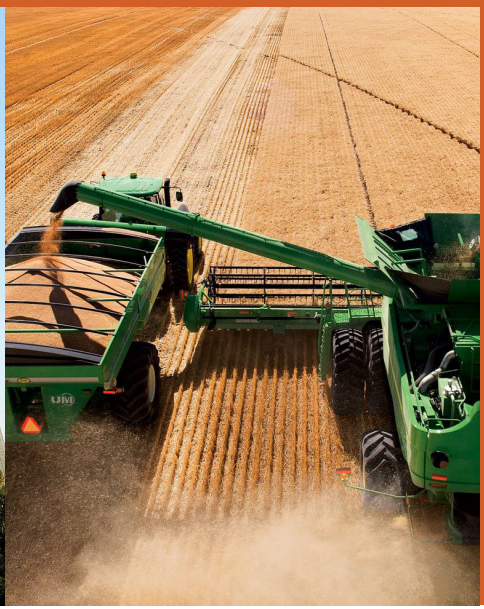


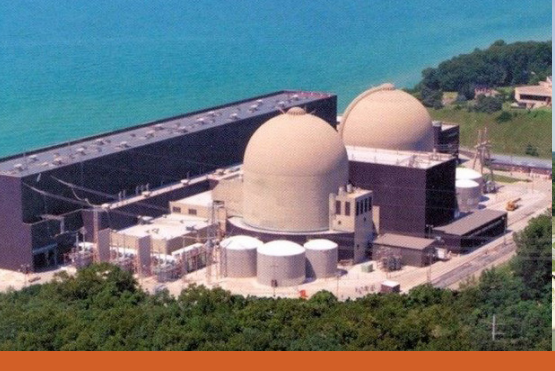
RADIOLOGICAL EMERGENCY

FARMER INFORMATION BOOKLET

INTRODUCTION

This booklet is provided to inform the agricultural community about protective actions that may need to be taken if a radiological emergency occurs at one of the four nuclear power plants bordering Indiana, located in Illinois or Michigan. This booklet also contains information on how the community would be notified and what procedures to follow. The Indiana Department of Homeland Security (IDHS) and local officials developed emergency response plans to support and serve the agricultural community in the event of a nuclear power plant emergency.

This booklet is intended for farmers, agricultural workers, livestock and poultry owners, fruit and vegetable growers, gardeners, food producers, processors and distributors.



WHAT IS A NUCLEAR POWER PLANT EMERGENCY?

A nuclear power plant emergency may involve a release of radioactive dust and gas particles into the atmosphere that can be spread by the wind and eventually fall and collect on the ground. The distance that particles travel depends on the weather. Strong winds spread lighter particles over large areas while heavier particles fall more quickly. Rain can also force radioactive particles to fall and concentrate in an area.

Nuclear power plant emergencies are categorized as follows:

Notification of Unusual Event (Lowest Severity)

Alert

Site Area Emergency

General Emergency (Highest Severity)

Notification of Unusual Event (Lowest Severity)

A Notification of Unusual Event (NOUE) can be triggered by any problem within the plant that potentially could lead to a decrease in safety. In this emergency level, no releases of radioactive material requiring off-site response or monitoring are expected, and the situation does not pose any threat to public safety.

Some examples of Unusual Events:

- Small on-site fire contained to one room
- The loss of off-site power for more than 15 minutes
- On-site or off-site communications equipment becoming unavailable

Alert

An Alert emergency level is triggered by any type of event that causes a reduction in plant safety. A radiation release from the power plant is possible, but only in small amounts that are within the U.S. Environmental Protection Agency (EPA) protection action guideline exposure levels. Alerts are not considered a threat to the public, although state agencies are able to choose what precautionary actions should be taken (i.e. activation of Emergency Operations Center).

