Program Description
Animal Care and Use Program

National Veterinary Services Laboratories/Center for Veterinary Biologics

U. S. Department of Agriculture

1920 Dayton Avenue, Ames, IA 50010

April 30, 2020

For
AAALAC International

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Appendices

Program Description

Instructions for Completing and Submitting the Program Description for the Institutional Animal Care and Use Program

Section 1. Introduction

A. State the name of the program unit and, if applicable, its parent organization. List all organizations (schools, centers, etc.) included within the program unit.

The National Veterinary Services Laboratories (NVSL) and the Center for Veterinary Biologics (CVB), Ames, Iowa, are branches of the United States Department of Agriculture (USDA), Animal Plant Health Inspection Service (APHIS), Veterinary Services (VS).

The CVB and NVSL share buildings at the National Centers for Animal Health (NCAH) campus in Ames, Iowa. The NVSL and CVB have a combined Animal Care and Use Program and IACUC. Animal care staff and services supporting the NVSL and CVB are provided by the National Animal Disease Center (NADC) managed Animal Resources Unit (ARU). The AAALAC file number is 000816.

The National Veterinary Services Laboratories (NVSL) Director Office (DO) has oversight of the four diagnostic testing laboratories: Diagnostic Bacteriology & Pathology Laboratory (DBPL), Diagnostic Bioanalytical & Reagent Laboratory (DBRL), Diagnostic Virology Laboratory (DVL), and Foreign Animal Disease Diagnostic Laboratory (FADDL). Three of the laboratories (DBPL, DBRL, and DVL) are located in Ames, Iowa, and one of the laboratories (FADDL) is located in Orient Point, New York. FADDL is not described in this Program Description.

CVB organizations include Inspection and Compliance (IC) and Policy, Evaluation, and Licensing (PEL). Virology and Bacteriology sections are a part of PEL.

B. Give a brief overview of the institution, its purpose and how the animal care and use program relates to the mission of the institution.

The NVSL was established in 1973 from the former Biologics Unit and Diagnostic Services Unit of the NADC, Agricultural Research Service (ARS), USDA, in Ames, Iowa. In 1984, the FADDL, Plum Island, New York, became a part of the NVSL when those functions were transferred from the Plum Island Animal Disease Laboratory of the Agricultural Research Service. (The Plum Island Animal Disease Laboratory is now part of the Department of Homeland Security.) In 1996, reorganization removed the Veterinary Biologics Laboratory from the NVSL and placed it in the new CVB. In 2004, the Diagnostic Bacteriology and Pathobiology Laboratories moved into a new facility on the main campus. In 2009, the

remaining NVSL groups, CVB and NADC staff and functions moved into the new Combined Laboratory Facility (CLF).

The NVSL is dedicated to testing of diagnostic specimens for domestic and foreign animal diseases, producing inter-laboratory proficiency tests, and producing and disseminating reference materials. An in-house Calibration Laboratory provides calibration services to the National Centers for Animal Health programs in Ames, IA. NVSL maintains its certification to ISO 9001 for business practices and laboratory support processes. NVSL also maintains accreditation to ISO 17025, ISO 17043, and ISO 17034 requirements for diagnostic testing and calibration services, proficiency test provision, and reference material production, respectively. The NVSL provides analytical services, disseminates scientific information, conducts developmental activities, and provides training for a range of APHIS programs. It works closely with APHIS' International Services to provide consultation, reagents and training for foreign governments. Laboratory services are provided for many APHIS programs. The NVSL works closely with Veterinary Service (VS) specialists in program development and program monitoring. Its personnel are active on many national and international animal health organizations and committees. The NVSL clients and stakeholders include private, state, Federal, and university diagnostic laboratories and other groups, both domestic and international.

The CVB is responsible for implementing the provisions of the Virus-Serum-Toxin Act of 1913 (amended in 1985), regulating veterinary biologics (vaccines, bacterins, antisera, diagnostic kits, and other products of biological origin) to ensure that the veterinary biologics available for the diagnosis, prevention, and treatment of animal diseases are pure, safe, potent, and effective. The CVB is the only laboratory in the USDA that is devoted to testing veterinary biologicals.

Animals play an essential role in the diagnostic (NVSL) and biologic (CVB) missions. General types of animal work include reagent production, training of field staff, efficacy testing, and safety testing. Although much of the biologic testing is outlined in 9 CFR, efforts to refine, and in some cases replace, the testing involving animals are ongoing.

C. Note that AAALAC International's three primary standards are *the Guide for the Care and Use of Laboratory Animals* (*Guide*), NRC, 2011; the *Guide for the Care and Use of Agricultural Animals in Research and Teaching* (*Ag Guide*), FASS, 2010, and the European Convention for the Protection of Vertebrate Animals Used for Experimental and Other Scientific Purposes, Council of Europe (ETS 123). Other regulations (pertinent local and national regulations) and guidelines used (U.S. Department of Agriculture (USDA), Public Health Service (PHS) Policy, Good Laboratory Practice (GLP), Canadian Council on Animal Care (CCAC), etc.) may also apply. Describe which of the three primary standards and other regulations and guidelines are used as standards for the institutional animal care and use program and how they are applied. For example, an academic institution in the United States with an Office of Laboratory Animal Welfare (OLAW) Assurance may use the standards of the *Guide* and PHS Policy for all animals, the Animal Welfare Act regulations for covered species, and the

Ag Guide for agricultural animals used in agricultural research and teaching (see also *Guide*, pp. 32-33). In the European Union, the standards applied might be the *Guide*, ETS 123, Directive 2010/63, and any country-specific regulations.

NVSL/CVB use the standards of the Guide and PHS Policy for all animals, the Animal Welfare Act for covered species, and the Ag Guide for agricultural animals used in agricultural research and teaching. Guidelines for the Use of Fishes in Research (American Fisheries Society, 2014) are used for our aquatic species.

D. Describe the organization and include an accurate, current, and detailed organizational chart or charts (see **Appendix 4**) detailing the lines of authority from the Institutional Official to the Attending Veterinarian, the Institutional Animal Care and Use Committee/Oversight Body (IACUC/OB), and the personnel providing animal care. Please include the title, name (*Note:* For individuals whose information is publically available, provide the titles and names; for individuals whose information is not publically available, you may provide titles only.), and degree (if applicable) of each individual at the level of supervisor or above. Names of animal care staff below the title of supervisor need not be included, but the titles and number of animal care personnel under each supervisor should be included. If animal care responsibility is administratively decentralized, including the management of satellite housing areas/locations, the organizational chart or charts must include all animal care programs, indicating the relationship between each administrative unit and personnel, the Attending Veterinarian, and the Institutional Official.

Dr. Byron Rippke is the responsible Institutional Official (IO). He is the Director of the Center for Veterinary Biologics (CVB). The CVB uses about half of the animals in the program. The CVB has two program units. PEL is managed by Dr. Paul Hauer. Mr. Steven A. Karli is the Director for Inspection and Compliance (IC). PEL and IC are both made up of three sections (this includes the Security and Safety Unit, reporting to IC). The PEL unit uses all of the CVB animals, so reference to CVB hereafter generally refers to the PEL unit of the CVB. The CVB is registered as an animal facility with APHIS, Animal Care and Dr. Rippke is the IO. The Leader of the Safety and Security Unit (SSU) reports to Mr. Karli. Dr. Rippke is the IO for AAALAC as agreed by the CVB and NVSL Directors in a memorandum of understanding.

For purposes of the Animal Care and Use Program or IACUC items, the NVSL Director is Dr. Suelee Robbe-Austermann. The NVSL is also registered as an animal facility with APHIS, Animal Care. The National Veterinary Services Laboratories (NVSL) Director Office (DO) has oversight of the four diagnostic testing laboratories: Diagnostic Bacteriology & Pathology Laboratory (DBPL), Diagnostic Bioanalytical & Reagent Laboratory (DBRL), Diagnostic Virology Laboratory (DVL), and Foreign Animal Disease Diagnostic Laboratory (FADDL). Three of the laboratories (DBPL, DBRL, and DVL) are located in Ames, Iowa, and one of the laboratories (FADDL) is located in Orient Point, New York. Also included is the National Animal Health Laboratory Network (NAHLN), and Program and Administrative Support Services (PAS) who provide support services for

NVSL's Diagnostic Laboratories and Director's Office. One of the four laboratories mentioned above is the Foreign Animal Disease Diagnostic Laboratory located on Plum Island, NY. That facility is not covered in this description as its animal care and use program is separated administratively and physically from the Ames program.

The NCAH ARU is managed by the NADC. The ARU was formed in 2007 from the former NADC and NVSL/CVB animal care and veterinary staff. The ARU supports all animal work at the NCAH. The NCAH is comprised of three entities: NADC, NVSL, and CVB. Dr. Michelle L. Crocheck is the Attending Veterinarian and Leader of the ARU. She oversees the animal care and use program for NCAH. Dr. Crocheck reports to Dr. Susan Brockmeier, Associate Director of NADC. The Facilities Engineering Unit (FEU) reports to Dr. Marcus Kehrli, Director of NADC. Dr. Brockmeier and Dr. Kehrli are two of the four members of the NCAH Board of Directors (BOD). The NCAH BOD consists of four members, two from the NADC, and one each from the NVSL and CVB.

There are four Sections in the ARU. Dr. Rebecca Cox is the Leader of the High Containment Section (HCS). Dr. Jean Kaptur is the Leader of the Small Animal Section (SAS) and Swine Virology Team. Mr. Stephen Sterle is the Leader of the Farm Management Section (FMS). There is currently a vacant position for the Leader of the Large Animal and Surgery Section (LASS). Those duties have been distributed amongst the clinical veterinarians and the attending veterinarian. The four section leaders report to Dr. Crocheck, Leader of the ARU.

E. Identify the key institutional representatives (including, but not limited to, the Institutional Official; IACUC/OB Chairperson; Attending Veterinarian; animal program manager; individual(s) providing biosafety, chemical hazard, and radiation safety oversight; etc.); and individuals anticipated to participate in the site visit.

Byron Rippke, DVM	Institutional Official, Director of CVB
Paul Hauer, DVM, MS, PhD	Director, CVB-PEL
Suelee Robbe Austerman, DVM, MS, PhD	Director, NVSL
Marcus Kehrli, Jr., DVM, PhD	Director, NADC
Susan Brockmeier, DVM, PhD	Associate Director, NADC
Michelle L. Crocheck, DVM	Leader, ARU, Attending Veterinarian
Vacant	Leader, LASS
Rebecca Cox, DVM, MS, PhD	Leader, HCS
Jean A. Kaptur, DVM	Leader, SAS and SV Team
Stephen Sterle, BS, LATG	Leader, FMS
Brian Conrad, BS	Supervisor, LASS
Hannah Schroeder, BS	Supervisor, HCS
Jacinta McCarty, BS, LAT	Supervisor, SAS
Paul Amundson	Supervisor, Dairy Team
Benjamin A'Hearn, PE	Chief Facilities Engineer
Jennifer Johnson, DVM	Chairperson, NVSL/CVB IACUC
Catherine Vande Griend, CPIA, ALAT	Compliance Officer

F. Briefly describe the major types of research, testing, and teaching programs involving animals and note the approximate number of principal investigators and protocols involving the use of animals. As mentioned in the instructions, please complete **Appendix 5** (Animal Usage) or provide the information requested in a similar format as an Appendix.

Animals are used for various diagnostic purposes and assuring the quality and safety of biologicals offered for sale to U.S. livestock, poultry, and pet interests. Diagnostic activities using animals involve agent identification and pathotyping. Biologics activities involve the testing of vaccines, bacterins, toxoids, and other biologicals to assure the safety, efficacy, and purity of these commercial products as authorized under the Virus-Serum-Toxin Act of 1913. Much of this work involves administering the product and observing animal responses to challenge with the respective pathogen. Many of these tests are published in Title 9 of the Code of Federal Regulations. Both areas produce reagents using animals. Training is provided to U.S. laboratory personnel and visiting foreign scientists relating to the NVSL diagnostic and CVB biologics activities. Field personnel (veterinarians and technicians) who support disease eradication efforts attend training courses here each year to learn ante and postmortem sampling techniques. The NVSL and CVB missions are not research, but efforts are made to refine testing procedures. The NVSL and CVB reviewed 46 (17 new, 29 renewals) protocols last year plus 31 amendments. About 15 investigators use or work with animals each year.

G. Note the source(s) of research funding (grants, contracts, etc.) involving the use of animals.

NVSL and CVB receive appropriated funding. All of CVB's funding is for regulatory work. CVB's annual funding is approximately $19M. CVB spent approximately $750,000 in animal purchases and animal care costs last year. Last year, CVB received approximately $1M in emergency funding for Avian Influenza/H1N1. NVSL had approximately $56.8 million in funding last year, including User Fee revenue. NVSL spent over $1.4 M toward Animal Care last year. Recent emergency/special funding for NVSL has included: virulent Newcastle Disease (vND).

The Animal Resources Unit budget is formed from contributions from NVSL, CVB and NADC based on usage of ARU services. The budget is approximately $5M annually. It is reviewed and approved annually by a Board of Directors consisting of four members, two from the NADC, and one each from the NVSL and CVB. Filling of vacant permanent positions in the ARU is subject to Board of Directors approval due to budgetary impacts.

H. List other units (divisions, institutes, areas, departments, colleges, etc.) of your organization that house and/or use animals that are not included in this Description. If any of these are contiguous, physically or operationally (e.g., same IACUC/OB, same animal care staff), with the applicant unit, describe the association. Explain why such units are not part of this program application.

