typical new homes, must be independently inspected and certified by an EPA licensed certification provider to meet the WaterSense criteria for water efficiency and performance.

The new homes will feature WaterSense labeled plumbing fixtures, Energy Star qualified appliances (if installed), water-efficient landscaping, and hot water delivery systems that deliver hot water faster, so homeowners don’t waste water—or energy—waiting at the tap.

By investing in WaterSense labeled homes, American home buyers can reduce their water usage by more than 10,000 gallons per year—enough to fill a backyard swimming pool—and save enough energy annually to power a television for four years.

If the approximately 1.27 million new homes built in the United States each year were WaterSense labeled, it would save more than 12 billion gallons of water.

With this announcement, EPA is inviting home builders to join the WaterSense program and commit to building water-efficient new homes.

WaterSense, a partnership program sponsored by EPA, seeks to protect the future of our nation's water supply by offering people simple ways to use less water.

More information on WaterSense labeled new homes:

http://www.epa.gov/watersense/spaces/new_homes.html

To see a video message about the WaterSense new homes specification:

<http://www.epa.gov/multimedia/playercontents/video/watersense/index.html>

R377

Massachusetts Home Inspectors

As you already know, 2010 is a renewal year for Massachusetts Home Inspector Licensing. A required 12 continuing education hours with 1 hour in ethics and 4 hours in 266 CMR is required.

There will be a 4 hour class on 266 CMR on Saturday April 10, 2010 in Worcester. Catalog of classes with registration details will be available in February 2010. Google Worcester Public Schools [Night Life](#) website.

The class focus is on applying the definitions and report writing requirements in the regulations to the systems and components in the Standards of Practice. An hour is anticipated to cover a system in the Standards of Practice. Exterior, Structure, Electrical, and Plumbing will be covered in the class. Time permitting, additional systems will be covered.

At this time I do not know the class size limit. I anticipate a typical classroom will be allocated and guessing 30 seats.

Please let me know if you plan to attend. If there are more than 30, I will work with Worcester Public Schools for a larger room. Cost is \$100.

Best Regards,
Jim Mushinsky
Centsable Inspection - centsableinspection.web.officelive.com
508-877-5939

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