

RADIOLOGICAL EMERGENCY INFORMATION



**FOR VERMONT'S
FARMERS,
FOOD PROCESSORS
AND
DISTRIBUTORS**

Vermont Agency of Agriculture, Food & Markets
116 State Street, Drawer 20
Montpelier, VT 05620-2901



Photo Provided By Skye Chalmers

This booklet has been prepared by the Vermont Agency of Agriculture and reviewed by the Vermont Department of Health and the Vermont Emergency Management Division of the Vermont Department of Public Safety to provide guidance to members of the agricultural community with farms, food processing facilities and distributing facilities within 50 miles of Vermont Yankee Nuclear Power Station. It explains the actions which you may be advised to take in order to protect your livestock and crops in the event of a radiological emergency. It also provides some tips to help you be prepared for a radiological incident. Please read and become familiar with the information in this booklet. Keep it in a convenient place for future reference.

Protect yourself, your family, and your employees from unnecessary exposure. Avoid needless handling of contaminated materials. Leave plants and crops in the ground until advised by State or local officials. If you are directed to destroy milk or produce, you will be given specific instructions on how and where this is to be done. **Keep records of any losses or expenses you may incur.**

For more information, write or call:

Vermont Agency of Agriculture, Food & Markets
116 State Street, Drawer 20
Montpelier, VT 05620-2901
802-828-2431

Vermont Department of Health
108 Cherry Street
P.O. Box 70
Burlington, VT 05402-0070
802-863-7200 or 800-464-4343 (from within Vermont)

Vermont Emergency Management
103 South Main Street
Waterbury, VT 05671-2101
802-241-8721 or 800-347-0488

or

230 Main Street, Suite 306
Brattleboro, VT 05301
802-251-2172

For additional information the following web sites are useful.

Radiological Emergency Planning Information:
<http://www.vtnuclearsafety.com> or <http://www.dps.state.vt.us/vem>

Agricultural Information:
<http://www.vermontagriculture.com/>

Radiological Health Information:
http://healthvermont.gov/e_ready.aspx

Weather Information:
<http://www.weather.com/> or <http://www.weather.gov/>

May 2006

LIST OF TOWNS IN VERMONT IN THE INGESTION PATHWAY ZONE

<u>Windham County (18)*</u>	<u>Bennington County (19)</u>	<u>Rutland County (5)</u>
Athens	Arlington	Danby
Bellows Falls, Village	Bennington, Town of	Mt. Holly
Brookline	Bennington, Village	Mt. Tabor
Dover	Dorset	Pawlet
Grafton	Landgrove	Wallingford
Jamaica	Manchester, Town of	
Londonderry	Manchester, Village	<u>Windsor County (13)</u>
Marlboro	N. Bennington Village	Andover
Newfane	Peru	Baltimore
Putney	Pownal	Cavendish
Rockingham	Readsboro	Chester
Stratton	Rupert	Ludlow, Town of
Townshend	Sandgate	Ludlow, Village
Wardsboro	Searsburg	Plymouth
Westminster	Shaftsbury	Reading
Whitingham	Stamford	Springfield
Wilmington	Sunderland	Weathersfield
Windham	Winhall	Weston
	Woodford	W. Windsor
		Windsor

*Brattleboro, Dummerston, Guilford, Halifax, Marlboro and Vernon are already involved in the ten mile Emergency Planning Zone.

SUMMARY

If a radiological emergency occurs, the Agency of Agriculture, Department of Health, and the Agency of Natural Resources will determine what areas within Vermont may be affected. These agencies will provide Field Sampling Teams to take soil, milk, water and food samples to determine if there are any radiological concerns in your area.

Therefore, be prepared to follow the guidelines for protecting and caring for your livestock, giving lactating dairy animals your first priority by sheltering them, and using feed and water from protected sources. There is no need to automatically destroy milk or other farm produce you feel may be contaminated. State agencies will sample milk, fruit and produce for contamination levels. The result of these tests will be used to advise you of the status of your produce and milk.

