INTEGRATED PEST MANAGEMENT IN FOOD PREMISES

Food Protection and Pest Management

A Guide to pest management in the food industry

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Chapter 6. Integrated Pest Management in Food Premises Part A

1. Introduction
In years gone by, from the time food left the farm until it reached the consumer, it was often exposed to mishandling and to mismanagement resulting in contamination and spoilage. The economics of production, consumer demand and federal regulations have brought about the necessity to protect and preserve food products so they may be delivered in an appetizing and healthful condition.

Today, after leaving the farm, food products are watched over, inspected, tested, and practically escorted through manufacturing processes and distribution until they reach the retail food store. Due to the great number of food producers and retail outlets, there are not enough federal (FDA-USDA), state, local (Environmental Sanitation or Health Department) inspectors or company employees to steward the product to the moment of purchase by the consumer. The food protection system requires special attention to avoid any breakdown at the manufacturing or retail level. Therefore, the pest control industry has a responsibility to aid the food industry in the protection of their product that has been so carefully guarded through its journey from the farm.

Integrated Pest Management (IPM) is a strategy that is now essential in the food industry. As these production facilities and stores become larger and more complicated, it is becoming increasingly difficult to provide quality pest control services at a reasonable cost.

The basic premise for IPM services is to control pests utilizing a variety of control methods and reducing the reliance on pesticidal treatments. In simple terms, IPM calls for identifying the sources of pest infestations, identifying conditions which contribute to pest infestations, monitoring for pest activity, and focusing control efforts at the sources of pest activity.

IPM is a cooperative effort between the pest control professional and food safety officers. If the producer or retailer is unwilling to cooperate completely in addressing sanitation issues and contributing conditions, then more pesticide use may be necessary to correct or prevent pest infestations. The concept of IPM and the food industry’s role in the program must be communicated to the customer's management and its employees. Without their cooperation, the goals of IPM are easily undermined.

2. Developing an IPM Program
The following steps are essential in developing a basic IPM program for both manufacturers and retailers.

Survey. A detailed survey of the premises should be performed to identify what pest problems are present and any conditions which might contribute to pest infestations. This survey should include questioning of employees about previous pest infestations. This questioning may uncover seasonal pest problems, such as flies, that require attention in the overall IPM program.

Diagram. A diagram of the facility should be completed. The manager can often supply a floor plan of the building. This diagram is also useful in determining where rodent control devices may be necessary. Areas of pest activity should be noted on the diagram as well as the type of environment adjacent to the facility. For example, the fact that the back of a store borders a field should be noted. This factor could be very important when deciding where to place rodent control devices and whether a change in outside lighting needs to be addressed (e.g., for crickets or ground beetles).

High Risk Areas. Determine the "high risk" areas for pest activity. For cockroaches, high risk areas include any site where moisture and food would be present. The deli and the seafood shop would be high risk areas for cockroaches while the dog food aisle would be considered a "low risk" cockroach area. The dog food aisle, however, would be considered a

high risk area for rodents, especially mice, and stored product pests.

Make a list of the pests of most concern and determine the high risk areas for each of those pests. High risk areas need to receive regular inspections and possible treatments.

Monitoring devices should be used in low risk areas as sentinels to alert the service technician to pest activity. Service efforts can then be focused on high risk areas.

Contributing Conditions. Make a written list of all contributing conditions. From this list, develop a recommendations list for the facility manager. Explain how each of these conditions can affect pest activity. These recommendations must be verbally communicated to the manager, who needs to be "sold" on the idea that cooperation in correcting these conditions is in their best interest.

Pest Activity Reporting. Create a system for employees to report pest activity. A "pest sighting book" established in the manager's office serves as a good reporting system. This is a very important IPM tool because each employee spends up to 160 hours or more each month in the facility. Their opportunity to see pest activity is much greater than the service technician who might spend one to three hours per month there. These reports of pest activity alert the service technician to new pest activity and point him or her in the right direction.

Log Book. Maintain a "log book" of pest activity preferably at the facility. After each service, the service technician should note each area where pest activity was found. Noting this activity on a copy of the floor plans can help in solving future pest infestations by allowing one to observe "patterns" of activity. For example, by keeping records, a service technician notes that he is catching mice month after month in two particular traps in the storeroom. Why are mice always present in this area? Closer investigation is warranted.