Some examples of Alerts:

- An on-site fire that could potentially cause failure of plant safety systems
- Natural or man-made events that threaten the stability of vital plant equipment
- Radiation levels becoming high in certain areas of the plant, which causes an unsafe environment for plant operators

Site Area Emergency

Site Area Emergencies (SAE) are triggered when events that cause a serious safety condition occur at the plant. In this emergency level, a radiation release is possible, but it is not expected to exceed the U.S. EPA protective action guideline exposure levels or leave the boundaries of the plant itself. The purpose of an SAE is to adequately staff emergency response centers and to ensure the public is prepared if the situation worsens.

Some examples of Site Area Emergencies:

- The reactor losing large amounts of cooling water
- The actual or potential loss of two of three power plant safety barriers
- Power plant security becomes compromised

General Emergency (Highest Severity)

A General Emergency (GE) is the highest emergency level and is triggered when the reactor core becomes or is expected to become damaged. During General Emergencies, radiation release is expected to be above the U.S. EPA protective guidelines, and exposure levels are expected to go beyond plant boundaries. Members of the public living within a 50-mile radius of the power plant will promptly be notified and provided with protective action information.

Some examples of General Emergencies:

- Plant operators have lost control of the facility
- Two of three safety barriers have been lost, and the third barrier is expected to be lost
- The reactor core has experienced severe damage

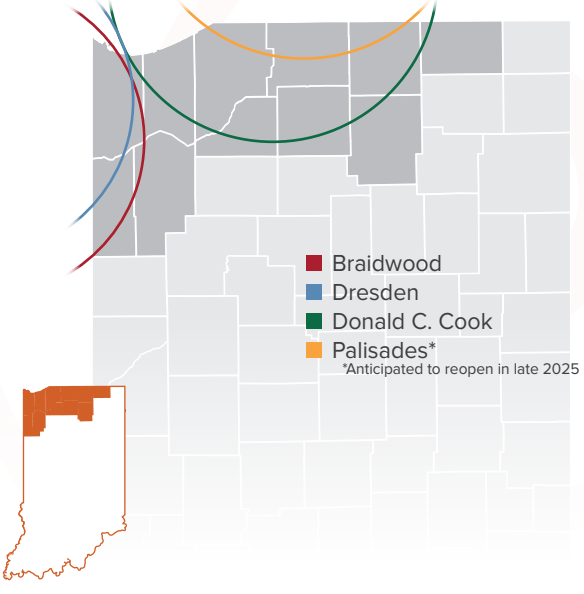
WHAT IS AN INGESTION PATHWAY ZONE?

During a General Emergency situation, land within a 50-mile radius of the plant is known as the Ingestion Pathway Zone. Following a large-scale incident, experts anticipate that food and water found outdoors within this area may become contaminated with radioactive material. Any food or water found outdoors within the Ingestion Pathway Zone should not be consumed, as it may be a threat to the health and safety of the general public. Wild game that is hunted in the Ingestion Pathway Zone during the events of a General Emergency should not be consumed, as there is a possibility it could be contaminated with radiation.

Following an incident, radiation and food specialists will work to test food, water and other items that may have been impacted. As these specialists learn more, they will work with local and state officials to provide additional safety instructions to citizens.

There are 11 Indiana counties that are in an Ingestion Pathway Zone:

- Elkhart
- Jasper
- Kosciusko
- LaGrange
- Lake
- LaPorte
- Marshall
- Newton
- Porter
- St. Joseph
- Starke