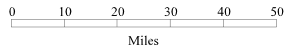
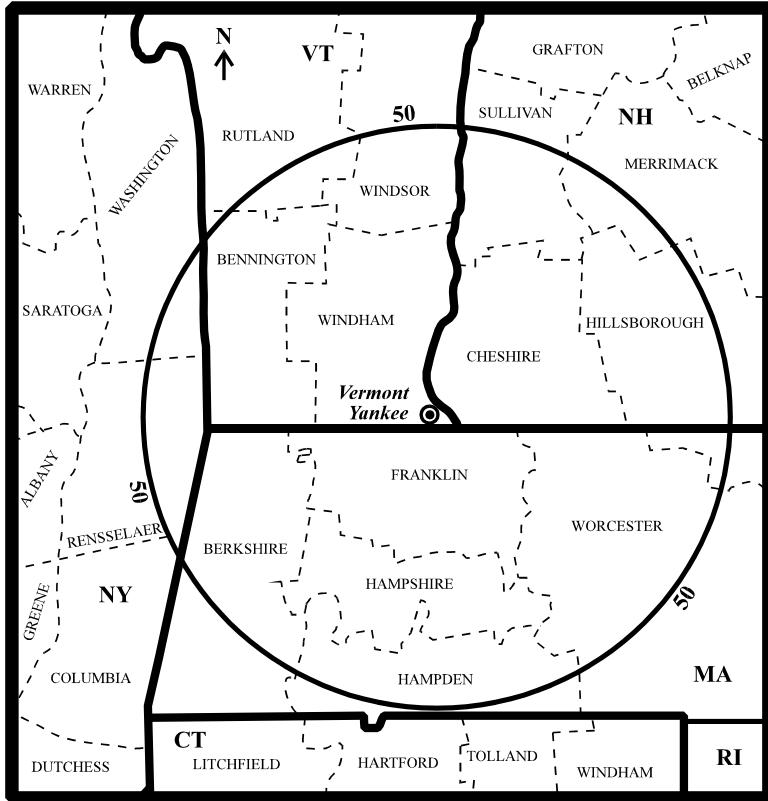
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Ingestion Pathway (50 mile) Zone

YOUR PLAN

The following space is provided for your thoughts, contact numbers, resource list, etc. to assist you if an emergency does occur.



BUILDINGS AND EQUIPMENT

Monitoring by the State of Vermont will determine whether any buildings or equipment are contaminated. If so, you will be advised on decontamination procedures. You may be told to wear protective clothing and wash down your buildings and equipment with soap and water. Cleaning does not destroy radioactivity but it does remove it from areas where people may be exposed.



PURPOSE

The purpose of this booklet is to provide information to **farmers, livestock owners, fruit and vegetable growers, food processors and food distributors** about actions that they may need to take if a radiological emergency occurs at a nuclear power plant within Vermont or a neighboring state. This booklet is focused on animals and plants that are likely to be in the human food chain. Owners of other animals such as horses should also refer to news releases at the time of a radiological incident.

The State of Vermont, working with Entergy Nuclear - Vermont Yankee, has developed emergency response plans to support and serve the farm and agricultural community in the event of a nuclear power plant emergency. This booklet also contains information on how you would be notified and what procedures you could be asked to follow.

For more information about state plans and emergency resources, please see page 20.

IF THERE IS AN EMERGENCY WHO WILL PROVIDE GUIDANCE?

Upon notification of a radiological emergency affecting the state, the State of Vermont will dispatch radiation monitoring and sampling teams. Extensive monitoring during and after a release of radiation would determine the exact locations that may be contaminated, and appropriate actions to take. Emergency information and instructions will be provided to the public over the Emergency Alert System (EAS) and other means (contacts in the food distribution chain). Specific instructions concerning restriction of trade, special washing or preparation of food and dairy products, precautionary measures, as well as additional protective actions will be supplied to you, either in person or in writing, through your contacts in the food distribution chain. These instructions will include actions to follow to protect yourself, your family, your livestock, and your crops.

State and local officials will keep all farmers, food processors and distributors in the affected area(s) informed of major developments concerning the radiological emergency.

HOW WILL YOU BE NOTIFIED IN AN EMERGENCY?

In the event of an emergency, state and local officials, through the Emergency Alert System (EAS) and news advisories, will advise you of the necessary precautions to take. If the emergency may effect farming, food processing and distributors in your area, specific instructions from the Vermont Department of Health will be issued over EAS stations by state officials. In the towns within the 10-mile Plume Emergency Planning Zone (EPZ), the sounding of sirens and the activation of Tone Alert Radios will advise people to tune into the Emergency Alert System. Refer to the following EAS radio stations:

Bennington County: WBTV - 1370 AM, 94.3 FM (Bennington)

WEQX - 102.7 FM (Manchester)

WMNV - 104.1 FM (Rupert)

WZEC - 97.5 FM (Hoosick Falls, NY)

Rutland County: WSYB - 1380 AM (Rutland)

WZRT - 97.1 FM (Rutland)