3. IPM and Customer Cooperation
Pests survive in facilities because certain conditions exist that support their survival. Overly favorable conditions allow pest populations to expand. Any conditions which may be contributing to the infestation must be identified and corrected.

The service technician should provide the management with recommendations on correcting any of these conditions. However, service technicians should not consider themselves food safety/sanitation experts unless properly trained. Management must address such items as poor sanitation, leaks, damaged weather strips on doors, doors being propped open, tall weeds outdoors, and piles of debris.

Gaining the manager's cooperation is a critical part of IPM. Without it, IPM has little chance for success because the pest management program is left with only the pest control technician's efforts.

Except for certain limited instances, the technician can only find and treat pest harborages. The technician has little control over the facility's activities that create favorable conditions for pests. Working closely with the management is very important.

4. The Initial Service
When the service is first started, any current infestation needs to be eliminated. An inspection determines where activity is present.

Contributing conditions should be noted and brought to the management’s attention. Treatment should be directed at pest harborages and potential pest entry points. This minimizes the amount of pesticide needed. More pesticide is usually necessary for larger pest populations and in the event contributing conditions are not removed or corrected.

5. Servicing High Risk Areas
As stated earlier, a high risk area is one where pests are most likely to occur. Identification of high risk areas varies with different types of pests. For example, high risk areas for cockroaches are the deli, cheese shop, seafood shop, etc. Rodent high risk areas are the storage area, the produce display area, and the pet food aisle. The IPM program should be designed to include the high risk areas for each of the primary target pests.

Cockroaches
If a deli or similar area has an active cockroach infestation, all cockroach harborages and potential harborages should be treated using residual insecticides.

The application of longer lasting dust formulations to voids would be beneficial in reducing the need to frequently reapply other types of residual insecticides.

Sealing cracks and holes following treatment of those sites eliminates them as potential cockroach harborages.

Once the current infestation has been eliminated, monitoring traps can be placed in hidden areas and inspected on a

regular (once per month) basis. Cockroaches captured by these traps or seen by visual inspection signal the need to treat again with residual insecticides.

Rodents
An active rodent infestation should be addressed using traps to quickly remove as many rodents as possible.

Potential rodent entry points need to be pointed out to the management. The manager should be advised of the importance of sealing these entry points in preventing future rodent infestations. The service technician can be involved in sealing small cracks or holes even if a temporary plug of steel wool is used until the hole can be permanently sealed.

Other factors contributing to the infestation such as poor sanitation, removing debris piles, etc., should also be discussed with the manager.

A series of bait stations and multiple catch traps should be maintained in the storage warehouse. Two multiple catch traps should be installed one on either side of doors leading to the exterior of the building.

Outside bait stations may be necessary when the potential for rodent infestation from outside is high. These stations must be of the tamper-resistant type and be secured from children and non-target animals.

Multiple catch traps should also be placed in hidden locations in the produce display area, under the gondola of the pet food aisle, and any other location in a store where mice have been a problem.

A diagram of the location of all rodent control devices should be maintained and kept in the facility's "pest sighting book." Record the type and number of rodents captured on this diagram and on the service ticket/sanitation report form. By tracking the numbers of rodents captured, patterns in rodent activity may be detected which can lead to the discovery of other factors contributing to these infestations.

Ants
Ants can appear anywhere within a building. However, ant activity usually will be located in areas near exterior walls. Pharaoh ants might be found anywhere within the building but are most likely to be found near sources of moisture.

Pharaoh ant infestations can only be effectively eliminated using baits. The presence of other food products will compete with the bait for the ants' attention, therefore, more frequent follow-up checks may be necessary in a supermarket environment. Follow-up visits involve checking to see if ants are feeding on the bait, whether a different bait is needed, or if new bait placements are necessary.

For other species of ants, an attempt must be made to find the location of the ant colony. Most ant infestations involve ants foraging from outside colonies, so an inspection of the exterior is usually warranted. Once the colony is located, it can be treated directly with the appropriate residual insecticide.

If the location of an ant colony infesting a store cannot be determined, a baiting program can be attempted. Baiting only works for certain species of ants--crazy ants, carpenter ants, and thief ants are difficult to control using currently available baits.