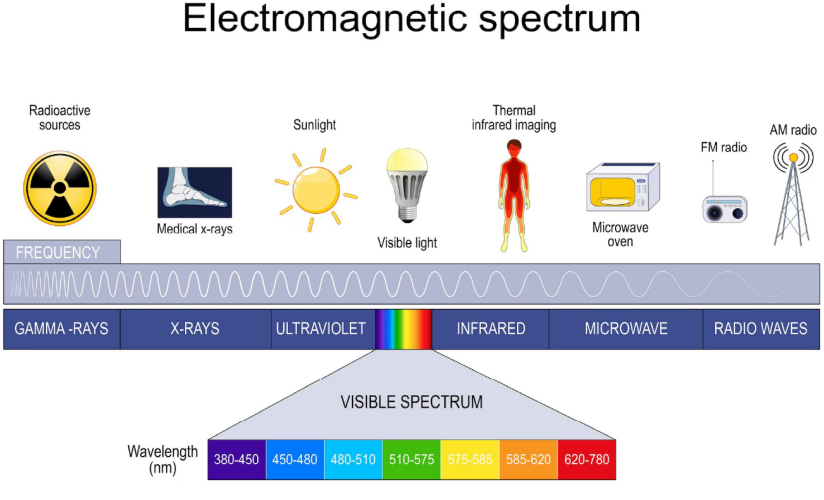


WHAT IS RADIATION?

Radiation is present at low levels in the environment all the time. Naturally occurring radioactive material can be found in soil and in buildings. Radiation comes from other sources, such as the sun and X-ray machines when they are activated. The effects of radiation on people and animals depend on the amount and length of time of exposure and the general health and age of the person or animal. Radioactive gases and particles can be inhaled, ingested and absorbed through the skin.

There are three main types of radiation:

- Alpha particles can travel only a few inches in air and can be stopped by a sheet of paper or the outer layer of a person's skin. These particles are only harmful if swallowed or inhaled.
- Beta particles can travel only a few feet in air and can be shielded with aluminum foil or plastic. As with alpha particles, beta particles are most harmful if swallowed or inhaled.
- Gamma rays are high energy rays similar to those used to produce medical X-rays. Gamma rays are penetrating and require shielding with high density materials such as concrete or lead.



HOW COULD I BECOME EXPOSED TO RADIATION FROM A POWER PLANT RELEASE?

When discussing radiological emergencies at nuclear power plants, the public's main safety concerns are contamination and exposure. Both can occur if radioactive materials are released during a radiological emergency.

Contamination

Radioactive contamination is the presence of radioactive materials where they are not wanted. External contamination occurs when radioactive material or particles come into contact with a person's skin, hair or clothing. People also can become internally contaminated if radioactive materials get into their bodies by swallowing or breathing in radioactive materials. Once contaminated, the person will continue to be exposed to radiation until the contamination is removed.

Exposure

Radioactive materials give off radiation, which is a form of energy that travels in waves or particles. This energy can penetrate the body. Exposure occurs when an individual is close enough to the radioactive materials for the body to absorb that energy. Exposure stops when the individual is no longer in the presence of the radioactive material. This can be achieved by shielding (i.g. shelter-in-place) or increasing the distance from the radioactive material (i.g. evacuation). Guidelines that are issued following a radiological emergency are designed to keep the public's radiation exposure to "As Low As Reasonably Achievable" (ALARA).

PROTECTIVE ACTIONS

If you are a farmer/livestock owner within one of the 11 Indiana counties in the Ingestion Pathway Zone, protective actions may be necessary to protect food, feed, water and livestock in the event of a nuclear power plant emergency. If food and water become contaminated, some protective actions will be necessary.

Information and instructions will be provided by local, state and federal officials through press releases and press briefings. Following a release of radioactive materials and particles, state agencies will send teams to collect samples and conduct tests to determine if contamination occurred.

It is important to stay informed during a radiological emergency as protective actions may change as the incident unfolds and new information is gathered.

What Are Protective Actions?

Protective actions are actions taken to prevent or reduce health risks from contamination to people, livestock and food products. For example, an agricultural product embargo may be established until sampling can be performed and testing can confirm that products such as milk and produce are found to be free of contamination.