WRVT - 88.7 FM (Rutland)

WEXP - 101.5 FM (Brandon)

WEBK - 105.3 FM (Killington)

Windham County: WTSA -1450 AM, 96.7 FM (Brattleboro)

WKVT -1490 AM, 92.7 FM (Brattleboro)

WRSY - 101.5 FM (Marlboro)

WVAY 100.7 FM (Wilmington)

Windsor County: WVPR - 89.5 FM (Windsor)

WVPR - 94.5 FM (Brattleboro)

For towns outside the ten mile Emergency Planning Zone but inside the fifty mile Emergency Planning Zone, the radio and television stations with either transmitters or studios in the affected counties will carry Emergency Alert System (EAS) messages and news releases concerning the Vermont response to the incident. Towns likely to be effected are in the southern four counties of Vermont. The four counties are: Bennington, Rutland, Windham and Windsor. Listeners and viewers should be aware that radio and TV stations in neighboring states will also have similar messages as well. However, Vermont residents should follow the instructions originating from Vermont stations because conditions may differ from those experienced in other states.

PERSONAL SAFETY

Depending upon the amount and type of radioactive material deposited, there may be a period of time when you may not be able to cultivate your land. Representatives from various state agencies will monitor the situation and issue instructions about working on your farm. You may be advised to take the following precautions:

1. Wear protective clothing (similar to that worn during pesticide applications) when working outdoors. Remove all outer clothing before entering your home.
2. Wear a dust filter over your nose and mouth if you are plowing, cultivating, diking, baling, or harvesting.
3. Wash exposed areas of your skin before eating or drinking.
4. Consult with state officials about the disposition of protective clothing and dust filters.

PROTECTION FROM CONTAMINATED SOIL

The State of Vermont will take soil samples to determine if your farm is safe to work or if any other precautions are necessary. If the soil is contaminated above established safety levels, it may be necessary to keep the land fallow for an extended period of time. The length of time depends on the amount and type of radioactive material deposited. After that, the land could be returned to normal use. In situations involving highly contaminated soil, removal and disposal of the soil may be more appropriate. State and local officials will advise you on the use of your land after an emergency.

Alternative crops may be recommended in some situations. Crops such as flax may be substituted for food crops because they contribute little or no radioactive material to the human diet.

Deep-plowing the soil will move radioactive material below the plant root level, and may prevent plants from taking up contaminated nutrients. The level of radioactivity will decrease with the passage of time.

Bees: Honey and beehives will need to be sampled and analyzed for the presence of radioactive contamination before being approved for marketing and consumption.

Wildlife: Wildlife should not be taken for food until approved by the Vermont Fish and Wildlife Department.

Fish: Recreational fish may continue to be caught and released because dilution of the radioactive material in large bodies of water should make radioactive contamination of fish highly unlikely. Fish raised for food in open ponds or tanks must be tested prior to sale or use as food. Samples of water and fish from open bodies of water will be analyzed to ensure they are safe.

Maple Syrup and Sap: If sap gathering equipment and sugar houses are contaminated during the syrup season, maple products produced after that should be monitored before being marketed or consumed. If the contamination occurs after the season, all equipment and buildings should be monitored and decontaminated prior to the next season.

Other Farm Products: Other products such as logs, firewood, Christmas trees, etc., will be tested before their sale or movement outside the affected area.

PROTECTION FROM PACKAGED FOOD PRODUCTS:

Food in finished packaging prepared before the release of radioactive material will not be harmful to eat as long as the outer wrappings are carefully removed and discarded.

FOOD, MILK PROCESSORS, WAREHOUSES, AND COMMODITY TERMINALS:

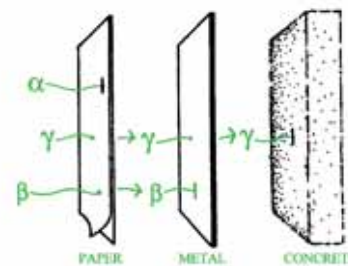
Windows and vents to the outdoors should be closed. Any system that draws air from the outdoors to the inside should be shut down, such as vacuum systems, air conditioners and compressed air systems.

The Vermont Department of Health or the Vermont Agency of Agriculture, Food and Markets will tell you when it is safe to prepare and market your fruits and vegetables.