Note: Questions regarding this section should be forwarded to the AAALAC Office.

The NADC Animal Resources Unit staff members support animal work of the NVSL/CVB (accredited Unit #816) as well as that of the NADC. The three organizations (NVSL, CVB and NADC) are co-located in shared facilities on the NCAH campus. The NADC has a separate IACUC and is not currently accredited. The NADC is subject to APHIS Animal Care annual unannounced inspections. The ARU staff members are assigned by type of work (containment level and species) and support animal users from both the NVSL/CVB and the NADC.

Some animal facilities are shared by the NVSL/CVB and NADC. Physical plant support, including utilities and repairs, is provided by the Facilities Engineering Unit (FEU) to all NCAH campus buildings. (b) (6) [redacted] housing NVSL/CVB animal projects. (b) (6) [redacted] NADC project animals. (b) (6) [redacted] NVSL animals. (b) (6) [redacted] house NVSL/CVB animals and (b) (6) [redacted] houses NVSL/CVB animals. (b) (6) [redacted] Vivarium has a suite arrangement as well. In general, the suites are used by either the NVSL/CVB program or the NADC program. Suite 329 is used exclusively by the NADC program.

I. Contract Facilities: If the institution contracts for animal care facilities or services for animals owned by the institution, the contractor and its AAALAC International accreditation status must be identified. If a contractor's animal care and use program is not accredited by AAALAC International, a brief description, following this Program Description outline, of the contractor's relevant programs and facilities must be provided. In addition, the species and approximate average number of animals housed in the contract facilities and the approximate distance between the institution's animal facility and the contract facility must be noted. Incorporation of the contractor program into the site visit schedule will be discussed with institutional representatives. If the institution does not contract for animal care facilities or services, so note.

The institution does not contract for animal care facilities or services.

J. Note other relevant background that will assist reviewers of this report.

It is possible that a 5 day no-contact restriction for poultry, pet birds, and hoof stock will be in place at the time of the site visit. Vaccinations (rabies) are required for some animal activities. It is requested that at least one site visitor have a current rabies titer and be respirator fit tested (N95 and full face respirators) to enter some rooms. It is also requested that at least one visitor have a current test for Tb. Entry and exit procedures will include clothing changes as well as showers.

Section 2. Description

I. Animal Care and Use Program

A. Program Management

1. Program Management Responsibility [*Guide*, pp. 13-15]

a. The Institutional Official [*Guide* pp. 13-14]
Describe how program needs are clearly and regularly communicated to the Institutional Official by the Attending Veterinarian, IACUC/OB, and others associated with the program.

The NVSL and CVB Institutional Animal Care and Use Program has one combined IACUC. Dr. Rippke is the responsible institutional official for the NVSL/CVB Animal Care and Use Program. Members of the combined IACUC are appointed by Dr. Rippke, with concurrence from Dr. Suelee Robbe Austerman, Director of NVSL for animal care and use. Dr. Robbe Austerman appoints the representatives for NVSL members and then forwards that name to the Institutional Official. New IACUC members receive a written notification of appointment from Dr. Rippke.

b. Role of the Attending Veterinarian [*Guide*, p. 14]

i. Describe the institutional arrangement for providing adequate veterinary care. Although individual name(s) and qualifications will be described below, identify by title the veterinarian(s) responsible for the veterinary care program, including:

- a list of responsibilities
- a description of the veterinarian's involvement in monitoring the care and use of laboratory animals
- the percentage of time devoted to supporting the animal care and use program of the institution if full-time; or the frequency and duration of visits if employed part-time or as a consultant.
  Note: If preferred, this information may be provided in a Table or additional Appendix.

Dr. Michelle L. Crocheck is responsible for the health and care of all animals at the NVSL/CVB, Ames, Iowa. Dr. Crocheck fulfils the veterinarian role on both the NVSL/CVB and the NADC IACUC. As the Leader of the ARU, she supervises the clinical veterinarians and farm manager as well as managing the ARU annual budget. Dr. Crocheck and the three clinical veterinarians of the ARU, provide the weekend and emergency veterinary care. Dr. Crocheck is devoted to supporting the animal care and use program 100% of her time.

There are three clinical veterinarians devoted to supporting the animal care and use program 100% of the time (Dr. Cox of the High Containment Section, and Dr. Kaptur in the Small Animal Section and Swine Virology Team, a third veterinarian is being recruited to fill a vacancy) in the ARU. The clinical veterinarians provide veterinary care to the animals in their respective sections and share the responsibility for the animals under the care of the Farm Management Section. All 4 veterinarians of the ARU share responsibility for after hours, weekend and holiday coverage. In addition, the veterinarians assist scientists with animal procedures and necropsies as requested. The clinical veterinarians also supervise teams of animal caretakers in their sections.

ii. List others (e.g., Principal Investigators, veterinarians serving as Principal Investigators, veterinary faculty/staff, technical staff, farm managers) who have a *direct role in the provision of veterinary care* and describe their responsibilities. The Organizational Chart(s) provided in **Appendix 4** must depict the reporting relationship between these individuals and the Attending Veterinarian.
Note: If preferred, this information may be provided in a Table or additional Appendix.

We have 4 technicians in the ARU. One technician is tasked with coordinating blood and tissue requests, animal order requests, serving as surgical nurse, and provides follow up treatments or preventive care as directed by the veterinarians. One technician provides support for the gnotobiotic animal work, diagnostic support, and also assists with preventive care and follow up treatments as directed by the veterinarians. One technician is assigned to the Small Animal Section, providing follow up treatments as directed by the veterinarians, as well as diagnostic support and breeding colony maintenance, and animal care support as needed. One technician is dedicated to supporting the aquatic animal care by performing water quality testing, managing the life support system, and providing direct care for aquatic species.

All animal care staff members are instructed to report unexpected illness or injury to their respective supervisor and the veterinarian as soon as possible. Animal care staff may provide follow up treatment of animals under the direction of the veterinarians.

c. Interinstitutional Collaborations [*Guide*, p. 15]
Describe processes for assigning animal care and use responsibility, animal ownership and IACUC/OB oversight responsibilities at off-site locations for interinstitutional collaborations.

Not applicable

2. Personnel Management

a. Training, Education, and Continuing Educational Opportunities

Describe *how* the IACUC/OB provides *oversight* and *evaluates the effectiveness* of training programs and the assessment of personnel competencies. Describe how training is documented.
Note: Do not include details about the training program, which should be described in the following sections.

All training is documented by the Compliance Officer (CO). The documentation can be the results from an exam on AALAS Learning Library (ALL), a sign-off sheet from an experienced instructor of a procedure, or the agenda/certificate from a conference, seminar or other educational meeting. The courses on the ALL were evaluated by the training subcommittee of the IACUC. The subcommittee also evaluates conferences, webinars, seminars, or other educational training. For procedures, the CO may observe the training and/or the procedure after training.

i. Veterinary and Other Professional Staff [*Guide*, pp. 15-16]

For the Attending Veterinarian and other individuals having a direct role in providing veterinary medical care (veterinarians, other professional staff listed above, private practitioners, etc.), provide: name, credentials (including degrees), and a description of their qualifications, training, and continuing education opportunities.
Note: Please do not provide curriculum vitae of personnel; if preferred, this information may be presented in a Table or additional Appendix.

Dr. Michelle L. Crocheck, Leader, ARU, and Attending Veterinarian, – Dr. Crocheck (b) (6) [redacted] Dr. Crocheck began employment at NVSL as a clinical veterinarian in June 2000. She was also the project manager for the Scrapie Third Eyelid Test Validation Project. Dr. Crocheck served as Attending Veterinarian from April 2003 until April 2004. (b) (6) [redacted], Dr. Crocheck served as Animal Resources Section Head and Attending Veterinarian for the NVSL/CVB Program. With the reorganization in November of 2007, she became Attending Veterinarian for the NCAH and Leader of the newly formed Animal Resources Unit. Dr. Crocheck has attended the National AALAS meeting many times. She has attended IACUC 101 several times, and IACUC 201 once. Dr. Crocheck attended the Iowa Veterinary Medical Association Annual Meeting and James McKean Swine Conference. In addition, she completed "Zoonoses, Protecting People and Their Pets" course online, AALAS Learning Library courses, several AALAS webinars including topics such as euthanasia, social housing of rabbits and pain management. Dr. Crocheck has coordinated and attended recent OLAW, NABR/FBR, FASEB, and PRIM&R

webinars related to regulatory compliance, emergency preparedness, IACUC Scenarios, and FOIA.

Dr. Rebecca J. Cox, Leader, High Containment Section, ARU - Dr. Rebecca Cox (b) (6) [redacted] Dr. Cox joined the ARU in January of 2008 as Leader of the High Containment Section. Dr. Cox has attended biocontainment training at U of GA, Central Veterinary Conference as well as the Iowa Veterinary Medical Association Conferences, and annual James McKean Swine Diseases Conference held at Iowa State University. Dr. Cox has also completed courses on the AALAS Learning Library and the Iowa State University Center for Food Security and Public Health "Zoonoses, Protecting People and Their Pets" course online.

Dr. Jean A. Kaptur, Leader, Small Animal Section, ARU – Dr. Jean Kaptur (b) (6) [redacted]. Dr. Kaptur joined the ARU in October of 2010 as Leader of the Small Animal Section. Since joining the ARU, Dr. Kaptur has attended the IA AALAS Branch meeting, National AALAS, Institute for International Cooperation in Animal Biologics (IICAB) Immunology/Principles of Vaccination block at Iowa State University and the Iowa Veterinary Medical Association Meetings held twice a year. She has also attended the James McKean Swine Conference. Dr. Kaptur has also completed "Zoonoses, Protecting People and Their Pets" course online. In addition, she completed AALAS Learning Library courses, several AALAS webinars including topics such as euthanasia, social housing of rabbits and pain management. Dr. Kaptur completed training to become a Pork Quality Assurance (PQA) Advisor, allowing her to train staff on site in accordance with PQA programs. (b) (6) [redacted]

The third Clinical Veterinarian position is vacant at the time of this submission. Duties have been divided among the three veterinarians listed above.

ii. Animal Care Personnel [*Guide*, p. 16]

1) Indicate the number of animal care personnel.

Animal Caretakers	35
Animal Caretaker Supervisors	5
Animal Caretaker Leaders	2

Student Caretakers (Part-time, temporary)	up to 10

2) Summarize their training, certification level and type, experience, and continuing education opportunities provided.
Note: If preferred, this information may be provided in a Table or additional Appendix.

All staff members have completed training on laboratory animal care and handling of species being used. Required initial training is done on the AALAS Learning Library (ALL) and videos as needed for species not covered on the ALL. Videos are used for training on white-tailed deer and bison. We have custom courses on the ALL for equine and cattle. Several weeks of on-the-job training and close supervision are provided to new animal caretakers. For a few tasks, a process to score proficiency has been initiated. These are rodent and aquaculture room care and observation procedures. The FMS Leader is certified at the LATG level. One Animal Caretaker Supervisor is certified at the LAT level. The Compliance Officer is certified at the ALAT level and as a CPIA. Many animal caretakers also have college degrees in related disciplines.

The IACUC training program requires completion of 2 courses of IACUC-approved training every year. Continuing education is provided by the ALL, in-house seminars, webinars, and attendance at AALAS branch, district, and national meetings.

iii. The Research Team [*Guide*, pp. 16-17; 115-116; 122; 124]

1) Describe the *general mechanisms* by which the institution or IACUC/OB ensures that research personnel have the necessary knowledge and expertise in the animal procedures proposed and the species used.

Before the Animal Care and Use Protocol (ACUP) is approved, all listed personnel must complete the species specific training in AALAS Learning Library. For the procedures, many are methods the technical staff is experienced in doing. Any procedures listed on the ACUP not known to the personnel, training will be provided by an experienced instructor.

a) Briefly describe the content of any required training.

All animal users (investigators, technicians, animal care staff, etc.) are given initial training to complete in AALAS Learning Library. The courses are: Animal Welfare Act Regulations, AVMA Guidelines on Euthanasia, Guide for the Care and Use of Laboratory Animals, and

Working with the IACUC: non-VA version. The animal users are also required to complete a course for each species they use.

b) Describe the timing of training requirements relative to the commencement of work.

Training must be completed by staff listed on the Animal Care and Use Protocol (ACUP) prior to approval by the IACUC. Animal Resources Unit (ARU) staff must complete their required training prior to be allowed to do work with the live animals at the NCAH. Visitors must either complete a briefing and training on species they will work with or provide training documentation from the IACUC at their home institution.

c) Describe continuing education opportunities offered.

Each year animal users are required to do a minimum of two animal related courses. These may be courses in the AALAS Learning Library or seminars, webinars, scientific meetings, or conferences approved by the IACUC Training Subcommittee.

2) Describe the process(es) to ensure surgical and related procedures are performed by qualified and trained personnel, including:

- who determines that personnel are qualified and trained for surgical procedures
- the roles that the Attending Veterinarian and IACUC/OB have in this determination [*Guide*, pp. 115-116]

Surgery is performed only by veterinarians, primarily those from the ARU. There are several planned surgery procedures that are outlined in Standard Operating Procedures (SOP). Those surgeries are: C-sections, rumen cannulation, and splenectomies. The SOP outlines the specifics of pre- and post-operative care, as well as anesthetic and analgesics to be used. Rat laparotomies have also been performed. This procedure also has an SOP that outlines the specifics of pre- and post-operative care, as well as anesthetic and analgesics to be used. Emergency surgeries would be performed by the ARU veterinarians. For the splenectomies, the primary surgeon went to the Iowa State University College of Veterinary Medicine to observe and learn the procedure. From this experience, she was able to implement some updates to our previous surgical procedure. Prior to performing this procedure on horses or cattle, the surgeon did the procedure on sheep here at the NCAH under a training ACUP that was reviewed and approved by the IACUC (including the Attending Veterinarian). This began with terminal surgery and then a survival surgery. Rumen cannulations have only been performed on cattle for the NADC program. For this procedure, the surgeon received hands on training

from a veterinarian on site. C-sections are being performed by the ARU veterinarians. One of the veterinarians has a PhD in Reproductive Physiology and another had experience with C-sections at a previous position with a contract research organization. Audits have been performed on the surgery procedures.