Personal Protection

Depending upon the amount and type of radioactive material deposited, there may be a period of time when farmers may not be able to cultivate their land. Agriculture, environment and health officials will sample, test and monitor the area to determine the level of risk and provide instructions on how to work safely on the farm. Farmers may be told to take the following precautions:

- Wear protective clothing (similar to what is recommended during pesticide applications) when working outdoors. Remove all outer clothing before entering the home, livestock barns or milking parlors where livestock and milking equipment could be contaminated.
- Consult with state officials about the disposal of protective clothing and dust masks.
- Shower after completing outdoor activities.
- Wash hands thoroughly before eating.
- If windows were open in a home or barn during the emergency, wash the surfaces where contaminated materials could have deposited.



LIVESTOCK

Giving Animals Protected Water

Animals need water to survive. Even if there was no protected feed during a radiological emergency, animals can live for several days on water alone. Farmers may be advised to place animals on protected water. Water from closed containers and underground sources, such as covered deep wells and springs, are considered protected and will be safe for livestock. Water in open ponds or streams could be contaminated and should not be used until told it is safe to do so.

Giving Animals Protected Feed

Farmers may be advised to place animals on protected feed. Protected feed means feed that has not been stored in the open or exposed to radioactive contamination. Animal feed that is kept in enclosed barns, sheds, granaries, silos and intact Ag-Bags is considered protected feed. If feeding from covered trench or bunker silos with open ends or opened Ag-Bags, remove and discard the first 6-12 inches of silage from the exposed ends where contamination may have occurred. Feed that is not considered protected is feed that is stored outside and directly exposed to air and rain. This includes feed stored in cribs and sheds with open sides, uncovered haystacks or bales, uncovered trench silos, bunkers and upright silos without doors. During an emergency, farmers may need to ration the on-hand supply of protected feed and water. Keeping the animals alive is the goal. It is important to remember, these levels will not support high milk production. This may be beneficial if faced with a temporary agriculture embargo. Refrain from offering high quality forage to milking cattle to decrease milk production until directed to return to regular production.

Sheltering Animals

Farmers may be asked to shelter farm animals. This will help prevent radioactive contamination from harming animals and from entering the human food supply. Barns, milking parlors, machine sheds, garages, corn cribs and swine or poultry buildings are all possible livestock shelters. An open building, such as a pole barn, provides the least amount of protection.

If shelter is limited, the most valuable livestock should be given priority. Milk, egg and meat-producing livestock should be given priority because contamination of these products may be passed onto humans through consumption. It is better to provide adequate space to the more valuable animals than to try to provide shelter to all animals and lose them from overcrowding.

In addition, farmers may want to consider putting the best breeding stock and calves, especially newborns with lactating cows, in protected shelter. Bulls, steers and young weaned heifers may be a lower priority. Dry cows may be a lower priority as well.

Although ventilation systems are needed to keep sheltered livestock healthy, they allow radioactive materials to enter the building. Therefore, it is important to limit outside air from entering the building to the least amount necessary for the animals' safety. Do not use fans for ventilation unless absolutely necessary.

EMBARGOES

During and following a radiological emergency, state officials may restrict the movement of food products and withhold them from the marketplace within the 50-mile ingestion Pathway Zone. This is intended to reduce the chance of contaminated products entering the human food supply. This includes wholesale and retail markets, farm stands and farmers markets. These products should not be released until they are deemed safe or until a decision is made to dispose of them.

Farmers will be instructed how to safely handle and dispose of contaminated food products and how to decontaminate animals and property if necessary. Contaminated food will be isolated to prevent it from exposing non-contaminated food and from accidentally entering the marketplace.

State officials will determine whether disposal of contaminated products is appropriate and necessary. Please wait for their guidance.

Lifting an Embargo

After sampling and testing results show that food products are safe, the Indiana State Department of Health (IDOH) will lift embargoes in previously restricted areas. Sampling and testing will be completed as quickly as possible to determine which areas are safe to lift embargoes.