BE PREPARED

Here are some things you can do now to prepare for an emergency:

1. Read and understand this brochure and keep it in a convenient place.
2. Plan where you would shelter your animals. Decide which animals would require immediate shelter. If you do not have enough shelter for all, determine priorities.
3. Decide how you would provide your livestock and poultry with stored feed and water.
4. Plan for storing or processing milk if marketing must be delayed for a few days.
5. For your information, the Agency of Agriculture telephone number is (802) 828-2431, Monday through Friday, 7:45 AM -4:30 PM.
6. In an emergency contact your town Emergency Management Director and listen to your local radio or television station that issues Vermont Emergency Alert System broadcasts for additional and up to date information.



UNDERSTANDING RADIATION

Radiation is energy in motion - it is tasteless, odorless and invisible. Naturally occurring radioactive materials are present in our bodies, in our homes, in the soil, and in the food and water we consume. Radioactive gases are also present in the air we breathe. These naturally occurring forms of radiation are referred to as “background radiation” and account for more than half of the exposure we normally receive.

In addition to natural background radiation, there are other sources of exposure. The largest source of radiation exposure to the average individual comes from the medical and dental use of X-rays and from the use of radioactive materials to diagnose and treat disease.

Radiation produces charged particles or "ions" as it moves through materials. This is called "ionizing" radiation. Alpha (α), beta (β), gamma (γ) radiation and X-rays are all forms of ionizing radiation.

Alpha particles may be stopped by a sheet of paper. Beta particles may be stopped by a thin sheet of metal. Gamma rays are the most penetrating and may be effectively stopped by concrete or lead.

The harm that may come to you from radiation will depend on the nature and energy level of the radiation to which you are exposed, the length of time you are exposed to it, how much of your body is exposed, and how much radioactive material is collected in your body.

TYPICAL RADIATION EXPOSURE LEVELS

Sources and Radiation Dose
(average dose in millirem)

One to Two packs of cigarettes daily	1300-2000/yr*
Indoor radon	200-300/yr **
Air-Food-Water	36/yr
Chest X-ray	20/test
The Earth (Atlantic Coast)	16/yr
Round trip, coast-to-coast plane trip	4/trip
Living next to a nuclear power plant	1/yr

* This dose is primarily to the lungs

**Actual dose can vary greatly depending on factors such as how well a house is ventilated.

The biological effect of radiation on man is measured in units called millirem. The average person receives about 360 millirem a year from background radiation. Man-made sources such as dental and medical X-rays can contribute, on the average, 60 of that 360 millirem per year. These amounts are not considered likely to lead to any adverse health consequences.

Milk: Milk should be safe to use if it is from adequately sheltered dairy animals. If there is a release of radioactive materials into the environment, you may be advised to place dairy animals on protected feed and water and provide them with shelter. If dairy animals consume feed and water contaminated with radioactive materials, some of the contamination will be absorbed into their bodies and could then enter the human food supply through milk and milk products. Milk from animals with internal contamination should not be consumed, or sold, until you are told that it is safe to do so by state authorities.



Poultry and Poultry Products: If there is a release of radioactive materials into the environment, you may be advised to place poultry on protected feed and water and provide them with shelter. Poultry, especially those kept for egg production, should be monitored by taking samples of poultry products and eggs to determine the presence of radioactive contamination. If poultry products and eggs are found to be contaminated they should not be consumed, or sold, until you are told that it is safe to do so by state authorities. Poultry raised indoors and given protected feed and water are less likely to be contaminated.

Grains: In many cases, it is generally a month from the time grains are harvested until they reach the consumer and the wind and rain will probably remove most contamination. Milling or polishing will probably remove any remaining contamination. Sampling and laboratory analysis will determine if the grain is safe to use. Contaminated grain should be stored separately from previously harvested, uncontaminated grain. Grain products should not be consumed, or sold, until you are told that it is safe to do so by state authorities.

Vegetables and Fruits, Including Grapes: Wash, scrub, peel, or shell locally grown fruits and vegetables, including roots, tubers and grapes, to remove surface contamination.

Fruits and vegetables ripe at the time of an emergency may be lost because of the personal hazard posed by harvesting contaminated fruit. Fruits and vegetables that do not have to be picked immediately could be picked and cleaned after the radioactivity decays. Canning, freezing or storage of fruits and vegetables will also allow the decay of most radioactive materials to take place. Fruits and vegetables should not be consumed, or sold, until you are told that it is safe to do so by state authorities.