3) Describe the training and experience required to perform anesthesia. [*Guide*, p. 122]

For the survival surgeries above, we have a licensed veterinary technician on staff that assists with surgery as well as a technician that has worked in the surgery area for over 10 years. Many of the animals sedated are for terminal exsanguination. The ARU veterinarians perform the anesthesia for carotid cannulation procedures of large animals (cattle and horses).

Personnel work with experienced staff on anesthesia of animals prior to having that responsibility. In the case of a new procedure/anesthesia, the ARU veterinarians would have responsibility and train other staff that may need to be responsible for it in the future.

4) Describe how the proficiency of personnel conducting euthanasia is ensured (especially physical methods of euthanasia). [*Guide*, p. 124]

After completing the ALL course on Euthanasia, staff would receive hands on training for the method(s) of euthanasia appropriate for the species they will use.

b. Occupational Health and Safety of Personnel [*Guide*, pp. 17-23]

i. Institutional Oversight [*Guide*, pp. 17-19]

1) List the institutional entities (units, departments, personnel, *etc.*) that are involved in the planning, oversight, and operation of the institutional occupational health and safety program related to animal care and use (e.g., office(s) of environmental health, institutional health services or clinics (*including contracted health services*), industrial hygienists, Institutional Biosafety Committee(s) and/or Officer(s), Radiation Safety Committee(s) and/or Officer(s).

- Include a brief description of their responsibilities and qualifications.
- If contracted services are used, also include their location (e.g.,remote offices to which personnel must report).

The National Centers for Animal Health (NCAH) has a Safety and Security Unit (SSU) comprised of Occupational Health, Biosafety, Environmental

Protection, Industrial Hygiene and Safety, and Security. The SSU has a variety of location policies and procedures.

SSU Leader

The Safety and Security Unit of the Common Services Division is responsible for providing oversight and technical consultation on all environmental, health, safety (and biosafety), and security issues with the goal of providing and ensuring a safe and healthful environment for employees and visitors of the NCAH. Areas managed include: occupational health program, biological safety program, safety and industrial hygiene programs, physical security programs, environmental protection programs and the select agent program. The Common Services Division provides services to all entities of the NCAH plus the other support units.

Biosafety Officer

Develops policy and operational standards, sets goals and objectives, and assesses overall program effectiveness for the Biosafety Section. Performs risk assessments and suggests risk mitigation methodologies and procedures for all elements of biosafety. Provides training on biosafety and/or select agent issues and solutions to Center personnel, and expert veterinary medical and/or microbiological counsel and advice concerning the execution of policies and functions to ensure compliance with statutory and regulatory requirements governing both program activities and safety/biosafety/environmental programs to the Board of Directors and NCAH personnel.

Industrial Hygienist/Safety Officer

Performs comprehensive industrial hygiene and safety evaluations and compliance surveys of work operations. Ensures the NCAH complies with existing and new safety regulations. Identifies and directs the implementation of appropriate corrective actions when deficiencies or unsafe conditions are found in work areas. Serves as the NCAH Chemical Hygiene Officer, NCAH Respiratory Protection Manager, and the Location Radiation Safety Protection Officer. Responsible for the development of guidance materials and written procedures of NCAH safety requirements for a wide variety of operations/activities. Assesses work environments for potentially harmful employee exposures to chemical and physical hazards and recommends protective measures to mitigate these hazards. Manages the hazardous waste, used oil, and universal waste programs for the NCAH.

NVSL/CVB IACUC has established an Animal Use Biosafety Committee (AUBC) to review proposed activities involving the use of potential human pathogens. The committee is composed of the Attending Veterinarian, Compliance Officer, and the Biosafety Officer from Safety and Security Unit. If potential human pathogens are to be used, the AUBC conducts a review of the protocol prior to the IACUC review.

NVSL/CVB has an Institutional Biosafety Committee that is fully compliant with the requirements outlined in the NIH Guidelines for Research Involving Recombinant or Synthetic Nucleic Acid Molecules.

The NCAH has a Safety and Health Committee that serves in an advisory capacity to the NCAH Board of Directors. Each work group contributes a safety representative that meets quarterly to discuss safety issues.

The Marketing and Regulatory Programs Business Services unit of USDA's Marketing and Regulatory Programs (MRP) provides resource management and administrative services to support the objectives of the Animal and Plant Health Inspection Service (APHIS). MRPBS has several divisions which address a variety of employee and customer needs. The Emergency Management Safety & Security Division provides safety and health services through the Safety, Health and Environmental Protection Branch.

A contracted Occupational Health Physician is utilized for physical exams and consultation on specific cases, as well as development of protocols for exposure response.

Contracted staff are also utilized to collect surveillance samples from employees.

2) Describe methods to identify work-related hazards and the processes used to evaluate the significance of those hazards in the context of duties and tasks. Describe both common approaches and differences, if applicable, for categories of personnel such as, but not limited to, researchers, veterinarians, husbandry staff, cage washing staff, students, housekeeping, physical plant staff, security personnel, IACUC/OB members (including nonaffiliated members), contractors, visitors, etc. [*Guide*, pp. 18-19; see also Chapters 2 and 3 in Occupational Health and Safety in the Care and Use of Research Animals, NRC 1997.].

The NVSL-CVB Animal Care and Use Committee members conduct a review of all animal care and use protocols. This includes a review of the potential hazards such as biologic agents/infectious agents or toxins; chemical agents (e.g., carcinogens and mutagens), and physical hazards. The SSU has standing representation on the Animal Care and Use Committee and is always available for consultation.

All ARU staff receives annual Hazard Communication training where employees receive the skills and knowledge to read and interpret chemical container labels and safety data sheets. ARU staff also receive annual hearing conservation training and are offered annual audiograms. Where required,

ARU staff receive respiratory protection training and fit testing. The NCAH Occupational Health (OH) Nurse provides advice on safe needle devices. The OH Nurse also has established medical surveillance procedures in place to monitor for potential employee illnesses. Many Animal Resources Staff have also taken the AALAS Learning Library Course "Syringes and Needles".

As part of the Occupational Health Plan, supervisors are required to submit Hazard Inventories that are reviewed by the OH Nurse (with consultation from other SSU resources as necessary).

3) Describe methods and frequency of reassessing work-related hazards.

The NVSL-CVB Animal Care and Use Committee members conduct a review of all animal care and use protocols both when they are new, and annual review, and at renewal. The SSU has standing representation on the Animal Care and Use Committee and is always available for consultation.

Ongoing medical surveillance provided by the OH Nurse, provide (at minimum) an annual re-assessment of hazards and employee concerns, and such consultations are available to employees at any time. Many NCAH personnel also avail themselves of voluntary wellness monitoring (basic blood work and urinalysis) on an annual basis.

As part of the Occupational Health Plan, supervisors are further required to submit new Hazard Inventories in response to changing hazards or working conditions, including any new biohazards or physical hazards.

4) Describe institutional programs or methods used to track and evaluate safety-related workplace incidents, including injuries, exposures, accidents, etc. Include the frequency of such assessments. [*Guide*, pp. 18-19]

Human Resources maintains the OSHA 300 logs and Workers Compensation records for the NCAH with assistance, as needed, from the Occupational Health Nurse and the Industrial Hygienist.

The OH Nurse maintains a record of all injuries that come through OH Clinic. The supervisor is responsible for evaluating all workplace injuries and implementing corrective actions to mitigate the possibility of the same incident occurring to other employees. SSU is available for consultation and follow up at the request of the supervisor. The NCAH has a reporting SOP and form that captures incident and investigation details, and tracks follow-up and resolution actions.

The OH Nurse reports accident and illness rates to the NCAH Safety and Health Committee allowing committee members the opportunity to ask questions and provide feedback.

ii. Standard Working Conditions and Baseline Precautions

The following section pertains to the Occupational Health and Safety Program for all personnel associated with the animal care and use program. Specific information regarding the use of hazardous agents is included in ***subsection iii*** below.

1) Medical Evaluation and Preventive Medicine for Personnel [*Guide*, pp. 22-23] *Note:* Include blank forms used for individual health assessment as **Appendix 6.**

a) Describe who (e.g., personnel assigned to job/task categories in I.A.2.b.i.2) above) receives personal medical evaluation as a component of individual risk assessment. Describe who are ***not*** included and/or exempted from personal medical evaluation. *Note:* Do not include the names of personnel.

Supervisors complete and submit a Hazard Inventory form to the Occupational Health Nurse at the time of employment. Employees complete a Medical History form at the time of employment. Employees complete an Occupational Exposure Questionnaire at the time of annual physical exams.

Ongoing medical surveillance provided by the OH Nurse provide (at minimum) an annual re-assessment of hazards and employee concerns, and such consultations are available to employees at any time. Many NCAH personnel also avail themselves of voluntary wellness monitoring (basic blood work and urinalysis) on an annual basis.

As part of the Occupational Health Plan, supervisors are further required to submit new Hazard Inventories in response to changing hazards or working conditions, including any new biohazards or physical hazards.
Medical surveillance is conducted on those that are involved with work on the pertinent pathogens. For example, if someone is not working with Leptospirosis, they are not tested for it.

b) Describe provisions for allowing an individual (following completion of individual health and job related risk assessments) to decline participation in all or part(s) of subsequently available medical and preventive medicine components of the institutional program, e.g., vaccinations, physical examinations, respiratory protection, as

applicable. Provide an estimate (percentage) of personnel associated with the animal care and use program that have declined participation in the medical evaluation program.
Note: Do not include names of the personnel

The new employee packet includes a form for declination of participation in the serum banking (pre-employment sampling) and vaccination declination forms are present in applicable SOPs. Additionally, participation in all medical surveillance programs, wellness programs, or other medical programs available at the NCAH is voluntary (depending on the employment requirements for any given position). Refusals of medical contact or procedures such as examinations or vaccinations that are required for specific types of work are referred to the supervisor and addressed through the Human Resources Department. Required medical surveillance procedures are listed in Appendix 2 of the OHP.
No personnel have refused occupational health requirements, and about 50% of the whole campus takes advantage of voluntary benefits such as wellness bloodwork. Animal care staff typically have a higher rate of participation in such voluntary benefits.

c) Describe provisions for assuring confidentiality of medical information.

As described in the Occupational Health Plan, medical records are maintained by the OH Nurse in a confidential manner for the duration of employment plus a minimum of an additional thirty (30) years, consistent with the requirements of applicable regulations:

- Privacy Act of 1974 (5 USC 552a)
- 5 CFR 293 (Employee Medical File System)
- 5 CFR 297 (Privacy Provisions for Personnel Records)
- OPM/GOVT-10 (Office of Personnel Management Employee Medical Files Systems of Records Notice)
- 29 CFR 1910.1020 (Access to Employee Exposure and Medical Records)

d) Describe safety considerations for individuals with incidental exposure to animal care and use (e.g., contractors, personnel working in open laboratories).

Animals are used in the animal facilities and not in the scientific laboratories, so there would not be exposure to personnel working in open laboratories. Our Non-affiliated IACUC member provides documentation that he is medically able to utilize respiratory protection. When participating in inspections, he is able to view animals in an infectious disease study via observation windows (such as rabies work in mice).

We have facilities and engineering staff on site that are included the medical surveillance program. In the case of planned maintenance involving outside contractors, this is typically done when the area is not in use.

e) Describe general features of the medical evaluation and preventive medicine programs, within the context of work duties, including:

- pre-employment/pre-assignment health evaluation,
- medical evaluations (including periodicity),
- diagnostic tests (e.g., for tuberculosis),
- precautions for working with potentially hazardous species (e.g., nonhuman primates, sheep, venomous species)
- immunization programs, and
- procedures for communicating health related issues.

Pre-employment physicals are required for animal care staff. Prior to respirator fit testing (and on annual recertification) a medical questionnaire is completed. The OH Nurse reviews those questionnaires and discussed any potential issues with the employee or may refer them to the contract physician if needed to ensure they are medically fit to use a respirator.

Supervisors complete and submit a Hazard Inventory form to the Occupational Health Nurse at the time of employment. Employees complete a Medical History form at the time of employment. Employees complete an Occupational Exposure Questionnaire at the time of annual physical exams.

Ongoing medical surveillance provided by the OH Nurse provide (at minimum) an annual re-assessment of hazards and employee concerns, and such consultations are available to employees at any time. Many NCAH personnel also avail themselves of voluntary wellness monitoring (basic blood work and urinalysis) on an annual basis.
As part of the Occupational Health Plan, supervisors are further required to submit new Hazard Inventories in response to changing hazards or working conditions, including any new biohazards or physical hazards.

f) Describe any other entities that provide medical services (e.g., emergency care, after-hours care, special medical evaluation, contracted services). Include a brief description of their credentials and/or qualifications, and how these entities remain knowledgeable about animal- or institution-related hazards and risks.

A contracted Occupational Health Physician from the local clinic is utilized for physical exams and consultation on specific cases, as well as development of protocols for exposure response.