Decontaminating Livestock

Livestock that have been fed protected feed and water but exposed to external contamination may potentially be used for food if adequately washed and monitored by officials before slaughtering. Animals can be washed using soap and water. Protective, impermeable clothing similar to what is recommended for pesticide applications should be worn during this process to prevent contamination of personnel while handling and washing animals.

Regulatory officials may collect and test samples at any point before, during or after processing to test for contamination and assure food safety.

Building and Farm Equipment

Buildings and equipment may also be contaminated by radioactive particles. State officials will provide information on how best to decontaminate buildings and equipment. Farmers may be told to wear protective clothing and wash down buildings and equipment with soap and water.

FARMING ACTIVITY DURING A RADIOLOGICAL EMERGENCY

Milk and Dairy Animals

1. Remove all dairy animals from pasture, and shelter them.
2. Give dairy animals protected feed and water.

When a release of radioactive materials has occurred, state officials may visit farms in the area to take samples of milk, feed and water to test for contamination. They may recommend that milk and dairy products not be consumed or sent to market until test results show that it is safe. Milk should be safe if it is from dairy animals that were sheltered properly and placed on protected feed and water. If dairy animals are not sheltered properly or can access food and water from uncovered sources, radioactive contamination may be absorbed into their bodies and could enter the human food supply.

Contaminated Milk

If dairy products are found to be contaminated, it will be recommended that milk and milk products be withheld from the marketplace. However, it is possible for milk products contaminated with very low levels of radioactive material to be deemed safe by officials for human consumption. Time will also reduce the amount of radioactive material present in milk. Fluid milk can be kept for long periods of time using ultra-high temperature pasteurization, which may allow radioactive material to decay to a safe level. In addition, producing cheese, dry milk, butter, yogurt, ice cream and evaporated milk using fluid milk may be an alternative to store product and allow the radioactivity to decrease.

Meat Animals and Meat Products

Farmers may be asked to place meat animals on protected feed and water and to shelter them. If livestock consume contaminated feed and water, 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 told that it is safe to do so by state officials. Instructions will be given on a case-by-case basis.

Poultry and Poultry Products

Officials may recommend that poultry are put on protected feed and water and provided shelter. Poultry raised outdoors, especially those kept for egg production, may be sampled by officials to determine if eggs have radiological contamination. Poultry raised indoors and given protected food and water are less likely to be contaminated. Reduce ventilation in chicken coops and shelters if possible. Ventilation and fans that draw air in from the outside can pull in contaminated particles from outdoors. If poultry products and eggs are found to be contaminated, they should not be eaten and they should not go to market.

Grains

If grains are permitted to grow to maturity, most contamination may be removed by the wind and rain. Milling or polishing will likely remove any remaining contamination. It can take a month from the time grains are harvested until they reach the consumer, and sampling and laboratory analysis will determine if the grain is safe to use. When harvesting potentially contaminated grain, it should be stored separately from grain harvested and stored before the emergency.

Fruits, Grapes, Vegetables and Nuts

Officials may recommend that all locally grown fruits, vegetables, roots (such as carrots), tubers (such as potatoes) and nuts be washed, scrubbed, peeled and/or shelled to remove any surface contamination.

Fruits and vegetables ripe at the time of a radiological release may be lost because of the risk to humans while harvesting the contaminated fruit. Fruits and vegetables that do not have to be picked immediately could be picked and cleaned after state officials verify that the radioactive levels are safe and/or have decreased. Canning, freezing or storage of fruits and vegetables will allow radioactive levels to decay.

Fruits and vegetables should not be consumed or sold until you are told that it is safe to do so by state officials. Harvesting, processing or consumption of wild foods, such as mushrooms or berries, should be controlled in the same manner as fruits, grapes, vegetables and nuts.

Bees and Honey

Honey and beehives may need to be sampled and analyzed by officials if radiological contamination is found in the area where foraging bees can bring back contaminated pollen, which would allow for the possibility for radiation to be stored in the beeswax. Therefore, an additional three-mile quarantine for honey products would be needed beyond standard quarantines for food products.

