ULTIMATE SERVICE ASSOCIATES
A NORTH AMERICAN SITE SERVICES CO.

*The ultimate solution for maintaining your nationwide generator network*

# Ensuring Vermin Protection for Generator Systems

**1.0 Introduction:**

As covered in a prior information sheet detailing the causes for power outages in the United Sates, one reason identified was animals with a high percentage being vermin evasion and damage to the generator system; see figure 1. Nearly 5% of power outages are the result of animals/vermin. When the numbers are split between outside and inside installations, the percentage of outside applications is higher. While manufacturers of generator systems provide protection for operators inadvertently touching live circuits and rotating equipment and protection against adverse weather, these protections are no guarantee that vermin can get inside and cause damage which leads to failure.

***This information sheet discusses how industrial, commercial, and residential generator systems can be protected from animals and the type of damage these animals can create.***

## Protecting Generator Systems From Evasive Species

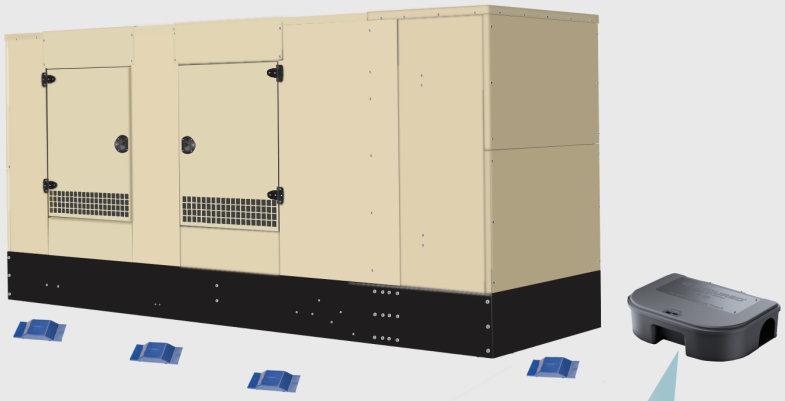
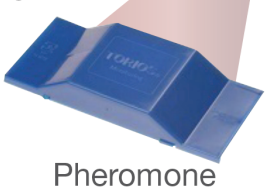


Figure 3

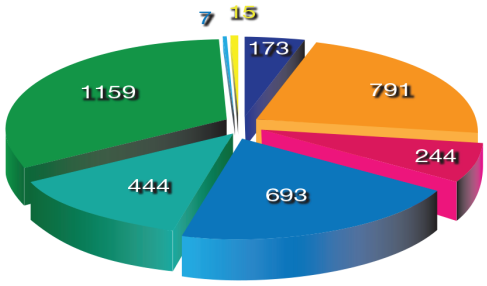


Pheromone Trap/Monitor

Figure 2

Bait Trap

Reported Power Outages by Cause




- Animal - 173
- Faulty Equipment/Human Error - 791
- Planned - 244
- Unknown - 693
- Vehicle Accident - 444
- Weather/Trees - 1159
- Over demand - 7
- Theft/Vandalism - 15

Figure 1

To fulfill our commitment to be the leading network service provider in the Power Generation Industry, the USA, Inc. team maintains up-to-date technology and information standards on Power Industry changes, regulations and trends. As a service, our **Information Sheets** are circulated on a regular basis, to existing and potential Power Customers to maintain awareness of changes and developments in engineering standards, electrical codes, and technology impacting the Power Generation Industry.

## 1.0 What Animals Invade Generator Systems:

Nature has many types of species that can and do harm generator systems for a variety of reasons. In this information sheet we cover the most common invasive species and the damage that is likely to occur. When protecting your generator installation be aware of the following species:

**1.1 Rodents –** Rodents cover a variety of types from field mice, voles, to rats. The number one item they hone in on is the generator system's wiring. All types of rodents, including squirrels, have a tenancy to gnaw on wiring installations. Why they do this is not known, but it could be associated with the paraffin in the wax used for lubricating wires in the manufacturing process when the wire is pulled through the insulation. Alternatively, they may be using wiring to sharpen their teeth. Either way, it breaks down wiring insulation causing shorts between various exposed wires.