Contracted staff are also utilized to collect surveillance samples from employees.

There is also ongoing dialogue with the staff at the local hospital (Mary Greely Medical Center). There are periodic drills conducted involving our on-site Rapid Response Team (NCAH Employees) and the Mary Greely Paramedic and Emergency Room staff.

2) Personnel Training Regarding Occupational Health and Safety
[*Guide*, p. 20]

Describe general educational program(s) to inform personnel about:

- allergies,
- zoonoses,
- personal hygiene,
- physical injuries in animal facilities (e.g., noisy areas, large quantities of chemicals such as disinfectants, ergonomics) or species used (e.g., nonhuman primates, agricultural animals),
- other considerations regarding occupational health and safety.

Include in the description a summary of the topics covered, including:

- Entities responsible for providing the training
- Frequency of training or refresher training

Note: Do not include special or agent-specific training for personnel exposed to experiment-related hazardous agents; this will be provided in **Section iii.3** below.

Animal Resource Unit employees receive:
Provided by SSU:
Hazard Communication Training (SDS access, interpretation, hazard labeling)
Formaldehyde training where applicable
Respiratory Protection Training (with annual fit testing)
Personal Protective Equipment Training
Where personnel generate a hazardous waste employees also receive hazardous waste training.
Provided via AgLearn electronic system:
Hearing Conservation Training (with annual audiogram)
Provided by ISU Ag Extension staff annually:
Manure applicator annual training for those that land apply animal waste (for Iowa Department of Natural Resources Certification)
Provided by ARU Management:
Area specific safety training for biocontainment facilities

prior to unescorted entry (entry, exit, emergency procedures)
Operation of tractors where applicable

Provided by contract specialists:
Operation of forklifts where applicable
Operation of UTV where applicable

Provided via AALAS Learning Library species courses and project scientists:
Species specific training, including zoonotic diseases, for animal species used at the NCAH

Where a respirator is not required for pathogens, personnel are still required to wear an N-95 filtering facepiece in the Vivarium to minimize exposure to allergens.

3) Personal Hygiene [*Guide*, p. 20; *Ag Guide* pp. 4-5]

a) List routine personal protective equipment and work clothing provided and/or required for animal care personnel, research and technical staff, farm employees, etc.

Personal protective equipment (PPE) selection is based on a risk assessment. The Animal Care and Use protocol normally serves as the risk assessment (peer reviewed, signed, and dated). Employees working in animal facilities wear dedicated clothing, coveralls scrubs/smocks, or work shirts and pants are provided. Outer clothing such as coats, insulated coveralls and boots are also provided for staff that work in outdoor environments. In some instances either re-usable or disposable laboratory coats are used. Re-usable lab coats and dedicated clothing are laundered by an external contractor. Clothing is properly disinfected prior to leaving the NCAH campus. In high risk areas, underclothing is provided.

Other PPE used on NCAH campus includes: disposable gloves, respirators (full-face or N95) or powered air purifying respirators, hearing protection, steel-toed boots, hair bonnets, shoe covers, safety glasses, and cut resistant gloves.

b) Describe arrangements for laundering work clothing.

Once clothing is decontaminated, it is sent off campus for laundering by a contractor. Decontamination consists of autoclaving or chemical decontamination.

c) Describe provisions and expected practices for washing hands, showering, and changing clothes, including instances where work clothes may be worn outside the animal facility.

The level of hygiene is dependent on the testing being performed. Hand washing and boot/glove disinfection are performed at each room. Some testing requires that clothing is changed before entry and exit, while other testing requires showering out of the room or building. The level of hygiene is posted at the entry point of each testing room. The Animal Biosafety Level 3 facilities also require showering out of the building or suite. In addition to those in the containment facilities, shower and change facilities are available for animal care personnel in Building 24, or Building 402. Government supplied clothing is not to be worn outside of the work locations. Outer garments worn in the animal rooms are not to be worn outside the animal facility unless covered. Soiled attire is properly decontaminated and laundered.

d) Describe policies regarding eating, drinking, and smoking in animal facilities.

Eating, drinking, smoking, chewing tobacco, handling contact lenses, applying cosmetics, and storing food for human consumption are not permitted in animal areas. Food must be stored in cabinets or refrigerators designated for this purpose. The designated areas for eating and drinking in NCAH animal facilities are Room 513 of the Building 20 Vivarium and room 1194 of Building 9. The Building 24 Break Room, Building 402 Lunchroom, and the NCAH Cafeteria are also available for these activities.

4) Standard Personnel Protection [*Guide*, pp. 21-22]

a) Describe facility design features, equipment and procedures employed to reduce potential for physical injury inherent to animal facilities (e.g., noisy areas, large quantities of chemicals such as disinfectants, ergonomics) or species used (e.g., nonhuman primates, agricultural animals).

Facilities in general, are designed for safe handling of the various animal species with head gates, chutes, etc. that are species appropriate. Personnel wear long sleeve clothing when handling species such as rabbits and poultry to minimize scratching injuries. Handling equipment or gloves are used as appropriate for small animals. Personnel are enrolled in a Hearing Conservation Program for areas where noise can't be mitigated. Noise monitoring has been conducted in areas such as the cage wash area. Where

large quantities of chemicals are stored, spill containment is used and transfer of the materials is as ergonomically friendly as possible.

b) Describe likely sources of allergens and facility design features, equipment, and procedures employed to reduce the potential for developing Laboratory Animal Allergies (LAA).

Handling animals or their bedding as well as changing room pre-filters are potential sources of allergens in the Vivarium (b) (6) [redacted] Biosafety cabinets and bedding changing stations are used when possible to mitigate this risk, however, some cages are too large for that equipment. In that facility, where a respirator is not required for pathogens, personnel are still required to wear an N-95 filtering facepiece in the Vivarium to minimize exposure to allergens. Respiratory protection must be worn if handling the animals and/or bedding, as well as while changing room pre-filters.

c) Describe likely sources of zoonoses and facility design features, equipment, and procedures employed to reduce potential exposure to zoonoses.

There are two potential avenues for zoonotic disease exposure – 1) incidental from animals that may have it or break with it soon after arrival and 2) animals studies that involve the use of zoonotic diseases.

Vaccination (for rabies), medical surveillance, and PPE as approved by the IACUC in the ACUP, are all used to minimize potential exposure.

Species specific training, including zoonotic diseases, for animal species used at the NCAH is provided in the ALL. In addition, scientists provide agent specific training when they will use zoonotic diseases in their animal studies.

d) Describe the procedures for the maintenance of protective equipment and how its function is periodically assessed.

Filtering face pieces are one time use only. Respirator filters are also one-time use as well. Employees required to use respiratory protection receive annual training to include information on the proper care and use of their respirator (i.e., proper cleaning and disinfection, use, and storage of reusable respirators). Employee skills and knowledge on donning and doffing respiratory protection is reviewed annually both during training and during scheduled fit tests.

Employees are trained in the proper selection of personal protective equipment (e.g., gloves, hearing protection) and how to properly care for and maintain this equipment.

e) Respiratory Protection

i) Describe situations where respiratory protective equipment is available or required, such as cage washing facilities, feedmills, etc.

Respiratory equipment is required in many animal areas due to animal allergens (Vivarium) as well as for protection of personnel caring for animals with zoonotic disease. Entry door cards at the animal facilities indicate the need for and type of, respiratory protection to be worn for entry.

ii) Describe programs of medical clearance, fit-testing, and training in the proper use and maintenance of respirators.

Employees are trained and fit tested in respiratory protection annually by Industrial Hygiene and Safety. Employees are medically qualified on an annual basis to use a respirator. Fit testing is done quantitatively with the use of a TSI PortaCount. Employees are trained to maintain re-usable respirators in a clean and sanitary condition. In many instances employees are required to place their respirator in a clean cabinet after cleaning and sanitizing their respirator. Filters can be re-used or used for an extended period of time consistent with CDC and OSHA guidance on the matter. N95 filtering face pieces can also be re-used or used for an extended period of time consistent with CDC and OSHA guidance on the matter.

iii) Describe how such respiratory protective equipment is selected and its function periodically assessed.

The selection of respiratory protection is based on a risk assessment. The Animal Care and Use Protocol (ACUP) normally serves as the risk assessment (peer reviewed, signed, and dated).

f) Heavy Equipment and Motorized Vehicles

i) Provide a general list of the types of cage processing equipment used, such as rack/cage washers, tunnel washers, robotics, and bulk autoclaves. Describe training programs, informational signage, and other program policies designed to ensure personnel safety when working with such equipment.
Note: Details of specific equipment installed in animal facility(ies)

are to be provided in **Appendix 15** (Facilities and Equipment for Sanitizing Materials).

Interactive training on operation of the large autoclaves in the Building 20 Vivarium emphasizes safety. Staff members also must read the SOP and Work Instruction that cover this equipment.

The following is posted on the autoclaves:
"Remember: In cases of emergencies call x2222 or 337-7222 (if using cell phone) Never put a hand or any part of the body inside the chamber while the door is closing
Use the appropriate tool to pull carts out of the autoclave to avoid entering the unit.
There is a bar running the length of the door that can be pushed in case of an emergency.
(This will stop the door from closing.)
There is an emergency stop button (Big, red button) on the control panel to stop the autoclave.
Ensure the autoclave is not occupied prior to closing the door and starting a cycle.
Do NOT stand too close since there is a pulse of steam that escapes then opening the autoclave.
Wear the appropriate PPE (FACE shield, rubber apron, heat resistant gloves, rubber boots, etc.)"

Interactive training on operation of the cage washer in Building 20 Vivarium emphasizes safety and the following is posted on the cage wash:

PPE
Never walk through the rack wash.
Ensure the washer is not occupied before closing the door and starting a cycle.
Allow steam to escape before retrieving any items and use heat resistant gloves.
Use proper lifting techniques.
The rack washer is equipped with an emergency pull cord inside the will stop the system, as well as an emergency push on both of the two doors.
In addition only one of the two doors can be open at any given time.
In cases of emergencies, call x2222 or 337-7222 (if using a cell phone)

ii) List other heavy equipment such as scrapers, tractors, and farm machinery (manufacturer name, model numbers, etc. are not necessary). Describe training programs, informational signage, and other program policies designed to ensure personnel safety when

working with such equipment.
Note: If preferred, this information may be provided in a Table or additional Appendix.

Staff are required to complete a safety training followed by a skills assessment prior to unsupervised operation of tractors, skid loaders, Gators, or forklifts. In addition, they are provided supervised hands-on training before and after safety training until the employee and their supervisor are comfortable with operating on their own. Yearly safety refresher training is required for tractor and skid loader operators. Training for Forklift and gators is required every three years.

iii) If motorized vehicles are used for animal transport, describe how the driver is protected from exposure to hazards such as allergens or zoonoses and decontamination methods employed. Also describe instances where vehicles may be shared between animal and passenger transport.

Once animals are challenged with pathogens, they are not typically moved from the facility. Incoming small animals would remain in their shipping crates for transport across campus if necessary.

g) Describe safety procedures for using medical gases and volatile anesthetics, including how waste anesthetic gases are scavenged.

Induction boxes are used when small animals are involved. Vaporizers on the NCAH campus are serviced at prescribed frequencies by a contractor. Activated charcoal filters are used to capture waste anesthetic gases. In the Vivarium waste anesthetic gases are scavenged into the ventilation exhaust after filtered through activated charcoal. In the Surgery Suite (3GH), the hose directly attaches to back of anesthesia machines and is vented out through the ceiling (active scavenger system). There is also a portable unit that uses an F/Air Scavenger System that is a passive scavenger system using replaceable activated charcoal filter canisters to absorb waste gases (halogenated only...it does not absorb nitrous). The canisters are replaced after 12 hours of use.

iii. Animal Experimentation Involving Hazards [*Guide*, pp. 20-21]

1) List, according to each of the categories noted below, hazardous or potentially hazardous agents currently approved to be used in animals that are or will be maintained for more than a few hours following exposure. If the hazardous agent cannot be listed by name for security/proprietary reasons, identify it by the general category of agent and level of hazard.

Note: If preferred, this information may be provided in a Table or additional Appendix.

a) Biological agents, *noting hazard level* (CDC Biohazard Level, Directive 93/88 EEC, CDC or USDA/DHHS Select Agent, etc.). Examples may include bacteria, viruses, viral vectors, parasites, human-origin tissues, etc.

The NVSL and CVB test veterinary diagnostic materials and all vaccines produced for sale in the United States. Some of these are test agents or challenge agents that are potentially hazardous to personnel. Numerous infectious agents, including unknown etiologic agents, are used at the NVSL/CVB for biologics and diagnostic testing programs. A complete list is nearly impossible to maintain because the work changes with changing world and national agricultural needs. Therefore, the list below contains the more common live agents used in NVSL/CVB containment facilities.

BSL-3 agents:

- Mycobacterium bovis and avium
- Street and fixed rabies viruses
- Eastern and western equine encephalomyelitides viruses
- various arboviruses
- Exotic Newcastle Disease Virus
- highly pathogenic avian influenza virus
- vaccinia virus
- pseudorabies virus
- hog cholera virus
- vesicular stomatitis virus
- Brucella spp.
- exotic bluetongue virus
- West Nile virus
- Cowdria ruminatium

BSL-2 infectious agents:

- Anaplasma marginale
- Babesia equi, B. caballi, B. bovis, & B. bigemina
- Clostridium botulinum toxin
- Clostridium spp.
- Erysipelothrix rhusiopathiae
- Escherichia coli
- Actinobacillus pleuropneumoniae
- Histophilus somnus
- Leptospira species
- Avian Mycoplasma spp.