Fish, Shellfish and Aquaculture

Little can be done to protect wild fish and shellfish from radiological contamination in their natural habitat. If approved by Indiana Department of Natural Resources (DNR) officials, catch and release fishing may be conducted within the area affected by the emergency. Fish and shellfish should not be harvested for consumption until samples have been tested and determined to be safe. Fish and shellfish raised in ponds, marine waters or raceways should not be harvested or consumed until samples have been tested and determined to be safe.

Wildlife and Captive Animals on Game Farms

Wildlife should not be harvested for consumption within the area affected by the emergency until tested and determined to be safe by the DNR. To the extent that it is possible, wild birds and animals, such as deer being raised at game farms, within the affected areas should be fed protected feed and water and, where possible, be provided shelter. Whether or not they were protected, they should not be sold, released or harvested until approved by state authorities.

Alpacas, Horses and Other Farm Animals

Animals should be moved inside a covered enclosure prior to the arrival of contamination. If this is not possible, animals should be thoroughly washed with soap and water by appropriately protected personnel (see the Decontaminating Livestock section on page 14) prior to being moved to a covered shelter. Animals should be sheltered in a safe indoor enclosure that allows for accommodation of normal husbandry needs, including contact with peers and exercise to minimize danger or stress to the animals being housed. Care should be taken to ensure use of uncontaminated sources of water and feed until restrictions are lifted for other agricultural species. In any animals not related to food production, it is unlikely that any testing will occur.

Nursery Stock

While there is a low potential for significant contamination of nursery stock such as trees, shrubs, plants and Christmas trees, they should not be removed from the impacted area until evaluated and approved for use by state officials

Soil and Soil Management

If soil contamination occurs, proper soil management procedures could be implemented to reduce contamination:

1. Idling or non-use of the land for a period of time may be necessary in some cases.
2. Changing the type of crops to non-food/feed crops such as fiber crops of cotton and flax.
3. Deep plowing may keep radioactive material below the plant root zone where the radioactive material can decay and limit absorption by crops.

State officials will provide guidance on proper soil management.

Protected Water Sources

Covered wells, covered rain barrels and covered tanks not connected to surface water are protected water sources. Storage containers that are supplied by runoff from rooftops or other surface drain fields are not protected water sources.

Disconnect filler pipes from these unprotected water barrels and tanks to prevent contamination from being washed into the storage container. Water from unprotected storage containers (ones that were not disconnected from surface water sources) should not be used for irrigation or human or animal consumption unless evaluated and approved by state officials.

FOOD AND MILK PROCESSORS, WAREHOUSES AND COMMODITY TERMINALS

Milk and food products in an affected area can become contaminated during collection and processing. After a radiological emergency, state officials may restrict shipment of food products to reduce the chances of contaminated food products entering the human food supply.

Processors

Windows and vents to the outdoors should be closed. Vacuum systems should be shut down, as should compressed air systems. Any system that draws air from outdoors to the inside should be shut down. Regulatory officials may take samples of food, produce and finished products for contamination analysis. After testing, they will determine if products are safe for processing and distribution.

Distributors

Windows and vents to the outdoors should be closed. Vacuum systems should be shut down, as should compressed air systems. Any system that draws air from outdoors to the inside should be shut down. Regulatory officials may inspect shipments to check for contamination. After testing, they will determine if the shipment is safe for distribution. This testing may take several days. Do not release products until they are deemed safe.

Warehouses and Terminals

Windows and vents to the outdoors should be closed. Vacuum systems should be shut down, as should compressed air systems. Any system that draws air from outdoors to the inside should be shut down. Samples of products may be collected and tested to determine whether or not they have been contaminated, and which products are safe and can be released.

Protection of Packaged Food Products

Radioactive material will travel as fine particles that may coat the outside of a food product container. Food in finished packaging during the time of the radiological material release should not be harmful to eat as long as the outer wrappings are discarded. State officials will provide further advice to avoid any contamination from the outside packaging.

