V 2.0

USE OF REMOTE RODENT MONITORING WITH REGARD TO FOOD SAFETY REGULATIONS AND CURRENT PEST CONTROL PRACTICES

Rodent Monitoring System

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SUMMARY

The Bayer Rodent Monitoring System (RMS) is a distributed sensor network designed to provide 24/7 monitoring of rodent activity. Its primary function is to instantly alert the pest management company of a rodent capture in a multi-catch or snap trap. The Food Safety Modernization Act (FSMA) has been implemented and the benchmarks of the Global Food Safety Initiative (GFSI) have been accepted by many as industry standards. Therefore, pest management for the food industry must align itself with these regulations and standards to support a safe food supply chain. The RMS provides a reliable and convenient solution helping pest management companies become more valuable partners to the food industry.

This paper outlines some of the requirements for pest management based on Food and Drug regulations and GFSI standards. It explains how the Bayer RMS can help pest management companies and food processing/handling facilities partner to implement a more effective rodent control management plan in response to these regulations and standards. In addition, the need for conducting a regular system maintenance program for the RMS is discussed. Using the Bayer RMS with appropriate data analysis and implementing timely corrective actions will help reduce the likelihood of rodent-induced food contamination, enhancing the rodent control program's efficacy. While the Bayer RMS improves the efficiency and accuracy of rodent control, effective implementation that is compliant with regulatory and GFSI standards (including corrective actions if needed) requires collaboration with pest management companies.

Currently, most pest management companies serving the food industry travel site to site, routinely checking each rodent trap for a capture. This lengthy, laborious process leaves limited time to make thorough and proper inspections of pest-conducive conditions throughout the facility. Additionally, most pest management and facility management teams are unable to detect real-time rodent activity with enough accuracy to strengthen their rodent control system beyond its current level.

Even now, rodent trapping devices are still purely mechanical. The two basic functions, trap and kill, have remained the same for more than 100 years. Without a connected monitoring system, rodents are often not discovered until the pest control technician arrives on site and makes a visual inspection of the trap. Therefore, the ability to quickly identify, control and correct infestations is limited. The exact time of a possible infestation, capture or source of rodent activity cannot be known.

In September 2015, the FDA issued the final rule for preventive control for human food as part of FSMA. The goal of this legislation is to safeguard the US food supply by shifting focus from reacting to contamination to proactively preventing it. FSMA requires more frequent prevention-oriented inspections of food processing/handling facilities to identify and protect against potential food safety hazards.

The Bayer RMS makes rodent control easier in facilities that must comply with FSMA and GFSI certified programs (formerly known as schemes). It provides 24/7 monitoring of each rodent control location. If a rodent is captured, an immediate notification is sent to the pest management company and/or facility management. Trend lines and data from the system enable pest management companies to review the effectiveness of trap placements. Additionally, the rodent control practice supported by the Bayer RMS can better assist risk management and the decision-making process.

3.1 BRIEF SYSTEM OVERVIEW

As shown in Figure 1, the Bayer RMS displays each monitored location on a facility map, reporting each monitor's status in real time. The map is stored online in the Bayer Digital Pest Management (DPM) portal (Figure 2), facilitating secure collaboration between the pest management company and the facility management team.

The initial placement of monitors is based on a site assessment (e.g., facility survey) and Integrated Pest Management (IPM) Program for maintaining consistency with prevailing standards. Once the monitors are installed, all responsible personnel, whether with the service provider (e.g., Pest Management Professional) or the site (e.g., QA manager), can access the DPM portal to learn the recent activity and status of each device. Available reporting includes: recent monitor activity, physical movements of the monitor, as well as rodent capture alerts. The system also provides daily "heartbeat" messages which verify proper system function, overall system connectivity and battery levels.