Pasteurella multocida & Mannheimia hemolytica
Salmonella cholerasuis
Contagious ecthyma virus
Swine pox virus
Bovine rhinotracheitis virus
Bovine respiratory syncytial virus
Bovine viral diarrhea virus
Domestic bluetongue virus
Ovine progressive pneumonia virus
Mink viral enteritis virus
Domestic Newcastle disease virus
Infectious bursal disease virus
Infectious bronchitis virus
Canine distemper virus
Canine parvovirus
Infectious hepatitis virus
Feline leukemia virus
Feline panleukopenia virus
Infectious reovirus
Infectious laryngotracheitis virus
Avian encephalomyelitis virus
Hemorrhagic enteritis virus
Avian adenovirus
Avian poxvirus

Aquatic Pathogens that may be used (as stated previously, the different pathogens are driven by the diagnostic and biologic mission needs): Aeromonas salmonicida, Vibrio anguillarium, Vibrio ordalii, Edwardsiella ictaluri, Flavobacterium columnaris, Yersinia ruckeri, and Cyprinid Herpesvirus Type 3

OIE listed pathogens and viruses including but not limited to: Viral Hemorrhagic Septicemia Virus, Spring Viremia of Carp, Infectious Salmon anemia Virus, Infectious Hematopoietic necrosis virus, IPNV, Gyrodactylus salaries, ranaviruses, iridoviruses, herpesviruses, Aphanomyces Invadans, and unclassified nidovirales-like virus associated with baitfish deaths in upper Midwest.

Select Agents are handled in facilities as required on the Select Agent registrations which are approved by the USDA or CDC. The NVSL and CVB are currently registered with HHS as part of 42 CFR part 73 (the select agent regulations), number C20161012-1840 with an expiration date of 10/12/2019. The Responsible Official (RO) is Dr. Karl Hochstein of the National Veterinary Services Laboratories. Alternate Responsible Officials, are Dr. Elizabeth Lautner (D&B), Dr. Byron Rippke (CVB), Dr. Steve Karli (CVB),

Dr. Suelee Robbe Austerman (NVSL), Dr. Aaron Monroy (CVB), Lisa Henry (CVB) and Dr. David White (CVB). Select Agents currently registered for use in animals include:
Botulinum neurotoxins
Eastern Equine encephalitis virus
Brucella abortus
Brucella melitensis
Brucella suis
Venezuelan equine encephalitis
African horse sickness virus
Avian influenza virus
Classical swine fever virus
Newcastle disease virus
African swine fever virus

b) Chemical agents, *noting general category* of hazard (toxicant, toxin, irritant, carcinogen, etc.). Examples may include streptozotocin, BrdU, anti-neoplastic drugs, formalin, etc.

none

c) Physical agents (radiation, UV light, magnetic fields, lasers, noise, etc.).

none

2) Experiment-Related Hazard Use [*Guide*, pp. 18-19; See also Chapters 2 and 3 in *Occupational Health and Safety in the Care and Use of Research Animals*, NRC 1997].
Note: Written policies and standard operating procedures (SOPs) governing experimentation with hazardous biological, chemical, and physical agents should be available during the site visit.

a) Describe the process used to identify and evaluate experimental hazards. Describe or identify the institutional entity(ies) responsible for ensuring appropriate safety review prior to study initiation.

The Institutional Biosafety Committee approves recombinant DNA work prior to use. Radioactive isotopes are not used in animals. The IACUC has established an Animal Use Biosafety Committee (AUBC) to review proposed activities involving the use of potential human pathogens. The committee is composed of the Attending Veterinarian, Compliance Officer, and the Biosafety Officer from Safety and Security Unit. If potential human pathogens are to be used, the IACUC approves the protocol subject to the investigator following the recommendation of the AUBC. Biosafety procedures, including entry and exit instructions, as well as required PPE; are

posted on animal room doors with white, green, yellow, orange or red door cards indicating the level of hazard.

b) Describe how risks of these hazards are assessed and how procedures are developed to manage the risks. Identify the institutional entity(ies) responsible for reviewing and implementing appropriate safety or containment procedures.

The Institutional Biosafety Committee approves recombinant DNA work prior to use. Radioactive isotopes are not used in animals. The IACUC has established an Animal Use Biosafety Committee (AUBC) to review proposed activities involving the use of potential human pathogens. The committee is composed of the Attending Veterinarian, Compliance Officer, and the Biosafety Officer from Safety and Security Unit. If potential human pathogens are to be used, the AUBC reviews the protocol prior to IACUC review.

c) Describe the handling, storage, method and frequency of disposal, and final disposal location for hazardous wastes, including infectious, toxic, radioactive carcasses, bedding, cages, medical sharps, and glass.

Infectious waste such as carcasses or bedding is packaged, the packages surface decontaminated and transported to be incinerated on campus. In some cases, materials may be packaged and autoclaved from the area. SSU handles disposal of medical waste (i.e. sharps continers) by contract through Stericycle. We do not use radioactive materials in animals.

d) Describe aspects of the medical evaluation and preventive health program specifically for personnel potentially exposed to hazardous agents.

Personnel working with infectious diseases will be involved in the medical surveillance program. This involves serologic testing at regular intervals and Tb testing (as appropriate).

3) Hazardous Agent Training for Personnel [*Guide*, p. 20]
Describe special qualifications and training of staff involved with the use of hazardous agents in animals.

Agent specific training is provided by the scientific staff for projects involving select agent pathogens. In addition, pathogen training is being provided by scientific staff on some pathogens being used in animals, especially if the pathogen has not been used previously.

Transmissible Spongiform Encephalopathy (TSE) annual training is completed by all staff working with those pathogens.

4) Facilities, Equipment and Monitoring [*Guide*, pp. 19-20]

a) Describe locations, rooms, or facilities used to house animals exposed to hazardous agents. Identify each facility according to the hazard(s) and containment levels (if appropriate*)*.
Note: If preferred, information may be provided in a Table or additional Appendix.

(b) (6) [redacted] facility capable of handling large animals. The (b) (6) has rooms that can house caged or small animals at (b) (6) [redacted] large animal facility.

b) Describe circumstances and conditions where animals are housed in rooms outside of dedicated containment facilities (i.e., in standard animal holding rooms). Include practices and procedures used to ensure hazard containment.

Not applicable

c) Describe special equipment related to hazard containment; include methods, frequency, and entity(ies) responsible for assessing proper function of such equipment.

Biosafety cabinets and ventilated caging systems are used in containing infectious diseases in animals. SSU provides support in ensuring equipment is tested regularly for proper function.

d) Describe the husbandry practices in place to ensure personnel safety, including any additional personnel protective equipment used when work assignment involves hazardous agents.

Personnel wear gloves, respirators, eye protection, secondary layers over dedicated clothing, and in some cases, head covering. In BSL3 areas, personnel shower out at the room, suite, or facility level.

e) Incidental Animal Contact and Patient Areas

i) List and describe facilities that may be used for both animal- and human-based research or patient areas, including the policies and procedures for human patient protection, facility decontamination, animal transport through common corridors or elevators, and other

personnel protection procedures.

Not applicable

ii) Describe any *other* circumstances in which animals or caging equipment are transported in common use corridors or elevators (e.g., have the potential to come in contact with individuals not associated with the animal care and use program), and measures taken to mitigate risks associated with such use.

Animals are received in shipping crates on the dock in Building 24 and the animal caretaker supervisor or designee is notified upon arrival. The animals are transported by an animal caretaker directly to the clean airlock of the (b) (6) [redacted] When the animals travel from the dock to the (b) (6) [redacted] they remain in their filtered shipping crate.

An animal caretaker remains with the animals while in transport. From the clean airlock, the animals are transported in their original shipping crates into the isolation corridor where 5 random animal weights are collected and recorded on the Animal Arrival Sheet. The animals are then transported in their original shipping crates into their designated animal room. Animals are transferred from shipping crates to animal housing at the animal room.

B. Program Oversight

1. The Role of the IACUC/OB [*Guide*, pp. 24-40]

a. IACUC/OB Composition and Function [*Guide*, pp. 17; 24-25]

Please provide a Committee roster, indicating names, degrees, membership role, and affiliation (e.g., Department/Division) as **Appendix 7**.

i. Describe Committee membership appointment procedures.

The committee members are appointed in writing by the IO for a 5 year term.

ii. Describe frequency of Committee meetings. Note that **Appendix 8** should contain the last two IACUC/OB meeting minutes.

Committee meetings are scheduled monthly. However, they can be cancelled due to lack of a quorum or the need for full committee review of protocols. On average, the committee meets eight or nine times a year.

iii. Describe the orientation, training, and continuing education opportunities for IACUC/OB members. [*Guide*, p. 17]

During orientation, new committee members are shown where documents are located on SharePoint for information concerning the IACUC. It includes the SOPs, Charter, Policy Statements, and other references from IACUC 101 and past articles on protocol review and semiannual facility inspections. Non-affiliated members are either emailed these documents or given a binder. They are also assigned the following courses on AALAS Learning Library: Working with the IACUC, Essentials for IACUC members, and the Semiannual Facility Inspection. Webinars by PRIM&R, AALAS, and NABR/FBR on various topics are made available for additional training. Members are encouraged to attend IACUC 101 and the related courses if possible.

b. Protocol Review [*Guide*, pp. 25-27]

A blank copy of your institution's protocol review form should be provided as **Appendix 9**. Also include forms used for annual renewal, modifications, amendments, etc., as applicable.

i. Describe the process for reviewing and approving animal use. Include descriptions of how:

- the IACUC/OB weighs the potential adverse effects of the study against the potential benefits that may result from the use ("harm-benefit analysis"),
- protocols that have the potential to cause pain or distress to animals are reviewed and alternative methodologies reviewed,
- veterinary input is provided, and
- the use of animals and experimental group sizes are justified.

Note: Make sure you address each of the items above.

There are pre-review requirements for our ACUPs which include the AV, Select Agent, and Animal Use and Biosafety Committee review tiers. After the ACUP is approved through these levels, the IACUC is sent the entire protocol for seven days. A protocol is required to be discussed at an official meeting if it meets at least one of the following criteria:
- Pain Category E
- New Species to NVSL/CVB
- Cat or Dog Studies
- Surgery
- Developmental Projects

If it does not fulfill one of the above criteria, the IACUC will have seven calendar days during which the members will enter comments or questions, and have the opportunity to request a full committee review. If a full committee review is not requested, the Chair will assign the Designated Reviewer(s). The Designated

Reviewer (DR) will act on behalf of the IACUC to approve, requested additional information, or refer the ACUP for full committee review. The DR is not authorized to withhold approval, but must refer the ACUP to full committee review.

Our form includes the following questions:

- Rationale 1b: What are the potential benefits to human/basic knowledge which justify each of the above uses of experimental animals?
- Rationale 2c: Indicate how group sizes (number of animals per project) were determined. Justification for these numbers using an appropriate statistical assessment such as a Power Analysis is expected. If a Power Analysis is not appropriate (e.g., pilot studies, tissue protocols, etc.) provide a detailed description of how the requested number of animals was determined. Be sure to include descriptions of the groups (e.g. Control, treatment, etc.) and the numbers of animals included in each group.

ii. Describe the process for reviewing and approving amendments, modifications, and revised protocols. If applicable, include a description/definition of "major" vs. "minor" amendments.
Note: If preferred, this information may be provided in a Table or additional Appendix.

Minor amendments are sent to the IACUC Chair or Protocol Administrator for approval. Major amendments are sent to the IACUC (after AV or Select Agent pre-review if necessary) for a seven calendar day period. During this time any member can call for full committee review and enter comments or questions. After the seven days, the Chair will assign the Designated Reviewer(s) if full committee review has not been requested. If full committee review is requested, the protocol will be discussed at the following, regularly scheduled committee meeting.

Minor Change – (As designated by the IACUC) may be approved by the IACUC Chair:

- Change in trained personnel, other than the PI to the ACUP. If appropriate, the National Centers for Animal Health Security and Safety Unit is consulted to confirm all health and safety requirements. In addition to the Chair, this could also be approved by the Protocol Administrator.
- Increasing the number of animals by less than 2% or 2 animals total, whichever is greater.
- Adding or changing a drug dosage approved by the Attending Veterinarian (AV).
- Obtaining one routine blood sample per ACUP approval period.
- Increasing the observation period for animals not experiencing pain or distress.
- Changing the age or size of the animals except the very young or very old animals.

c. Special Considerations for IACUC/OB Review [*Guide*, pp. 5; 27-33]

i. Experimental and Humane Endpoints [*Guide*, pp. 27-28]

1) Describe the IACUC/OB's review of "humane endpoints," i.e., alternatives to experimental endpoints to prevent or in response to unrelieved animal pain and distress.

PIs are required, unless justified, by the IACUC to euthanize before death by using clinical signs and increasing observations after animals are challenged. These endpoints are determined through past experience and literature searches. Any studies in which the animals cannot be euthanized prior to death must be scientifically justified.

The ACUPs for CVB also follow Notice No. 12-12 which states:

"All codified potency tests (with the exception of the rabies challenge test discussed below) that are conducted by administering viable virus, bacteria, or a bacterial toxin to animals in a dose that is expected to be lethal should be modified (in the Outline of Production) to include the following wording, unless justification for alternative working acceptable to the CVB is provided:
Moribund animals exhibiting clinical signs consistent with the expected disease pathogenesis that are unable to rise or move under their own power should be humanely euthanized and considered as deaths as outlined in 9 CFR 117.4. Observations must be made with sufficient frequency to ensure suffering is minimized.