WHAT HAPPENS AFTER A RADIOLOGICAL EMERGENCY?

Re-Entry

Re-entry is the controlled, temporary entry into a restricted, contaminated area. If evacuated, farmers may be allowed to return temporarily to their farm when conditions allow. State and local officials will advise farmers through emergency alert system (EAS) broadcasts and other means if re-entry has been allowed. Farmers will receive instructions on what routes to use and safety precautions to take. Re-entry will allow farmers to perform critical activities such as milking, watering and feeding of farm animals.

Relocation

Relocation of people from homes, farms or communities may be necessary when the exposure to deposited radiological contamination is unsafe for people to return and stay.

Recovery

Recovery is the process of reducing radiation in the environment to acceptable levels for normal daily living. Following an emergency, state and local officials will identify the types and levels of contamination. They may need to take samples of air, water, soil, crops and animal products from a farm or business. They will provide instructions on how to decontaminate animals, food and property.

Reimbursement

Federal law requires nuclear power plants to participate in an insurance pool to cover legitimate claims for losses as a result of a radiological emergency. Farmers should accurately document any losses incurred as the result of a radiological emergency in the event that it is determined that a payout is warranted.

CHECKLIST

- ☐ Shelter all farm animals, especially dairy producing animals.
- ☐ Feed and water livestock from protected sources.
- ☐ Bring feed into building or cover it if outdoors.
- ☐ Store as much water as possible for livestock in enclosed wells or containers.
- ☐ Cover wells, rain barrels and tanks.
- ☐ Delay grazing on pasture until told it is safe to do so.
- ☐ Wear outer clothing that covers all areas of the body, similar to what is recommended for pesticide application (e.g., hats, gloves, boots, coveralls, long shirts and long pants) when going outside.
- ☐ Remove outer clothing before going indoors.
- ☐ Once inside, shower immediately.
- ☐ Do not use fresh milk, meat, fish, eggs, fruits or vegetables from farms or gardens until they are sampled and tested or until told it is safe to do so by officials.
- ☐ Do not stir up dust from activities such as cultivating, baling, disking or harvesting.
- ☐ Do not slaughter any animals until officials say it is safe to do so.
- ☐ Do not process or distribute agricultural products or food products until they are sampled by state officials, or told it is safe to do so. This process may take several days.
- ☐ Do not destroy agricultural products until officials say it is necessary or safe to do so.
- ☐ Do not fish or hunt in the embargo area until authorities say it is safe to do so.
- ☐ Do not harvest wild foods, such as mushrooms or berries, in the embargo area until authorities say it is safe to do so.

COUNTY EMAs IN THE INGESTION PATHWAY ZONE

Elkhart County Emergency Management
26861 County Road 26, Elkhart, IN 46517
(574) 891-2238
https://emergencymanagement.elkhartcounty.com/en/

Jasper County Emergency Management
125 S. Cullen St., Rensselaer, IN 47978
(219) 866-9423
https://www.jaspercountyin.gov/departments/emergency-management

Kosciusko County Emergency Management
121 N. Lake St., Warsaw, IN 46580
(574) 371-2602
https://www.kosciusko.in.gov/department/index.php?structureid=11

LaGrange County Emergency Management
114 W. Michigan St., LaGrange, IN 46761
(260) 463-4719
https://www.lagrangecounty.org/department/index.php?structureid=18

Lake County Emergency Management & Homeland Security
2900 W. 93rd Ave, Crown Point, IN 46307
(219) 755-3549
https://lakecountyin.gov/departments/emergency-mgmt

LaPorte County Emergency Management of Homeland Security
809 State St., LaPorte, IN 46350
(219) 326-6808
https://laporteco.in.gov/departments-online/emergency-management-of-homeland-security/