Rodent damage has been seen in residential, industrial, and commercial installation. Rodents are attracted to the warmth and protection of enclosed areas. During winter moths they build nests to seek shelter from the cold. Many generator installations are for standby, and as such are stationary for long periods of time. During these periods nests can be built among wiring bundles and ventilation areas.

In addition to wire gnawing and nesting, rodent droppings are highly corrosive to any metal material within the generator.

**1.2 Large Animals –** Damage from larger animals mainly due to location. Damage occurs when unfenced installations are damaged when the animal, cow, bear, etc., rubs against enclosures and other components.

**1.3 Birds –** The biggest problem with birds is the building of nests. Most damage from birds occurs in outside installations. Generator enclosures are designed with openings for cooling air, exhaust, and cable connections. Even though enclosures are designed for weather protection, small birds can access small opening to build nests.

Nests within a generator system can result in the following:

- Obstructing ventilation openings for incoming and outgoing coolant air
- Obstructions for radiator coils leading to overheating
- Blocked exhaust vents for lack of performance and fire risk
- Corrosion due to bird excrement

Most evasion of generator systems by birds is internal, but in some areas where big birds nest there is the possibility of a bird building a nest on top of an enclosure to be above ground.

**1.4 Insects –** Mud wasps, bees and spiders have built nests in vents and cooling equipment during a standby generators stationary period.

## 2.0 Installations Susceptible to Evasive Species Damage:

Animals of many types can be found in most environments that generator systems are installed in, but the most susceptible are outside installations. The following installations are considered susceptible to damage from evasive species:

**2.1 Residential –** Generator service providers report many problems with residential generators installed adjacent to the home from rodent-type damage. The generator sits idle for long periods of time for damage to build up. The worst time is in the spring when many creatures become active and start to seek out nesting locations.

**2.1 Remote Commercial and Industrial Applications –** Network service providers to telecommunication companies having many remote locations, report failures from vermin nesting in equipment. Part of any seasonal planned maintenance program should include inspections for any species invasion, particularly just before winter and the start of spring.

## 3.0 How to Mitigate Generator Damage from Evasive Species:

Your authorized generator distributor is very familiar with the damage evasive species can inflict on a generator system. When rodents, birds, etc. invasion is discovered, an authorized generator distributor should be called to thoroughly check out the system for any damage. If there is a reason for failure, they can repair any damage and put in place procedures to ensure it doesn't occur again. The plan is to remove rodents and other creatures ensuring they are keep out, these plans include:

**3.1 Rodent Discouragement –** Make sure any openings have mesh, small enough to stop access but not too small to hinder functions such as ventilation. The next step is to place rodent bait stations around and near the installation to discourage them from entering the enclosure or any other part of the generator. ***See figure 2***

As a second line of defense, strategically place baits inside the equipment, this will discourage nest building if rodents do access the interior  Another line of defense to attract rodents away from the generator system is to install pheromone monitor boards inside the enclosure or just under it. ***See figure 3***

**3.2 Large Animals –** In rural remote installations and farming environments, an outside installation should be fenced to prevent inquisitive creatures from damaging equipment.

**3.3 Bird Discouragement –** Openings for ventilation, wire access, and service should be covered in areas where birds are known to nest. Again, meshing of openings cannot impede the required ventilation, so consult with your service distributor.

**3.4 Insects –** Meshing to prevent insects in areas of ventilation will prove to be restrictive to airflow. It is important to monitor evasion by insects, particularly in cooling items such as radiator coils and inside control panels.

## 4.0 Planned Generator Service Programs:

Your authorized generator distributor can offer a planned service program to ensure the generator is ready to start when required. These programs include certain maintenance items and part of the program will also inspect the unit for evasive species.

If the presence of evasion, like rodents is found, it is important that the generator set is run up to speed and all functions are checked to ensure there are no faults such as chewed through wires. Remember to consult with your authorized generator distributor.

## 7.0 Engine Generator Systems Within Microgrids:

While Microgrids will switch between various energy sources, frequently, an engine-driven system is the preferred source of final power in the event renewable energy and battery storage is no longer able to supply the connected load. Also, combined heat and power (CHP) is often used to distribute cooling and exhaust heat to local sources for greater efficiency within the served grid.

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