Flies
Flies are highly mobile insects and their presence is frequently indicative of poor waste disposal practices. They have the potential to contaminate food and packaging and to spread disease causing organisms.

One of the essentials in controlling flies is, having identified the species, to locate the breeding sites. There may be a necessity to treat that site with insecticides, but simply changing the characteristics, cleaning up, drying out, etc., of the site is frequently sufficient to break the life cycle.

Prevention of entry by flies through the use of window and door screening is an excellent way to control flies, but it is unfortunate that human interference with such screens often means that they are not as efficient as they should be. Fly doors are often propped open and window screens are cut and damaged, rendering them useless as protection devices.

Traps should be used within the premises at strategic points to attract and capture the flies. These can be food lure traps or visually attractive traps using ultra violet light. Using traps both to control flies and to monitor the effectiveness of control measures is essential to a full fly control program.

The location of the traps should be recorded and detailed records maintained of the fly catches.

Regular Service Visits
More frequent inspections are necessary to achieve reduced use of pesticides in an IPM program. Additional inspection visits increase the chances new pest infestations will be found. How often service visits for inspection and treatment can

be made depends a great deal on the amount of money the customer is willing to spend for such services. At least twice per month service frequency is recommended for an IPM program.

Check the Pest Sighting Log. The initial step in a regular service visit is to check the pest sighting log to determine if any pest activity has been reported since the last service visit. A short talk with the facility manager on duty can also provide additional information concerning pest activity.

Inspect High Risk Areas. All high risk areas in the store should be inspected at least once per month. All monitoring traps and rodent control devices also need to be checked. Questioning the persons who work in these areas provides valuable information concerning where pests have been seen. This helps to pinpoint pest activity, which often saves time.

Service Active Sites. The most critical areas to service during a regular service visit are where pest activity has been reported in the "pest sighting book" and where activity was found during the previous service. It is important to always follow-up any treatments provided to control an infestation to ensure the infestation has been eliminated.

Find the source--solve the problem. When anyone reports having seen a pest, the first step is to identify the pest involved. Knowing the identity of the pest helps determine where one should look for its harborage, i.e., where the pest is hiding or breeding.

Treating where a pest was seen rather than looking for where it lives wastes valuable time and is not following good IPM practices. A treatment applied directly to sites where pests live or hide results in a judicious use of pesticides and eliminates unnecessary applications. Keep detailed records of any pesticide applications.

7. Communication
The heart of any IPM program is communication between the pest management company and the customer. A cooperative atmosphere between these two parties is critical in reducing contributing conditions and ensuring the success of the overall program.

The customer's management needs to know what infestations are found and where, as well as what they need to do to help prevent and resolve these infestations.

The employees serve as the eyes of the service technician between services. These persons help the service technician pinpoint pest activity, so that the best results can be achieved in a productive manner with a minimum use of pesticides.

All pest activity should be documented and these records kept available for periodic review. This information can prove useful in determining patterns of activity and in solving difficult situations.

Review inspection reports of regulatory agencies and discuss any noted pest problems with the manager.

8. In food production and distribution facilities
The following guidelines should be followed in these premises:

1. Outside measures
Fencelines. If a food distribution warehouse has a fence surrounding the facility, that fence should be vegetation free. Weed growth is unsightly, a fire hazard and may provide harborage for rodents. Check under rail tracks, along concrete sidewalks, hillsides and next to fence posts for rodent burrows. Bait stations may be located at fence posts as a technique to prevent rodents from moving in from surrounding areas.

Vacant Lots. Inside the fence, away from the warehouse and the paved loading areas, there is frequently undeveloped land. If it is covered with weeds and/or over-grow vegetation, they should be mowed periodically or the ground treated to maintain bare ground. Weedy areas are breeding grounds for rodents and insects. A bare strip is suggested because it is discourages rodents from travelling from breeding areas in fields to the warehouse building. Neatly maintained lawn areas, or at least regularly mowed areas, are pleasing to both the community and employees.

Perimeter. Examine the outside of the building perimeter carefully to determine if there is any rodent activity next to the building. Check the location and condition of rodent bait stations.

