FLORIDA ATLANTIC UNIVERSITY

Division of Research
Comparative Medicine

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SOP # 112	**Title: Development and Implementation of Environmental Monitoring Programs**

SCOPE: This SOP is applicable to all Veterinary Services personnel

SOP OWNER: Attending Veterinarian (AV)

PURPOSE: To outline the procedures for developing and implementing an environmental monitoring program in a specific area such as centralized vivarium or satellite facility

LOCATION: All Vivaria and Satellite Facilities

Approved by: Sylvia Gografe, D.V.M., Ph.D. Director Veterinary Services

References

1. *Guide for the Care and Use of Laboratory Animals*. National Research Council; National Academy Press, Washington, D.C., 2011
2. Biosafety in Microbiological and Biomedical Laboratories, 5th Edition, CDC/NIH, 2009
3. FB Engley and BP Dey. A Universal Neutralizing Medium for Antimicrobial Chemicals. Proceedings of the 56th Mid-Year Meeting of the Chemical Specialties Manufacturing Association (CSMA). 1970

1. Responsibilities

a. Laboratory Animal Technician
   i. Adhere to procedures as outlined in this SOP.
   ii. Perform only procedures for tasks which have been trained.

b. Certified Veterinary Technician (CVT)
   i. Adhere to procedures as outlined in this SOP.
   ii. Provide appropriate training including hands-on sessions to personnel helping with procedures necessary in developing and implementing an environmental monitoring program.
   iii. Oversee under the guidance of the AV environmental monitoring program(s) once established and implemented.

c. Facility Manager/Trainer Coordinator
   i. Adhere to procedures as outlined in this SOP.

ii. Ensure procedures are followed as outlined in this SOP.
iii. Ensure appropriate SOP training is provided to particular personnel depending on function/job description.

d. Director/Attending Veterinarian (AV)
i. Adhere to procedure as outlined in this SOP.
ii. Oversee development and implementation of environmental monitoring program(s).
iii. Ensure appropriate training is provided to particular personnel and necessary resources are available.

2. General Information

a. All animal housing rooms, procedure rooms and equipment that comes in contact with the research animals will benefit from the development of an environmental monitoring program (EMP). This pertains to both Comparative Medicine (CM) centrally managed vivaria and Principal Investigator (PI) managed satellite facilities.
b. The EMP is designed to
i. Unify and standardize sanitation methods
ii. Provide a well-defined monitoring program that clearly establishes performance expectations for staff
iii. Provide a scientific process, and data needed, to determine the staff and/or the equipment (e.g. cage washers) ability to efficiently and effectively sanitize all areas and equipment in an animal research facility
c. Varying methods of cleaning and sanitation can make it very challenging to evaluate the efficacy of the sanitation process, and is usually due to lack of standard operating procedures, training, and methods.
d. To accomplish these goals, the following is necessary for implementation in order to have a basis for informed decision making:
i. Monitoring equipment
ii. Standardized evaluation methods
iii. Testing areas established for base line data
iv. Monitoring performed within all facilities on a regular basis based on general best practice knowledge and scientific publications. The frequency of testing might be later adjusted with accruing experience.

3. Procedure

3.1. Recommended Monitoring Methods

a. Adenosine triphosphate (ATP) is a sanitation monitoring system that measures relative light units (RLU). The Neogen AccuPoint Advanced ATP Monitoring System is available and used in FAU research animal facilities.
i. ATP is the energy source in all living cells and remains in place after organic material is exposed to a surface. Through measurement of residual ATP the amount of organic matter (i.e. dirt) or bio-load that remains on a surface can be determined. This remaining bio-load is biological and contains the potential for microbiological contaminants such as pathogenic bacteria, mold, and yeast. It is an indicator for the effectiveness of cleaning.

ii. ATP measurement with the Neogen AccuPoint is selected due to ease of use, timely response and custom programming features. Individualized facility monitoring templates can/will be programmed into separate AccuPoint monitoring devices and data can/will be uploaded upon completion of sampling for each template. This feature ensures repeatable and consistent testing within each facility site.

b. D/E Neutralizing Microbial Agar is used for the isolation of microorganisms from sanitized environmental surfaces.
   i. It was developed by Dey and Engley to neutralize the inhibitory effect of carryover of a broad spectrum of disinfectants and preservative antimicrobial chemicals. D/E neutralizing media neutralize higher concentrations of residual antimicrobials when compare with other standard neutralizing formulations, which is critical to avoid false negative results.
   ii. D/E Neutralizing Microbial Agar contains media that measures colony forming units (CFU), which allows for the determination of CFU per ml on the sample. This provides an indication of the microbiological load and the degree of contamination found on surfaces and equipment.

3.2. EMP Implementation Steps

a. Overall Microbial and ATP test plans including sample site are agreed upon and clearly outlined in agreement with the responsible person for the particular area. This is done with the goal of the implementation process in mind, which is
   i. Standardization of the cleaning techniques and
   ii. Assessment and standardizing levels of sanitation within each facility/area by use of ATP and CFU sampling results for the implementation of standard operating procedures.

b. Baseline Microbial & ATP testing/sampling is performed in pre-established areas in the animal facility such as caging/housing equipment, work/room surfaces, doors and floors. The beginning selection criteria are based on
   i. Traffic patterns that include hallways and animal room entry orders
   ii. Commonly used or touched surfaces such as hood surfaces and door handles and high-risk areas of cross contamination such as procedure areas.

c. These baseline data will be reviewed with the responsible person for the particular area, and any “hot spots” will be recommended as a targeted priority for future sampling.

d. Acceptable microbial & ATP levels will be established based on the facilities specific pathogen free status designation, traffic pattern and equipment usage.

e. Standard Operating Procedures (SOPs) will be developed that will define:
   i. Chemical concentrations of detergents and disinfectants used
   ii. Cleaning and disinfection frequency
   iii. Specific methods used to accomplish these acceptable microbial counts and ATP reading for targeted "hot spots", as well as, regular scheduled cleaning.

f. Once SOPs have been written and approved SOP training sessions will ensue and eventually proficiency of personnel performing cleaning/disinfection as well as sampling procedures certified.

g. Evaluation of the EMP will be done 12 months after initiation. The expectation is that after completion of the first year of the EMP microbial counts and ATP reading have been reduced to acceptable levels.

4. Record Keeping

a. All steps of the EMP development and implementation will be documented.
b. Hand written as well as printed results including test results from samples sent to commercial laboratories is kept in a specific folder including raw data.
c. Steps implemented to improve microbial counts and ATP readings will be described.

Review Date	Revision Date	Revision Number	Description of Revision