In the case of the rabies challenge described in 9 CFR 113.209, 9 CFR 113.312, and Supplemental Assay Method 308, acceptable wording is:
Animals exhibiting paresis, signs of paralysis, and/or convulsions must be humanely euthanized and considered as deaths as outlined in 9 CFR 117.4

Similar definitions should be incorporated into non-codified potency and safety tests and efficacy study protocols. Proposed endpoints will be reviewed on a case-by-case basis.

When implementing humane endpoints, equal treatment must be given to both vaccinated and control animals. Criteria should be as objective as possible, to minimize differences in individual interpretation. Observations must be documented and support euthanasia based on humane endpoint criteria.

Firms are strongly encouraged to use anesthesia for IC inoculation of mice when conducting rabies vaccine inactivation testing under 9 CFR 113.209(d)(2)(i) and for IC inoculation with challenge virus for potency testing

under 9 CFR 113.209(d)(3). Firms wishing to use anesthesia in such testing should contact their Reviewer.

Care and attention, including training and procedures, must be used to ensure that the anesthesia is performed in such a way as to minimize pain and suffering.

The CVB encourages the use of analgesics in animal studies and potency testing, when it can be shown this does not affect the study outcome."

2) For studies in which humane alternative endpoints are not available, describe the IACUC/OB's consideration of animal monitoring and other means used to minimize pain and distress (e.g., pilot studies, special monitoring, other alternatives).

Twice daily observations are very common for the animal care staff to perform. Additional observations can be conducted by the technical staff if a project warrants.
Grimace Scales, Health Scoring charts, defined clinical signs and euthanizing at certain stages including animals in a moribund state help with monitoring animals to minimize pain and distress.

3) Identify personnel responsible for monitoring animals for potential pain and distress and describe any mechanisms in place to ensure that the personnel have received appropriate species- and study-specific training.

The observations may be made by the PI, assigned technical support staff, animal care staff or a combination of the three. The interval between observations are defined in the protocols.
Many PIs hold a pre-project meeting where the project is discussed with the technical support staff and animal care staff. Clinical signs expected are discussed along with the overall project.
Training is checked at protocol submission for technical staff. Animal care staff are assigned yearly training.

ii. Unexpected Outcomes that Affect Animal Well-being [*Guide*, pp. 28-29]
Describe how unexpected outcomes of experimental procedures (e.g., unexpected morbidity or mortality, unanticipated phenotypes in genetically-modified animals) are identified, interpreted, and reported to the IACUC/OB.

Unexpected Outcomes would follow the noncompliance or concern procedures which may cause the animal study to be put on hold until the issue is identified and resolved.

iii. Physical Restraint [*Guide*, pp. 29-30]

Note: This section is to include only those protocols that require prolonged restraint. Brief restraint for the purpose of performing routine clinical or experimental procedures need not be described.

1) Briefly describe the policies for the use of physical restraint procedures or devices. Include, if applicable, the IACUC/OB definition of "prolonged."

Not applicable

2) Describe animal restraint devices that are used or have been used within the last three years. For each device, briefly describe

- the duration of confinement
- acclimation procedures
- monitoring procedures
- criteria for removing animals that do not adapt or acclimate, and
- provision of veterinary care for animals with adverse clinical consequences.

Note: If preferred, this information may be provided in a Table or additional Appendix.

Not applicable

iv. Multiple Survival Surgical Procedures [*Guide*, p. 30]
Note: One survival surgical procedure followed by a non-survival procedure is not included in this category.

1) Describe the IACUC/OB's expectations regarding multiple survival surgery (major or minor) on a single animal.

Not applicable

2) Summarize the types of protocols currently approved that involve multiple major survival surgical procedures

Note: If preferred, this information may be provided in a Table or additional Appendix.

Not applicable

v. Food and Fluid Regulation [*Guide*, pp. 30-31]. *Note:* This does not include pre-surgical fast.

Summarize the types of protocols that require food and/or fluid regulation or restriction, including:

- justification
- species involved
- length and type of food/fluid regulation
- animal health monitoring procedures and frequency (e.g., body weight, blood urea nitrogen, urine/fecal output, food/fluid consumption)
- methods of ensuring adequate nutrition and hydration during the regulated period

Note: If preferred, this information may be provided in a Table or additional Appendix.

Not applicable

vi. Use of Non-Pharmaceutical-Grade Drugs and Other Substances [*Guide*, p. 31]

Describe the IACUC/OB's expectations regarding the justification for using non-pharmaceutical-grade drugs or other substances, if applicable.

Not applicable

vii. Field Investigations [*Guide*, p. 32]

Describe any additional considerations used by the IACUC/OB when reviewing field investigations of animals (non-domesticated vertebrate species), if applicable.

Not applicable

viii. Animal Reuse [*Guide*, p. 5]

1) Describe institutional policies regarding, and oversight of, animal reuse (i.e., on multiple teaching or research protocols).

For "Second Use" ("Reuse") animals, a physical examination and "resting period" between studies is required before release.

2) Briefly describe the types of activities currently approved that involve the reuse of individual animals.
Note: A list of specific protocols involving reuse of animals should be available during the site visit.

The protocols that will reuse the animals are typically blood and tissue donors, training courses, or antiserum production.

3) Describe other instances where the final disposition of animals following study does not involve euthanasia, including adoption, re-homing, rehabilitation, etc.
Note: A list of specific protocols involving reuse of animals should be available during the site visit.

Not applicable

2. Post-Approval Monitoring [*Guide*, pp. 33-34]

a. Describe mechanisms for IACUC/OB review of ongoing studies and periodic proposal/protocol reviews (e.g., annual, biennial, triennial, or other frequency).

For annual renewals and significant amendments, the IACUC is sent the entire protocol for seven calendar days during which the members will enter comments or questions, and could request full committee review. The Chair will assign the Designated Reviewer(s) if no one has requested full committee review. The Designated Reviewer (DR) will act on behalf of the IACUC to approve, request additional information from the PI to secure approval, or refer the ACUP for full committee review. The DR does not have the authority to withhold approval, but must refer the ACUP to full committee review. Some ACUPs are also reviewed during the semiannual facility inspection.

b. Describe the process and frequency with which the IACUC/OB reviews the program of animal care and use.

This is done semiannually during the January and July, same as facility inspections. Inspectors review health records, the pharmacy, and livestock trailers as part of assigned areas. Disaster Planning SOP is review at a minimum of every three years. IACUC SOPs & Charter are reviewed at a minimum of every three years. ARU SOPs are sent to the IACUC Chair for comments before going into effect.

c. Describe the process and frequency with which the IACUC/OB conducts facility and laboratory inspections.

- Describe the rationale or criteria used for exempting or varying the frequency of reviewing satellite holding facilities and/or animal use areas.
- If contract facilities or contractor-provided personnel are used, describe procedures used by the IACUC/OB to review such programs and facilities.

Note: A copy of the last report of these reviews should be included as **Appendix 10**.

Semiannual Facility Inspections are performed in January and July. The facility is broken up into five sections with each section being assigned to two, voting IACUC members to inspect during the assigned time frame. The members are assigned different areas than the last inspection they completed. The teams are to review at least two of the ACUPs that are being used in the area of inspection. Each team completes a report that is submitted to the Compliance Officer who compiles them, with assistance from the Chair, into the final Semiannual Facility Inspection Report that all the voting IACUC members review and sign at a convened committee meeting. The report is then provided the IO.

d. If applicable, summarize deficiencies noted during external regulatory inspections within the past three years (e.g., funding agencies, government, or other regulatory agencies) and describe institutional responses to those deficiencies. *Note:* Copies of all such inspection reports (if available) should be available for review by the site visitors.

Not applicable

e. Describe any other monitoring mechanisms or procedures used to facilitate ongoing protocol assessment and compliance, if applicable.

Audits are performed by the Compliance Officer. A minimum of two are done each year with surgical, pain category E, and new studies taking precedence. Reports are sent to the Chair and discussed at the next IACUC meeting.

During the Semiannual Facility Inspections, the IACUC inspection teams are asked to review some protocols the animals in that area are on. These are included in the reports.

3. Investigating and Reporting Animal Welfare Concerns [*Guide*, pp. 23-24]
Describe institutional methods for reporting and investigating animal welfare concerns.

This is outlined in ACUCSOPA111:

The Animal Resources Unit (ARU) and Principal Investigators (PIs) work together to prevent or correct perceived problems. The IACUC encourages informal resolution of concerns before formal complaints are filed. Such resolutions can be aided by consulting the approved Animal Care and Use Protocol (ACUP), IACUC policies, "The Guide for the Care and Use of Laboratory Animals", "The Guide for the Care and Use of Agricultural Animals in Research and Teaching", and Animal Welfare Act and Animal Welfare Regulations (Title 9, Code of Federal Regulations, Parts 1-3). IACUC members are available for informal consultation to help resolve concerns. The IACUC shall formally address any concerns which cannot be informally resolved, arise repeatedly, or involve serious instances of mistreatment or noncompliance. A person may submit a

formal complaint to the NVSL/CVB Directors, IACUC Chair, Attending Veterinarian (AV), or Compliance Officer (CO). Only a specific request to investigate a concern will trigger the compliant process.

If a concern cannot be handled directly with the source and/or subject matter expert, it shall be handled in one of two ways:

1) If the concerned employee deems immediate action is needed, the AV is contacted and will take any necessary action. If the AV is not available, the CO or IACUC Chair is to be contacted for instructions. Immediate action will determine if the concern is considered a complaint or noncompliance. This action may include documentation.

2) For all other situations, the concern shall be submitted to the IACUC Chair. If warranted, the Chair will assign an ad hoc committee, comprised of the CO and at least one IACUC member, to investigate the concern or complaint.

Noncompliance issues with an ACUP are required to be investigated by the IACUC. Depending on the circumstances, a signed, written statement of the noncompliance may be requested by the IACUC. The IACUC Chair or the AV has the authority to stop any animal procedure until the immediate situation in question can be adequately addressed by the IACUC.

The ad hoc committee will prepare a report for the IACUC. The report will be distributed through email for IACUC review. If the IACUC requests a written response, the PI has 30 days to respond. One 30-day extension can be granted by the IACUC Chair. Further extensions require a written request to the IACUC. Failure to respond will result in notification to the NVSL/CVB Directors within 10 working days of the missed deadline. Failure of the NVSL/CVB Directors to respond by the IACUC deadline will result in notification to APHIS as specified in the Animal Welfare Act.

The PI response and IACUC report with suggestive corrective and preventive actions will be presented at an IACUC meeting before final approval is given. The IACUC will determine the appropriate action. Preventative actions usually involve training. The IACUC corrective actions extend only to stopping or suspending an animal procedure, requiring changes to an ACUP, or written warning or notification. The IACUC may issue a verbal warning or written warning to the PI and/or employee with notification to their supervisor.

The IACUC Chair will notify the PI of such action. The PI of any activity disapproved/suspended by the IACUC may be appealed to the IACUC.
The approved IACUC report will be forwarded to the NVSL/CVB Directors within 30 calendar days of the conclusion of the investigation. Additional corrective or preventive actions may be taken by the IO or other management officials.

To assure that preventive and/or corrective actions have been taken within the designated time periods, the CO will be responsible for tracking progress on these actions. The CO or AV will perform at least one audit within 10 months of the final report to verify the desired results have been achieved. The specific aspects to be covered will be determined by the CO or AV. Audit reports will be signed and dated by the auditors, and the original report will be maintained by the CO with other audit reports. Copies will be sent to the IACUC Chair and AV. The CO or AV can request the IACUC reassess or reopen the case at any time during the year following the final report.

No NVSL/CVB employee, IACUC member, NCAH ARS employee, or visitor will be discriminated against or be subjected to any reprisal for reporting a suspected complaint or noncompliance. Reports of reprisal will be handled as a concern or compliant as described above. The management officials cannot approve an animal activity, nor shall there be reprisals to initiators or IACUC investigators of any legitimate compliant. Latitude in contacting employees is needed to perform a proper investigation, but attempts shall be made to remain courteous and open to all persons being interviewed during IACUC investigations. Employee rights shall be protected. However, employees are required to cooperate with the IACUC investigators. A summary of all complaints received during the covered period will be included in the Semiannual Animal Welfare Inspection Report. The names of the involved parties will not be included in these public reports.

4. Disaster Planning and Emergency Preparedness [*Guide* p. 35]

Briefly describe the plan for responding to a disaster potentially impacting the animal care and use program:

- Identify those institutional components and personnel which would participate in the response.
- Briefly describe provisions for addressing animal needs and minimizing impact to animal welfare.

Note: A copy of disaster plan(s) impacting the animal care and use program must be available for review by the site visitors.

Disaster response is outlined in the NCAH Incident Response Plan as well as the ARU Disaster Plan. Depending on the nature of the disaster, personnel from ARU, as well as Facilities Engineering Unit, Administrative Unit (for purchasing), Laboratory Resources Unit (for onsite warehouse), and possibly local emergency responders would be involved.

Provisions for water, power, feed, and other supplies have been considered. The power for the containment buildings is backed up by standby electrical generators on site and operated by FEU personnel. Equipment is on site to supply water to the animals independent of the automatic watering systems. In addition, some gel packs are available for caged animal needs. Feed supply on hand is generally in quantities to supply the animals for weeks to months. The onsite warehouse maintains general supplies such as gloves, needles, syringes, and disinfectants. In the event that supplies not on hand are needed in a disaster situation, a process is in place for emergency purchasing from outside vendors.