Marshall County Emergency Management
112 W. Jefferson St., Room 207, Plymouth, IN 46563
(574) 936-3740
https://www.co.marshall.in.us/department/index.php?structureid=18

Newton County Emergency Management
3218 W. County Road 100 North, Morocco, IN 47963
(888) 663-9866
https://www.newtoncounty.in.gov/department/index.php?structureid=29

Porter County Emergency Management
1995 S. State Road 2, Valparaiso, IN 46385
(219) 462-8624
https://www.portercountyin.gov/174/Emergency-Management

St. Joseph County Emergency Management
125 S. Lafayette Blvd., South Bend, IN 46601
(574) 800-6252
https://www.sjcindiana.gov/1933/Emergency-Management-EMA

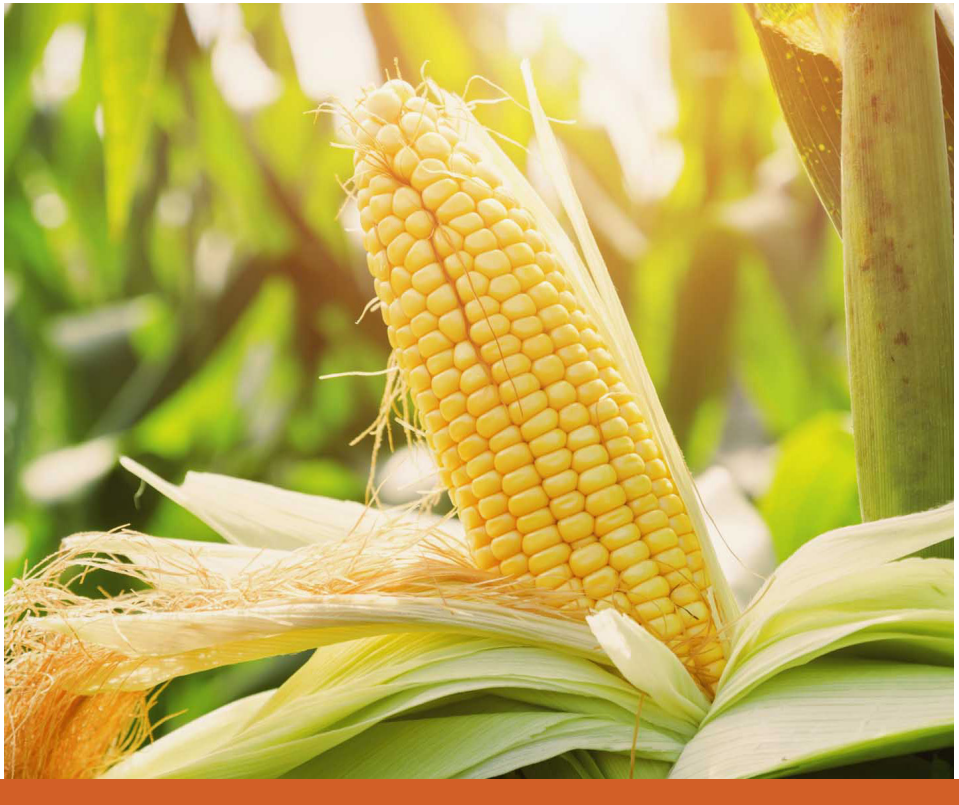
Starke County Emergency Management
108 N. Pearl St., Knox, IN 46534
(574) 772-9100
https://starke.in.gov/homepage/departments/ema/

ADDITIONAL RESOURCES

To learn more about the Indiana Department of Homeland Security's Radiological Emergency Preparedness program, visit: https://on.in.gov/idhs-rep-program

To learn more about nuclear power plants and their safety guidelines, visit the U.S. Nuclear Regulatory Commission's website: https://www.nrc.gov

For more information on radiation emergency preparedness, visit the Centers for Disease Control and Prevention's website: https://emergency.cdc.gov/radiation/



INDIANA DEPARTMENT OF HOMELAND SECURITY

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