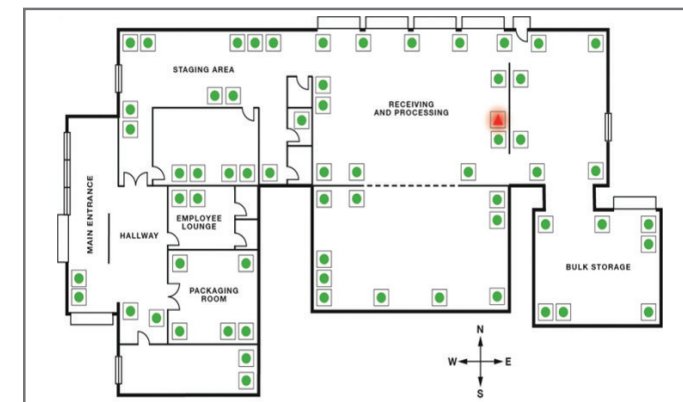**FIGURE 1. ONLINE FLOOR MAP OF MONITORED LOCATIONS AND STATUS**

FIGURE 2. RECENT MESSAGE HISTORY OF ONE MONITOR ON THE DPM PORTAL

IMPLEMENTATION OF THE BAYER RODENT MONITORING SYSTEM

3.2 SYSTEM MAINTENANCE PROGRAM

The system maintenance program is a risk-based and prevention-oriented program where monitors are manually inspected, cleaned and the probe triggered to confirm functionality; the latter is performed to document that the sensor is working in the absence of any mouse activity.

The system maintenance frequency is determined in a systematic manner based on risk, driven by the likelihood of pest activity and the impact of product contamination from pest activity. In this way, it is recommended that monitored locations in high-impact areas or with a high likelihood of pest activity are checked more frequently than lower impact areas with less pest risk. The recommended minimum inspection frequency is influenced by the cleanliness of the monitored locations and how the monitors will be maintained onsite.

An Area Event Report (Appendix 1) is available for pest management professionals in advance or upon arrival at the facility. This report helps them determine which monitors require routine maintenance or cleaning and which monitors need to be repositioned following a move from their assigned location. By focusing a PMP's effort on the monitors truly requiring attention, the PMP gains time previously lost to unproductive work (i.e., checking empty mouse traps). This time can be used to evaluate pest vulnerabilities in the facility, investigate infestations or provide other valued-added services to the client.

# IMPLEMENTATION OF THE BAYER RODENT MONITORING SYSTEM

3.3 RODENT CONTROL PROCESS FLOW SUPPORTED BY BAYER RM

Prior to installing the RMS, it is recommended that all stakeholders discuss and agree upon the responsibilities of each party. Suggested guidance can be found in Table 1. However, this guidance is provided as a general suggestion. Exact responsibilities may vary and should be determined by the needs, preferences and any applicable legal agreements between the parties. The general process flow is presented in Figure 3.

TABLE 1. GUIDANCE FOR THE RESPONSIBILITIES OF RODENT CONTROL SUPPORTED BY THE BAYER RMS

PARTY	RESPONSIBILITIES
Bayer	• Support service provider for site assessment and installation • Provide 24/7 monitoring and capture alerts • Provide pest management professionals with Area Event Report (Appendix 1) and trend line reporting • Provide detailed digital maps showing the location and status of each monitor (Figure 1)
Pest Management Company	• Agreed service plan • Provide pest control service • Respond to notifications; take corrective actions • Implement System Maintenance Program
Facility Management	• Respond to notification alerts as needed • Good sanitation practices; inspect incoming materials • Review and verify pest management service • Take corrective actions including work order for facility maintenance

FIGURE 3. RODENT CONTROL PROCESS FLOW SUPPORTED BY THE BAYER RMS
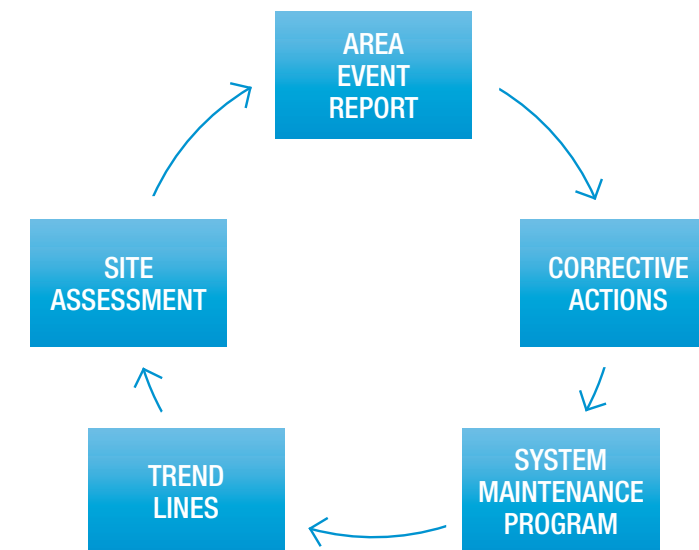
COMPLIANCE WITH CURRENT GOOD MANUFACTURING PRACTICES