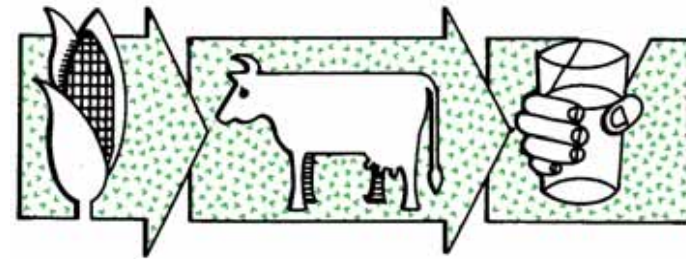
Photo Provided By Dennis Curran

Meat and Meat Products: If there is a release of radioactive materials into the environment, you may be advised to place meat animals on protected feed and water and, if possible, provide them with shelter. If livestock consume feed and water contaminated with radioactive materials, some of the contamination will be absorbed into their bodies and could then enter the human food supply through meat and meat products. Meat animals with internal contamination should not be slaughtered until you are told that it is safe to do so by state authorities. Instructions will be given on a case-by-case basis.

Livestock exposed to external contamination could be used for food if adequately washed and monitored by state officials before slaughtering. Animals can be washed using soap and water. In handling animals, you should wear protective clothing similar to that used for pesticide applications to prevent contaminating yourself.

RELEASE OF RADIOACTIVE MATERIAL FROM A POWER PLANT

A release of radioactivity from a nuclear power plant in an accident may send gases and tiny particles into the environment. The gases and particles would be spread by the wind and eventually fall to the earth. The actual distance that radioactive gases and particles would travel depends primarily on weather conditions. Heavier particles fall more quickly and deposit near the point of release. Strong winds spread lighter gases and particles over a larger area, greatly reducing the concentration of radioactive material on the ground. Rain increases the rate at which particles fall to earth from the plume and may increase the concentration of radioactive material on the ground in very localized areas.



CONTAMINATION

Contamination is the presence of radioactive materials in unwanted locations. People, animals, plants, soil and farm equipment may become contaminated.

People and animals can be exposed to radiation internally and externally. External contamination is caused by radioactive gases and particles lying on the surface of an object or ground. People and animals can be internally contaminated by breathing radioactive gases and particles in the air, by eating contaminated food, or by drinking contaminated water or milk. Therefore, it is necessary to take special precautions with farm animals to prevent contamination from entering the food chain. Plants can become contaminated internally by absorbing radioactive particles contained in the soil or water.

If radioactive material is deposited on a person's skin, or if radioactive materials have entered a person's body, the person is then considered to be contaminated. Outer skin surfaces can be washed or decontaminated. Radioactive material that is ingested may result in long-term exposure which may be a more significant health concern.

EXPOSURE VERSUS CONTAMINATION

These terms are frequently confused and can be distinguished from one another with a farm analogy. If you have a manure pile and you are close enough to smell it, you are exposed. If you go across the road to your neighbor's house you will not expose or contaminate them. If, on the other hand, you also step in the manure, you are now contaminated. If you go across the road to your neighbors' house without decontaminating your shoe or boot, you will expose your neighbors and probably contaminate their house. If you do contaminate your neighbor's house, they may also contaminate themselves.

Radiation is similar. An exposed but uncontaminated person or animal does not pose a risk to other people or animals. Contamination can be detected with radiation meters. External contamination can be removed by vigorous washing with soap and water.

HOW LONG CAN RADIATION BE HARMFUL?

Radioactive materials decay away at specific rates. Exposure from radiation is greatest during the first few hours and days following the release and deposition of radioactive materials. Those materials that remain in the air for longer periods of time lose much of their radioactivity before they settle to earth. The intensity of radiation decreases with the passage of time as radioactive materials decay.

PRECAUTIONARY ACTIONS

Why is water and feed that an animal eats during a radioactive materials release a concern? When meat and dairy animals eat or drink contaminated feed or water, some radioactive materials may be passed along the food chain through the eggs, meat or milk. Therefore it is important to protect farm animals as much as possible. This will limit the possibility of contaminating part of the food chain and endangering the public.

PROTECTING WATER SOURCES

Water from drilled wells is expected to be safe for consumption for both humans and animals.

Open sources of water, such as troughs, rain barrels and tanks, should be drained, rinsed and refilled after notification that radioactive materials have settled to the ground. The same procedure should be followed after windy weather spreads dust in the area. These open sources should be covered to prevent contamination from resuspension of dust.

Water from an open source, such as a pond or stream should not be used unless shown to be safe. State and local health experts will check water supplies and tell you whether they are safe.

Filler pipes should be disconnected from storage containers supplied by runoff from roofs or other surface drain fields. This will help prevent contaminants from entering the storage containers.