Loading Docks. Loading docks should be free of spilled foods, broken boxes, pallets and pests. Check the construction of the dock. If it is not solid concrete, the area under the dock should be free of debris open and easily accessible for inspection. Check under dock levelers for trash that can encourage pest build-up.

Railroad Siding. The railroad siding is also an important area to keep weed-free and neat. In large facilities the siding may run inside the warehouse to the point where the loading dock is located. Rodent populations can easily move into the warehouse following the tracks and through the doors. Doors should be protected with tight seals and multiple catch traps inside and outside, and on both sides of the entry. Rodent bait stations should be installed at these points and along

the rail pit.

Exterior Docks. These structures should be kept free of stacked pallets that can provide rodent harborage and bird perches. Check overhead pipes and the pavement below pipes for accumulations of bird droppings. The dock canopy may need to be screened to prevent bird nesting.

Surplus pallets are frequently stored outside in seldom-traveled areas. These pallets can provide excellent harborage for a variety of pests. When these pallets are used, however, there is a possibility of moving infestations into the warehouse as well as contaminating food that comes in contact with them. If pallets are stored outside, a program should be implemented for cleaning pallets shortly before use.

Maintenance Facilities. Inspect garage areas, as well as truck maintenance and washing areas, both exterior as well as interior, for insect or rodent infestation. Examine washing stalls for debris and spilled food. Tire storage area, parts departments and workshops provide harborage for rodents. Examine corners, under benches, locker and lunch areas for infestations. Sanitation here is usually poor and can affect pest populations in other areas.

Refuse Areas. These areas should be examined carefully to determine that there are no pest harborages. The compactor or dumpster should be adequate to handle a day's refuse. The area around the compactor should be free of spilled or excess trash. Compactors should have nearby drains and cleaning scheduled during pick-up.

Interior Dock Tracks. Where tracks run into the building through large closing doors, examine doors to be certain they are tightly sealed. Check the slot next to the rail track. A block or plate should be attached to the door to fill the gap, preventing rodent entry. An alternate solution to the rail track pit problem is to install a plate straight across the bottom of the door. The plate should fit into a slot cut through the tracks and the pavement. The plate then slips into the slot and forms a subterranean seal. The pit is created to facilitate easy unloading as the rail enters at a level below the dock. Pits should be kept clean and free of debris. Check under rail tracks for rodent burrows. A variety of other methods have been used to seal around the track area and require at least monthly checks and maintenance. Rail deliveries are not as common as in the past but when interior dock tracks exist, this is usually the primary rodent entrance.

Truck Loading Docks should be kept free of spilled food and debris. Packaging materials are frequently stacked between doors. This area provides excellent harborage for rodents and insects brought into the area via truck. Check to be sure this area is clean and free of any tools, pallets, or packaging materials. Doors should close tightly and be kept closed when not in use, even when a truck is backed up to the door seal.

Shipping Docks. In most plants distribution is done by truck from the same dock as receiving. Follow the above inspection procedures. Check the interior of trailers being loaded for pest and/or sanitation problems.

2. Inside Measures

Main Warehouse. Begin the inspection around the perimeter wall. There should be a 45.72cm (18") space between the wall and stored products. This space must be kept free of debris, clean and accessible for easy inspection. To make inspections easier, a white 45.72cm (18") stripe should be painted on the floor between the wall and stored products and up the wall the same distance. Rodent droppings and insect fragments are easily detected on the stripe providing an immediate indication of the general conditions. The white stripe is recommended for all walls, interior partitions and floor-wall intersections of railroad pits.

Examination of the bases of the supporting posts of any shelving will reveal any accumulation of food product and evidence of insects and rodents. Looking between stacks of palleted food products will provide any evidence of pest infestation. Careful examination under pallets and on top of product stacks should be carried out. Not every pallet stack need be checked but a representative number should be examined. Carefully inspect high-risk packaged goods, such as farinaceous products, dry pet foods, sugar, raisins and nuts. Examine the tops of packages to determine if there is evidence of insect or rodent infestation. Examine closely for insects that are attracted to products containing large amounts of protein. A population of dermestids in the light trap may indicate the length of time since the last inspection. The type of insect may also indicate the product that is causing the infestation. Pheromone traps should be placed near critical products.