II. Animal Environment, Housing and Management

Note: Complete each section including, where applicable, procedures performed in farm settings, field studies, aquatic environments, cephalopods (whose use may be described in Appendix 18 in lieu of each section of the Program Description), etc.

A. Animal Environment

Note: Facility-specific details regarding mechanical system construction and operation is requested in Section IV.B.5. and **Appendix 11**; current (measured ***within the last 12 months***), detailed (by room) performance data must also be provided as indicated in **Appendix 11.**

1. Temperature and Humidity [*Guide*, pp. 43-45]

a. Describe the methods and frequencies of assessing, monitoring, and documenting that animal room or housing area temperature and humidity is appropriate for each species.
Note: If preferred, this information may be provided in a Table or additional Appendix.

Temperatures are monitored for each room by the animal care personnel daily. Temperatures are generally not monitored in non-environmentally controlled areas, rather the animals are observed for signs of temperature stress. Temperatures are documented on the daily log sheets in each room. For most buildings, alarm parameters with differentials are monitored through the building automation system, which is monitored 24hours a day by the facility support staff at the main boiler/chiller plant control center. During business hours, alarms are conveyed to the facility engineering personnel for response. After hours, the plant staff will respond to the alarm and, if further assistance is needed, a call is placed to the facility engineering personnel for response. In several buildings, a cellular monitoring system is used with set points at which a text message, email, or phone call would be triggered to ARU staff. The ARU staff would contact the 24 hour facility support staff for response.

b. List, by species, set-points and daily fluctuations considered acceptable for animal holding room temperature and relative humidity.
Note: If preferred, this information may be provided in a Table or additional Appendix. [*Guide*, pp. 44 and 139-140]

Notification levels for Facility Temperatures:

species	Low reporting level	High reporting level
Cattle, sheep, goat, swine, poultry	64°F and below	78°F and above
Rabbit	63°F and below	70°F and above
Rat, mice, hamster, guinea pig	63°F and below	78 °F and above
Cat, dog	64°F and below	80 °F and above

Whitetail deer, reindeer, fallow deer, elk, bison, horse	60°F & below	70°F & above
Raccoon, mink	70°F and below	74°F and above

If temperatures are found to be at notification levels, Animal Caretakers must notify FEU (x7328) to check the HVAC system and address issues to get the temperature back into compliance. The Veterinarian on Call must also be notified of the out of range temperature (this may be by email or phone).
If the temperatures remain outside of the published ranges of the Guide for more than 4 hours, a veterinary assessment of the animal(s)' wellbeing will be made. If FEU is unable to bring the temperature back into compliance and the animal(s) are deemed to be in distress by the veterinarian on call, they must be moved to another suitable location.

In addition to documenting the temperature in the animal area, the animal care staff are instructed to observe the animals for any signs of stress due to the environmental conditions and report these to the veterinarian on call immediately.

Reporting out of range humidity
If humidity is outside of the published range, a determination of the animal(s)' wellbeing will be made. Note – published range is 30 to 70% for mammalian species. Humidity levels outside of the published range of the Guide will be evaluated in relation to temperature and HVAC in the facility.

c. Temperature set-points in animal housing rooms and/or environmental conditions are often outside of the species-specific thermoneutral zone. Describe the process for enabling behavioral thermoregulation (e.g., nesting material, shelter, etc.) or other means used to ensure that animals can control their thermoregulatory environment. Include a description of IACUC/OB approved exceptions, if applicable. [*Guide*, p. 43]

Nesting material is provided for many of the small animal species. In many of the large animal rooms, rubber mats are used on the floors.

2. Ventilation and Air Quality [*Guide*, pp. 45-47]

a. Describe the methods and frequencies of assessing, monitoring, and documenting the animal room ventilation rates and pressure gradients (with respect to adjacent areas).
Note: If preferred, this information may be provided in a Table or additional Appendix.

Current HVAC data is presented in the appendix.

b. Describe ventilation aspects of any special primary enclosures using forced ventilation.

Some caging in the [redacted] is connected to the building exhaust system.

c. If any supply air used in a room or primary enclosure is recycled, describe the percent and source of the air and how gaseous and particulate contaminants are removed.

Some buildings on the south part of campus and Building 192 on the north part of campus utilize recycled air. Pre-filters are used in the rooms in most of these cases. Many of these buildings are used for short term housing or as a facility for brief procedures (injections or blood collection) on the animals that are housed in lots or on pasture with shelters.

3. Life Support Systems for Aquatic Species [*Guide*, pp. 84-87]

a. Provide a general description of institutional requirements for enclosures using water as the primary environmental medium for a species (e.g., aquatics).

All tanks at NCAH are disinfected using Aquatic Virkon and those that are small enough, pass through the cage washer. Upon return to the animal space those tanks are flushed with fresh system water for a minimum of 2 days prior to fish arrival. Fish in tanks are fed based on published guidelines for individual species. Feed rates are adjusted following daily observations to limit wasted feed in the tank. This maintains nitrogenous wastes within an acceptable range. Solids are removed from the system either through flushing of the tank with system water or using a siphon. Fish at NCAH are held below production levels; therefore the nitrogen and phosphorus levels are negligible. Throughout NCAH life support system there are 600 control points associated with alarms and oxygen backup based on the condition of the alarm. These data points are logged every 15 minutes continuously.

b. Provide a general description of overall system(s) design, housing densities, and water treatment, maintenance, and quality assurance that are used to ensure species appropriateness.
Note: Facility-specific tank design and parameter monitoring frequencies should be summarized in **Appendix 12** (Aquatic Systems Summary).

Overall system design: The facility is made up of a water treatment space and animal housing space. It is operated by a software package that controls all aspects of the system. The software is interlaced to staff 24/7 for emergency response. The facility was constructed to be modular for different tank configurations, sizes, and flows. Portions of the system have been modified to recycle the water where possible. Depending on the project, species, number of fish, and statistical parameters, the specific configuration of the tanks is then adjusted. In addition, there are backup

oxygen systems in place to increase response time for staff when there is an emergency.

Housing densities: Below normal production levels for each respective species. These levels can be found in peer reviewed literature or institutional knowledge.

Water treatment: The facility uses city tap water that has had the chlorine removed with activated carbon (pumping sodium thiosulfate as a secondary form of chlorine removal). The pH is then buffered with hydrochloric acid (adjustable based on the species being housed 6-9). From there, the water is sent to the tanks as cold water (i.e. straight from the water tower), chilled, or heated. In the case of hot water, the water is looped through a packed column to remove gas supersaturation issues before being sent to the tanks.

Maintenance: The LSS is observed daily for operational status - sodium thiosulfate levels checked, hydrochloric levels checked, chlorine levels checked, and flow status monitored.

Quality assurance: Depending on the species that is going to be housed, peer literature is reviewed in advance of the species coming into the facility. Institutional knowledge also plays a role as the Fish Biologist has cultured over 15 different species.

The waste water stream from the facility is either to city sewer or the BSL3 steam treatment plant.

4. **Noise and Vibration** [*Guide*, pp. 49-50]
   Describe facility design features and other methods used to control, reduce, or prevent excessive noise and vibration in the animal facility.

In (b) (6) [redacted] there are sound attenuators on the supply and exhaust air ducts. Fire alarms are minimally audible, low level announcements, if at all, in the animal rooms, with blinking lights.
In (b) (6) [redacted] the fire alarms are strobe only in the animal rooms and audible in the corridors.

In (b) (6) [redacted], the walls separating cage wash and animals rooms from each other are masonry walls which due to their density, reduces sound transmission.

B. Animal Housing (all terrestrial, flighted, and aquatic species)

1. **Primary Enclosures**
   Note: A description of primary enclosures used (e.g., cages (conventional, individually-ventilated cage systems (IVCS), etc.), pens, stalls, pastures, aviaries, tanks) should be included in **Appendix 13**.

a. Describe considerations, performance criteria and guiding documents (e.g. *Guide*, *Ag Guide*, ETS 123 and/or other applicable standards) used by the IACUC/OB to verify adequacy of space provided for all research animals, including traditional laboratory animal species, agricultural animals, aquatic species, cephalopods, and wildlife when reviewing biomedical, field and agricultural research studies.

The Guide, The AWA, and the Ag Guide are the main reference documents used to determine minimum space requirements. Housing densities also consider the type of testing and containment requirements of the investigators. If guidelines are not available for some species (geese, turkeys, deer, elk), we extrapolate from the guidelines of a similar species. For aquatic species, the Guidelines for the Use of Fishes in Research are used.

b. Describe space exceptions to the guiding documents (*Guide*, *Ag Guide*, ETS 123, and/or applicable standards), indicating the references, considerations and performance criteria used (e.g., by the IACUC/OB) to verify adequacy of space provided for all animal species covered by the program. [*Guide*, pp. 55-63]

Any exceptions to the Guide must be approved by the IACUC with scientific justification or be approved by the Attending Veterinarian for medical reasons.

2. Environmental Enrichment, Social, and Behavioral Management [*Guide*, pp. 52-55; 63-65: *Ag Guide*, Chapter 4]

a. Environmental Enrichment

i. Describe the structural elements of the environment of primary enclosures that may enhance the well-being of animals housed (e.g., resting boards, privacy areas, shelves/perches, swings, hammocks).

Rabbits housed in groups have crate halves to crawl under for privacy. Rubbing posts, resting platforms, and hiding places are used when applicable for the species and the housing system. Items for perching are used in some poultry enclosures. The structures are designed to allow freedom of movement, easy access to food and water, and to provide enough space to allow separate eating and sleeping areas.

ii. Describe nonstructural provisions to encourage animals to exhibit species typical activity patterns (e.g., exercise, gnawing, access to pens, opportunity for exploration, control over environment, foraging, denning, burrowing, nesting materials, toys/manipulanda, browsing, grazing, rooting, climbing).

The following examples describe typical nonstructural provisions. Rabbits are housed in groups on a bedded floor when possible. They are provided with toys/manipulanda, and hay cubes to gnaw on. Rodents are also provided tunnels, nesting material (especially for whelping mothers), and structures for climbing. Guinea pigs are provided hay cubes for gnawing and tunnels. Large animals are provided balls, rattles, mirrors, chewable items, treats after sample collection, and rubber mats attached to posts (Itchin' post product) for rubbing. Poultry have perching items, swings, and mealworms. Waterfowl (geese) have wading pools.

b. Social Environment [*Guide*, p. 64]

i. Describe institutional expectations or strategies for social housing of animals.

When allowed by the study objectives, animals are group, or at least, pair housed. This allows physical, visual, and verbal contact. Most rodents are group housed; rabbits are pair or group housed when possible. Large animals and poultry are generally housed in groups, although containment spaces may only be large enough to pair house full sized large animals such as cattle and horses. Mink tend to be antisocial so would be housed individually with visual contact with others.

ii. Describe exceptions to these expectations (e.g., veterinary care, social incompatibility) and other typical justification approved by the IACUC/OB for housing animals individually.

Scientific justification is required for planned individual housing of social animals. Such situations would be reviewed by the IACUC. Animals may also need to be individually housed due to a veterinary care issue requiring treatment or due to social incompatibility.

iii. Describe steps taken with isolated or individually housed animals to compensate for the absence of other animals (interaction with humans, environmental enrichment, etc.).

If they must be individually housed, efforts are made to allow visual contact with other animals of the same species. Verbal communication is still possible in many cases. A companion animal of another species (goat) was recently provided for a horse that was required to be housed individually in containment. Completely isolated animals are given additional contact with animal care personnel. Individually housed animals are also given additional enrichment items to play with and appropriate music, if possible. When animals have been given zoonotic diseases, the additional contact may be discontinued.

c. Enrichment, Social and Behavioral Management Program Review [*Guide*, pp. 58, 69]

Describe how enrichment programs and exceptions to social housing of social species are regularly reviewed to ensure that they are beneficial to animal well-being and consistent with the goals of animal use.

An Enrichment Group with staff from each section in the ARU reviews the Enrichment program. Meetings are convened as needed to discuss new enrichment ideas. The IACUC reviews planned exceptions to social housing during protocol review.

d. Procedural Habituation and Training of Animals [*Guide*, pp. 64-65]
Describe how animals are habituated to routine husbandry or experimental procedures, when possible, to assist animals to better cope with their environment by reducing stress associated with novel procedures or people.

In some cases, rabbits are handled more often to help them adjust. Horses may be groomed as a means of human interaction/socialization which will help them adjust to being handled for other procedures. Cattle have been trained with food treats to put their head into the head gate for sampling. Treats have been used as rewards for some of our large animals following sample collection. In some cases, light sedation may be used to decrease stress of handling of some animals. When wildlife species are used, they may be moved through a handling system prior to a study to help them adapt.

e. Sheltered or Outdoor Housing [*Guide*, pp. 54-55]

i. Describe the environment (e.g., barn, corral, pasture, field enclosure, flight cage, pond, or island).

The NCAH attempts to reproduce a typical agricultural setting for farm animals when infectious agents are not being used as these animals have been bred to live in these more natural settings. Several open-air barns or shelters with paddocks, lots, or pastures are used for horse, ponies, cattle, sheep, and goats. An electric fenced pasture is available during most of the year for grazing and exercise purposes. Continual access to water and supplemental feed are also supplied.

ii. Describe methods used to protect animals from weather extremes, predators, and escape (windbreaks, shelters, shaded areas, areas with forced ventilation, heat radiating structures, access to conditioned spaces, etc.).