Intake valves on water systems should be closed when you suspect the water source may be contaminated. This will prevent distribution or irrigation until the water is tested and found to be safe.

PROTECTIVE ACTIONS

In the event of an emergency, the U.S. Food and Drug Administration (FDA) recommends Derived Intervention Levels of action to protect food, milk, and water from radioactive contamination.

With the exception of placing milk-producing animals on protected feed and water, decisions to recommend preventive and emergency protective actions will be based on measured levels of contamination in food and water samples, as well as health, economic and social considerations.

PROTECTION FROM CONTAMINATED FOOD PRODUCTS:

State officials will sample and analyze all products likely to have been contaminated prior to consumption or marketing. The following specific actions may be advised to reduce the danger of ingesting adulterated food products.

ANIMALS	WATER/DAY	FEED/DAY
Swine		
Brood Sow With Litter	4 gallons summer 3 gallons winter	8 Pounds Grain
Brood Sow (Pregnant)	1-2 Gallons Summer 1 Gallon Winter	2 Pounds Grain
150 Pound Gilt or Boar	1 Gallon	3 Pounds Grain
Sheep		
Ewe With Lamb	4 Quarts	5 Pounds hay
Ewe, Dry	3 Quarts	3 Pounds Hay
Weaned Lamb	2 Quarts	3 Pounds Hay
Poultry		
Layers	5 Gallons/100 Birds	7 Lbs./100 Birds
Broilers	5 Gallons/100 Birds	10 Lbs./100 Birds
Turkeys	12 Gallons/100 Birds	40 Lbs/100 Birds



SHELTERING ANIMALS



Photo Provided By Andre Jenny

You may be asked to shelter your farm animals and give them protected feed and water. This will help prevent contamination from harming your animals, and from entering the human food supply.

One way of protecting your animals is to provide them with shelter. Dairy cows and other milk-producing animals should be given priority as these animals can pass contamination on to humans through their milk. Secondary consideration should be given to egg-producing fowl, breeding stock, other livestock and poultry. Furthermore, best breeding stock should be given the most protected areas. If an evacuation is ordered and there is time, place the calves, especially newborns, with valuable lactating cows in the most sheltered areas.

Barns, milking parlors, machine sheds, garages, corn cribs, and swine or poultry buildings are all possible livestock shelters. Generally, masonry or concrete buildings offer the best protection. An open building, such as a pole barn, provides the least protection.

Although a ventilation system is needed to keep sheltered livestock healthy, it allows radioactive material to enter the building. Therefore, it is important to limit outside air entering the building to the minimum amount necessary for the animals' safety. Do not use fans for ventilation unless absolutely necessary. If you must use fans, set them on low speed to reduce air intake.

GIVING ANIMALS PROTECTED FEED

You may be advised to place animals on protected feed and water that have not been stored in the open or exposed to radioactive contamination. Types of protected feed include:

- Grain stored in covered bins;
- Hay stored in a barn or covered shed;
- Ensilage stored in a covered silo;
- Hay bales covered by a tarp or barrier plastic;
- Ensilage from a bunker silo may be used after removing a layer from the unprotected face and top.



GIVING ANIMALS PROTECTED WATER

Animals need water to survive. Even if you have no protected feed during a radiological emergency, animals can live for several days on water alone. Water from enclosed containers, and underground sources, such as covered deep wells and freely running springs, will be safe for livestock. Water in an open pond or stream could be contaminated and should not be used until you are told it is safe to do so.

The following table provides sustenance level feed and water guidelines for common farm animals. These levels will not support high milk production. Keeping the animal alive is the goal. Do not feed high volumes of excellent forage just before you leave as you want to discourage the cows from producing much milk as it may be sometime before you can come back to milk them again. The hay should be based on about 2.5 % of body weight on a dry mater basis.

ANIMALS	WATER/DAY	FEED/DAY
Cattle		
In production	9 Gallons Summer 7 ½ Gallons Winter	20 Pounds Hay
Dry Cows	9 Gallons Summer 7 ½ Gallons Winter	20 Pounds Hay
Weaned Calves	6 Gallons Summer 3 Gallons Winter	8-12 Pounds Hay
Cow (Pregnant)	7 Gallons Summer 6 Gallons Winter	10 -15 Pounds of Hay
Cow With Calf	9 Gallons Summer 8 Gallons Winter	12 -18 Pounds of Hay
Calf (400 Pounds)	6 Gallons Summer 3 Gallons Winter	8 -12 Pounds of Hay