Repack Area. These are sites where items are repacked in smaller quantities for small customer sales. Check for cardboard boxes, plastic wrappings and empty pallets that have accumulated in aisles and have not been picked up. All aisles and shelf areas should be free from this type of debris. Understand that there may be temporary accumulations of paper and boxes left on the floor during part of, or even throughout an entire shift. Check for aging boxes and wrappers, spilled foods and candy. In the repack area, packages are opened and small amounts of candy, pharmaceuticals and hardware are distributed to small purchasers. Food items are transferred to boxes containing small amounts of other products.

There is a good chance for pest contamination in the transferred items and to the products left in the original opened container. Inspect for pest signs throughout the repack area. Be sure packaging material does not remain on the floor or

under shelving. Returned items that are to be destroyed should not be kept in this area. Broken packages should be removed at least at the end of each shift.

Salvage. Damaged goods are generally stored together in this area where adjusters can determine settlements or for possible distribution after inspection and reprocessing. Checks should be made to ensure that there is no food on the floor and that all salvage items are on pallets (or 45.72cm [18"] off the floor on shelves). Spilled and exposed foods should be discarded or destroyed as soon as possible.

Spilled syrups and liquids should be examined to be sure no flying insects or larvae are present. The salvage area is also used to store damaged items. Leaking materials should either be in drop pans or removed immediately.

Cooler-Deep Freeze. Deep freezes should be inspected for rodent infestation. The cold temperatures of the area may not deter the rodents. Spilled foods do not spoil quickly in the deep freeze, therefore, general cleaning is not as thorough. Examination of a 45.72cm (18") "white stripe" area behind the stacks will show any rodent tracks, nesting materials and food sources.

Rodents may nest prior to mating to keep warm. Areas between pallets should be inspected for rodent infestation. If pallets have been stored for long periods of time, take time to inspect inside the stacks of food and also under the pallets for signs of rodent infestation. Rodent nests are often found in the floor drains, breaks in the wall or in boxes of meat or fish.

Deli-Cooler. This area, where the processed meats, cheeses, eggs and other perishable are stored, should be inspected as carefully as the deep freeze. Occasionally the deli-cooler is operated like a repack section where boxes of processed meats and dairy products are opened and consumer sized packages are distributed to smaller retail food stores. Rodents may gain easy access to this food. Opened packages should be moved (sold) as soon as possible. Foods, when stored, should be 45.72cm (18") off the floor or on pallets.

Waste Paper Disposal. The management of waste paper, cardboard and plastic debris is monumental in food distribution warehouses. These articles provide excellent harborage for rodents and insects. Compression box balers are an aide in smashing boxes into manageable bales. Bales afford good harborage for pest populations and they should be moved out of the warehouse as quickly as possible. In returning bales from the retail food store to the food distribution warehouse, pest infestations can be transferred. Using a separate loading dock or building for storing waste paper materials is recommended.

Trailers used for transfer should be inspected for rodent and insect infestation periodically. If this material is stored in a separate facility, check the inside and outside perimeter regularly and thoroughly for pest infestation.

Meat Handling Area. Some food distribution warehouses have meat cutting and storage facilities. These areas are usually located near the cold storage and deli-coolers. Refer to Inspection Procedures for Cooler-Deep Freeze and Deli-Coolers (above). Meat cutting facilities are inspected by the USDA (Meat Inspection Division). Any pesticide use must comply with USDA regulations.

Mechanical and Recharging Area. Inspection under tool benches, shelves and behind parts storage areas is essential. Particularly vulnerable are mechanics' areas where spilled coffee, lunch scraps and other potential food sources are found. Parts and tools offer excellent harborage for insect and rodent infestations. Parts stored off the floor will facilitate inspection. The electric industrial truck recharging area should be inspected for pests regularly. Examination of perimeter areas for rodent and insect infestations is necessary.

Lunchrooms and Locker Rooms. These areas should be clean and free of food. Clothing should be picked up and hung neatly on hooks or hangers. Lockers should be neat inside and not used for food storage. Inspect for pest evidence. Inspect the area around, under and behind vending machines, toilets, sinks and storage cabinets. Lockers should have sloping tops and as few legs as possible to facilitate cleaning. All should be opened, inspected and cleaned frequently.