GFSI COMPLIANCE

In the food industry, pest control is regulated by current Good Manufacturing Practices (cGMPs), a prerequisite for a Hazard Analysis Critical Control Point (HACCP)-based food and a preventive control for a Preventive Control Plan (PCP). According to the Centers for Disease Control and Prevention (CDC), rodents pose a threat to public health because they can carry diseases, such as Salmonellosis and Leptospirosis.

Two primary sources of Salmonella are dead insects and rodent infestation both of which result from ineffective pest management practices. The stringent compliance with cGMPs is the fundamental guarantee of food safety and company brand protection.

The following table provides an assessment of how the Bayer RMS helps rodent control service conform to cGMPs.

TABLE 2. COMPLIANCE WITH CGMPS SUPPORTED BY BAYER REMOTE MONITORING

CURRENT GOOD MANUFACTURING PRACTICE IN MANUFACTURING, PACKING, OR HOLDING HUMAN FOOD, 21 CFR §117.35		BAYER RMS SOLUTION
(C) Pest Control	No pests shall be allowed in any area of a food plant…….. Effective measures shall be taken to exclude pests from the processing areas and to protect against the contamination of food on the premises by pests. The use of insecticides or rodenticides is permitted only under precautions and restrictions that will protect against the contamination of food, food-contact surfaces, and food-packaging materials."	• Guided by IPM, the site assessment identifies rodent-introduced food safety risks in different control areas at a facility; it influences the initial monitor placement schemes. After installation, rodent activity is monitored 24/7 at these designated locations. • Capture notifications with timestamps are sent to pest management professionals and/or facility management. • Corrective actions can be taken in a timely manner following a capture.

The GFSI is an industry driven global collaboration to advance food safety. The Bayer RMS is an innovative rodent management and information platform that can help facilities be compliant with GFSI benchmarked standards. Some of the more comprehensive certification programs (formerly schemes) in the U.S. are the British Retail Consortium (BRC), the Safe Quality Food (SQF) and the Food Safety System Certification (FSSC) 22000 standards. Table 3 provides a summary of the essential elements from these schemes as they relate to pest control. They are all responsible for achieving high objectives in food safety management and a successful audit with regard to pest control.

TABLE 3. KEY REQUIREMENTS OF PEST CONTROL FROM GFSI RECOGNIZED FOOD SAFETY SCHEMES

GFSI SCHEMES	BRC	FSSC 22000	SQF
General Requirements	A HACCP-based food safety management system is required by all schemes. It must be periodically evaluated and updated to ensure the current food safety plan incorporates the most recent food safety issues.		
Documentation	BRC requires that records in electronic form be suitably backed up to prevent loss. Prepare policies, procedures, work instructions, specifications and effective corrective actions resulting from non-conformance.		
Specifications	All schemes require documented specifications for raw materials, finished products, and any product or service which could affect product integrity. A regular review should be in place to ensure these specifications are kept up to date.		
Corrective action	All schemes require that the organization has documented procedures in place for the determination and implementation of timely corrective action relating to product safety.		
General GMPs and prerequisite programs (PRPs)	Food Manufacturer shall have effective PRPs in place and be included in the development and review of HACCP.	PAS 220:2008 Prerequisite programs	Documented records showing GMP are followed in all modules; training of personnel.
Pest Control	Inspection frequency based on risk assessment; timely response. Any rodent management devices shall be mapped and kept current.	Pest control programs; preventing access, harborage and infestation; monitoring and detection.	Outline the pest control method and inspection frequency; measure the effectiveness of current method.