Offices. Examine offices for pest evidence. Check coffee counter, snack area and sink for unsanitary conditions. Check stationary and records storage areas. Determine if snacks are kept in desk drawers and take appropriate action to have them removed.

Roof. Inspect roof areas for standing water and debris. Ensure air exhaust and intake openings are properly maintained and screened to prevent pest entry. Check for bird roosting or loafing areas. Check for proper screening on roof vents and wall fans.

3. Preventive Measures

Sanitation. Good housekeeping is the most important factor in the control and exclusion of a pest population in a food facility. The person responsible for housekeeping should be aware of areas where spills and broken packages result in food accumulation on the floor. Flour, dry pet foods and salvage should be checked frequently to assure that food is not

being tracked through the warehouse. Spilled foods should be immediately swept from the floor. The person in charge of cleaning should have a scheduled program for cleaning each area.

All products should be stored off the floor on pallets. Some of the newer facilities utilize slipsheets. Cleaning is done by quickly moving pallets and replacing them after the cleaning is completed. White stripes should be cleaned periodically thus avoiding accumulations of dirt and dust. This facilitates accurate inspections. If housekeeping is not properly maintained, tactfully recommend corrective steps to bring the warehouse into compliance. Brooms and dustpans on forklifts permit quick cleanup of spills.

Exclusion of pests in food distribution warehouses minimizes problems within the facility.

Doors should be rodent proof. All cracks and holes should have air-curtain protection. All doors should be kept closed when not in use. Air curtains need regular inspection and some type of back-up protection since they are far less than perfect.

Perimeter of building should have a 0.61m (2') pea gravel strip to prevent rodent burrowing. Landscape fabric under the gravel helps control weeds while permitting drainage.

Vegetation. All vegetation should be kept to a minimum and mowed as needed.

Overhead (dock). Use screen or other covering to keep birds off structures. If bird resting areas are present, these should be screened or blocked off. Sticky repellents can be used.

Air. Exhaust and intake vents should be screened to prevent insect and bird entry. These are rarely screened adequately. Screening reduces air flow by 50%, this may require a "box out."

Plumbing and Electrical Services should be sealed where they enter the building (or go through walls or floors).

Inspection. Incoming freight should be examined by warehouse personnel to assure that shipments are pest-free. This should be done by a trained person with set procedures for each type of product.

Lighting. Exterior lights should be located and directed so they do not attract insects. This is particularly important at entrance-ways. Lights should be sodium vapor or placed at least 30 feet away and directed toward the facility.

Windows. All operable windows should be screened with 16 mesh screen.

4. Non-Chemical controls
Insect Light Traps should be placed inside in positions not likely to encourage insect entry. These light traps are excellent monitors and are used to determine the types of insect pests present and their numbers. They should be inspected every two weeks. In the summer they may require weekly inspection.

Rodent Traps (interior). Repeating rodent traps and snap-traps should be placed around the inside perimeter of the warehouse to monitor infestations and to provide control. Rodent traps should be placed next to exterior doors and in places where rodent penetrable packaging may be readily available such as flour, pet food and sugar storage areas.

Traps should be used in accordance with the NPCA Good Practice Statement for The Use of Traps for Commensal Rodent Control, ESPC 041317A (dated: 11-04-1978).

Rodent Traps (exterior). Rodent traps should be placed on the exterior perimeter of the warehouse on both sides of all entrances where rodents may enter. Occasionally traps should be placed along docks close to door openings. Food for rodents is frequently found in outside enclosed loading dock areas where trucks back through sealed doors. Place traps along these walls. Facility personnel should be responsible for inspecting traps on a weekly basis, if the PCO is not responsible for that work. Traps can be placed inside bait stations to keep them clean and out of sight.

Glue Boards. When used, boards should be placed as in the same way as snap traps, along walls and in between shelves, in natural rodent runs. Glue boards should be covered to protect from dust and should be regularly inspected and discarded when necessary.

Sealing and Caulking. All cracks along floor/wall junctions, door jams, shelves, pipes and conduits should be sealed to eliminate insect harborage. Cold storage areas generally do not require this preventive measure for cracks less than 6.35mm (1/4") wide.

Repellents can be used to keep birds off roosting points when it is not possible to build them out.

Continued in Part 2