TABLE 4. RODENT CONTROL PRACTICE SUPPORTED BY RMS FOR GFSI COMPLIANCE

GFSI SCHEME REQUIREMENTS	BAYER RMS
General Requirements	The installation of monitors is based on a detailed site assessment (including business type, risk assessment and pest activity). Further, the system can generate trend lines periodically to advise monitor placement schemes and inspection frequency.
Documentation	Bayer RMS maintains time-stamped records of all messages from the monitor(s) (e.g., movement, capture, heartbeat, last time inspected, etc.). The records can be retrieved for documentation purposes.
Specifications	Device specifications are provided by Bayer.
Corrective Action	The PCO or QA Manager can respond to capture messages or movements of the monitors as needed to protect product safety. Real-time alerts enable more timely corrective actions.
General GMPs PRPs	From the outset, Bayer RMS identifies rodent activity in different control areas. This information can be used to perform a hazard analysis to reduce or prevent infestation.
Pest Control	• Licensed service providers • Detailed site assessment • Data analysis and trend lines to review the effectiveness of current program • Enhances IPM by reducing conducive conditions for infestation by enabling additional preventive measures such as excluding pest access and removing harborage.

SUPPLIER AUDIT PROGRAM

A Second-Party Audit Program verifies that suppliers meet their customers' expectations in product safety and quality, facility environment. Food manufacturers, distributors, brokers and retailers should use their audit programs to ensure that controls are consistent with internal and external standards. The intention of a second-party audit program is not to set disciplines; rather, it is to improve the overall quality system throughout the supply chain, thus leading to a more efficient product sourcing and purchasing process. The expectations for pest management programs that apply to rodent control are briefly summarized below:

- Written pest management plans

- Inspection procedures and frequencies for plant infrastructure, pests, and all pest devices that demonstrate control

- Required documentation of pest activity log and analysis of records for trends in activity

- Documented corrective actions

- Training requirements; Licensed Pest Control Operators

- A dated map showing the location of pest control devices, such as interior rodent traps, glue boards, insect light traps, outdoor bait stations, and pheromone traps

As detailed in Table 4, the Bayer RMS can help facilities meet the rising expectations demanded by supplier audit programs. Additionally, the Bayer RMS can help companies improve the traceability and visibility of a product recall, minimize loss of the recall and quickly determine the root cause of any potential rodent infestation.

CONCLUSION

Protecting food safety throughout the entire food supply chain requires extensive control measures and coordination between parties. The Bayer RMS provides data and monitoring services that improve rodent control management. These features help reduce the number of errors attributed to manual data entry or incomplete record keeping. The system can be easily configured and managed, providing pest management companies and food facility management with informed and reliable rodent control plans to jointly protect food safety.

The benefits of the Bayer RMS include:

- 24/7 monitoring and real-time capture alerts

- Enables rapid response, root cause analysis and immediate corrective actions

- Up-to-minute trend lines and reporting

- Helps verify site rodent program conforms to GMP requirements and GFSI benchmarked standards

- Automatic, real-time information improving audit readiness

- Enables pest management professionals to spend their time proactively inspecting the facility for possible pest entry points

- Helps pest management professionals upskill in facility inspections and rodent biology

APPENDIX A

8.1 SAMPLE AREA EVENT REPORT

APPENDIX B

9.1 SAMPLE MAINTENANCE RECORD

Bayer DPM

Loading Dock Report

PCO: Hannover Messe Pest Control
Customer: Carbonated Beverages Inc
Area: Loading Dock

Date of Report: 03/11/2019
Report Period: 03/10/2019 06:00 AM EDT - 03/11/2019 06:00 AM EDT
Frequency: Daily

1. Captures or Snaps
There are no events.

2. Triggers: Multi-Catch Only
There are no events.

3. Bait Stations
There are no bait stations is this area.

4. Warnings
There are no events.

5. Monitors Requiring Attention

Remote Rodent Monitor System Maintenance Record					
Pest management company:				Customer:	
Site location:					
Maintenance tasks: Refer to SOP XX--XXXX					
Monitor#	Date	Time	Pass/Fail	Maintenance Summary	PCO (Initial)
Reviewer's signature:			Date of review:		

9.2 SAMPLE CORRECTIVE ACTION FORM

Sample Corrective Action Form	
Date of Record:	Events or observation:
Root cause analysis (if applicable):	
Actions Taken:	
Date:	Signature:
Evaluation of the corrective action:	
Evaluated by:	Date:
Reviewed by:	Date of Review:

9.3 SAMPLE PREVENTIVE MAINTENANCE CHECKLIST

Preventive Maintenance Checklist						
Completed by PCO					Completed by QA	
Task	Date	Initials of the person completing the task	Work Order	Assigned to	Date of Completion	Signature