The buildings and some shelters in the associated lots, provide shelter from weather extremes. The lots are surrounded by fencing to keep the animals from escaping. The entire compound is also surrounded by another 6 foot woven/barbed wire fence and an 8 foot chain link perimeter fence topped with barbed wire

iii. Describe protective or escape mechanisms for submissive animals, how access to food and water is assured, provisions for enrichment, and efforts to

group compatible animals.

Animal care staff members observe animals, provide food, and check waterers daily. Animal personalities are monitored by the animal care personnel. If dominant or submissive animals create situations that have the potential for causing an injury, the animals are separated. Visual contact with other animals is maintained if possible.

f. Naturalistic Environments [*Guide*, p. 55]

i. Describe types of naturalistic environments (forests, islands) and how animals are monitored for animal well-being (e.g., overall health, protection from predation).

The NVSL/CVB has no naturalistic environments other than the pastures available with some of the animal shelters and barns.

ii. Describe how food, water, and shelter are provided.

Animals with pasture access are provided balanced diets by the animal care personnel in bunks or troughs. Water is provided ad libitum via automatic watering systems. Hay is provided ad libitum to ruminants or horses, or the animals are on the pastures. There are shelters in the lots.

iii. Describe how animals are captured.

Animals with pasture access are guided to a small area where they can be confined. Then the animal care personnel can calmly gain control of each animal and lead them where they need to go for testing. Head gates or cattle chutes are available in all cattle areas. A sheep handling system is used for the blood donor flock. A couple of horse stocks are available on campus to aid in short term handling.

C. Animal Facility Management

1. Husbandry

a. Food [*Guide*, pp. 65-67]

i. List type and source of food stuffs.

Feed for horses, ruminants, swine, poultry, wildlife, fish, and small laboratory mammals are acquired from commercial suppliers. Hay is procured from vendors who deliver the large round, large square and small square bales. Hay and corn is also harvested on site as part of our nutrient management program. Corn and Rye

is purchased and/or harvested on-site as corn silage or Ryelage for use in Total Mixed Rations (TMR).

ii. Describe feed storage facilities, noting temperature, relative humidity, and vermin control measures, and container (e.g., bag) handling practices, for each of the following:

- vendors (if more than one source, describe each)
- centralized or bulk food storage facilities if applicable
- animal facility or vivarium feed storage rooms
- storage containers within animal holding rooms

Vendor storage facilities must meet the requirements specified in the feed contract and all feedstuff must be stored inside from harvest/processing until delivery. Specifications in the feed contracts also require vendors to include milling dates. When practical, periodic visits to the vendor facilities may be made by a government representative.

Feed from vendors is delivered to a central feed storage facility at the NCAH. Building 13 is a heated metal building with outside bulk feed bins constructed of metal. Building 13 includes a climate controlled room for storage of some bagged feed products. Feed from this warehouse is delivered to the animal facilities upon request. Hay, in square bales, is stored in Building 14; an enclosed cement floored metal building. The majority of the round bales are stored in a covered three sided shed with gravel floor. Corn Silage is stored in Plastic bags (9' diameter by 200' feet long) on a cement pad. Vermin control is accomplished through daily monitoring by care staff and by an independent contractor with monthly inspection of all buildings.

All non-portable animal buildings have a feed storage area or room. Adjacent animal buildings or portable feed sheds are used for the portable animal shelters. All open sacks are kept in closed containers. In most cases, these are plastic garbage cans with a lid that snaps on tight. Some animal buildings have bulk feed bins. Bulk feeds are delivered directly from the vendor as requested by NCAH or moved to the bulk feed bins using a bulk feed trailer pulled behind a track. Bulk feed is inventoried weekly and at which time feed manufacture dates are checked. Condition of the bulk feed bins is also evaluated at that time.

An exception for designated feed room storage in Vivarium for humidity is a limitation for the facility. The IACUC determined that it is acceptable to store feed in designated vivarium feed storage rooms as long as the feed is stored in the original packaging, on pallets, and the feed is not stored for longer than 180 days. Transient periods during which humidity levels are over 58% are acceptable in these rooms, but if humidity levels exceed 58% for more than 10 consecutive days, maintenance will be notified and asked to evaluate HVAC performance. The

length of time feed is stored is being checked. An Amega probe was installed to record the humidity at all times.

iii. Describe special food preparation areas, such as feedmills and locations where special diets are formulated, if applicable. Include in the description sanitation and personnel safety practices (noting that respiratory protection is described in Section 2.I.A.2.b. ii. Standard Working Conditions and Baseline Precautions above).

none

iv. Describe how food is provided to various species (*ad libitum*, limited amounts, types of feeders).

Feed is provided ad libitum to rodents, rabbits, young swine, and poultry. Ruminants, horses, and adult swine are limit fed. In most cases, hay for ruminants and horses is provided ad libitum by use of feeders designed for handling large square and/or round bales or small combination hay/grain feeders for some sheep/goats. TMR is provided to cattle in a concrete feed bunk, pad or portable feed wagon.
Generally, in containment buildings pelleted feeds and hay cubes (for ruminants) are fed to minimize clogging of drains from long-stem forages. Typically, metal or poly fence/wall mounted feed troughs and free standing hay/grain feeders are used in these buildings. J-feeders are used for poultry, rabbits, and guinea pigs. Modular diet delivery systems for mice, rats, and hamsters (wire bar/metal slotted elevated feeders that attach to the sides of the caging). Belt feeders on timers are used for fish in larger tanks (120 gallon). Fish in smaller tanks are hand-fed as needed.

v. Describe special food quality control procedures including procedures for rotating stock, monitoring milling dates, nutritional quality, bio load, chemical contaminants, etc.

Feed is manufactured to specifications outlined in written contracts. Nutritional quality and chemical requirements are specified in the contracts. Feed/feed tags are inspected at time of receiving for mill dates, packaging integrity, and to assure feed meets requirements/specifications. Feed stock is rotated by a person assigned to the feed warehouse. Samples are submitted for independent nutritional and mineral testing from each load of hay received, each cutting of hay harvested. Samples of each bag of corn silage/ ryelage are collected and submitted by the Farm Manager. A contracted Dairy Nutritionist balances feed needs for cattle on TMR diets. Where practical, visits are made to the suppliers' premises by a government representative to assure compliance to specifications.

b. Drinking Water [*Guide*, pp. 67-68]

i. Describe the water source, treatment or purification process, and how it is provided to the animals (e.g., bowls, bottles with sipper tubes, automatic watering, troughs, ponds, streams).

The source is the City of Ames. Water is supplied through various automatic watering systems.

ii. Describe methods of quality control, including monitoring for contaminants.

The hardness level of our water is monitored periodically by the Facilities Engineering Unit (FEU).

Drinking water at the National Centers for Animal Health (NCAH) falls under the sampling exemption noted in 40 CFR Part 141.3. The City of Ames has chosen not to include the NCAH in their current distribution system sampling plan. Therefore, the NCAH has chosen to self-monitor its drinking water. Samples indicate that drinking water at the NCAH meets drinking water standards.

Definitions:
TTHM = Total Trihalomethanes
(chloroform, dibromochloromethane, bromodichloromethane and bromoform)

HAA5 = Haloacetic Acids (five)
(monochloroacetic acid, dichloroacetic acid, trichloroacetic acid, monobromoacetic acid, and dibromoacetic acid)

Following are sample results for drinking water at NCAH.

Samples were taken on September 18, 2019

Parameter	**TTHM, µg/L**	**HAA_5, µg/L**	**Total Coliforms**	**E.Coli**
Drinking Water standard	***80 µg/L***	***60 µg/L***	***Absent***	***Absent***
Sample Location				
Bldg 154 before the backflow preventers	4.36	5.37	Absent	Absent
Bldg 10	<2.00	<5.00	Absent	Absent
Bldg 9	5.28	6.11	Absent	Absent
Bldg 21	4.49	5.62	Absent	Absent

Bldg 20-3rd floor Admin	6.86	<5.00	Absent	Absent
Bldg 20 - Cafeteria	5.03	<5.00	Absent	Absent
Bldg 24	<2.00	5.24	Absent	Absent
Bldg C-8	3.42	<5.00	Absent	Absent
Bldg 401	<2.00	<5.00	Absent	Absent
Bldg 402	<2.00	<5.00	Absent	Absent

iii. If automatic water delivery systems are used, describe how they are maintained and sanitized.

Vivarium water systems within the rooms and suites are flushed weekly. The manifolds on the racks are flushed with chlorine and rinsed with water after being run through the rack washer. Automatic waterers for large animals are cleaned by hand on a regular basis. For some models, the lid comes up and the bowl can be removed for more thorough cleaning.

c. Bedding and Nesting Materials [*Guide*, pp. 68-69]

i. Describe type(s) and how used for various species.

Straw, corn stalks, and pine wood shavings are used as direct bedding for farm animals. Hardwood chips are used as direct bedding for rodents and for group housed rabbits. Indirect bedding for mink consists of granular cellulose and plastic-lined absorbent pads. The plastic lined absorbent pads are also used in the poultry isolators.

ii. Describe bulk bedding storage facilities, if applicable, including vermin control measures.

Storage facilities for bedding include Bldg. 226 for straw, Bldg. 13 for shavings, and Vivarium storage area for the absorbent pads and hardwood chips. Vermin control is accomplished through an independent contractor.

iii. Describe quality control procedures, including monitoring for contaminants.

Bedding is ordered and stock is rotated by a person assigned to the feed warehouse or assigned vivarium staff member. Quality and chemical requirements are specified in written contracts.

d. Miscellaneous Animal Care and Use Equipment

i. Describe motorized vehicles and other equipment (e.g., trailers) used for transporting animals, noting the type and how the cargo compartment is environmentally controlled, if applicable.

The NCAH uses a cargo van with dashboard heating controls to transport small boxed or caged animals between buildings. This would primarily involve movement of poultry. Rodents and rabbits are transported via inside corridor to their housing location once they are received at the dock. The cargo area of the van is controlled by forced air that has been heated or cooled. Livestock trailers are used for transporting large animals. These trailers are not climatically controlled. Enclosed trailers are used to haul carcass tubs to the incinerator.

ii. Describe other animal care related equipment used in the animal care program (specialized equipment for exercise or enrichment, high pressure sprayers, vacuum cleaners, tractors, trailers, spreaders, etc.).

High-pressure water sprayers are used for cleaning animal rooms. These sprayers are used only when the room is empty of animals. Tractors, skid loaders, and spreaders are used for land application of manure from large animals housed in non-containment areas.

e. Sanitation [*Guide*, pp. 69-73]

i. Bedding/Substrate Change

1) Describe frequency of contact and non-contact bedding change for each species and enclosure type (solid-bottom or suspended) or pen.

The frequency of contact and non-contact bedding changes varies by species and cage type.

For contact bedding, static cages are cleaned (dirty bedding removed and replaced with clean bedding materials) at least twice per week with the cages washed and sanitized at least once per week. The racks are changed and sanitized at least monthly. Individually ventilated cages (IVCs) are cleaned once per week (i.e. dirty bedding removed and cages washed and sanitized). The racks are changed and sanitized at least once every 6 months. The soiled bedding from the soiled cage is discarded into a receptacle and the soiled cage is transferred to the dirty cage wash area.

For non-contact bedding in poultry isolators and rabbit cages, the pan liner is changed at least twice weekly.

2) Describe any IACUC/OB approved exceptions to frequencies recommended in the *Guide* or applicable regulations and the criteria used to justify those exceptions.

IACUC-approved exceptions to the frequency of bedding changes include the following:
•To reduce the exposure of personnel to rabies virus or other viral neurologic diseases, it is imperative that mice (housed in individually ventilated cages) not be handled directly by personnel after challenge-inoculation. Therefore, the animal racks are not to be changed and soiled bedding is not to be changed (unless wet) during the course of the test (14 – 28 days). If challenged mice need to be handled, a 6-12 inch forceps is utilized to prevent direct contact with these challenged animals.
•To reduce the risk of cannibalism in mice, soiled bedding is not changed in cages housing dams that have recently whelped.
•Due to the nature of the cage, mice, rats, or hamsters housed in individually ventilated cages may have a bedding change frequency of once a week.
•Rabbits housed in a pen on the floor will have dirty bedding removed daily with total bedding removal in the entire pen weekly.
To reduce stress on Guinea pigs challenged with Clostridium, they are placed in clean cages when challenged and during the observation period, soiled bedding is not changed unless wet.

3) Note the location where soiled bedding is removed from the cages/enclosures and where clean bedding is placed into the cages/enclosures.

Soiled bedding from animal rooms in which the animals have not been exposed to animal or human pathogens is discarded within bedding changing stations (BCS). These BCSs are located in the anterooms of all ABSL2 suites and in the dirty cage wash area (room 0404).

Soiled bedding from animal rooms in which the animals may have been exposed to animal or human pathogens is discarded within Bio-safety cabinets (BSC) or on a table top (the caretaker is to wear the appropriate PPE to perform this task).

New bedding is placed into clean cages in the clean cage area (room 0400). Alternatively, new bedding is placed into original cages within the animal room itself.

ii. Cleaning and Disinfection of the Micro- and Macro-Environments
Note: A description of the washing/sanitizing frequency, methods, and equipment used should be included in **Appendix 14** (Cleaning and

Disinfection of the Micro- and Macro-Environment) and **Appendix 15** (Facilities and Equipment for Sanitizing Materials).

1) Describe any IACUC/OB approved exceptions to the *Guide* (or applicable regulations) recommended sanitation intervals.

IACUC-approved exceptions to the weekly frequency of cage washing include the following:

- To reduce the exposure of personnel to rabies virus or other viral neurologic diseases, it is imperative that mice (housed in individually ventilated cages) not be handled directly by personnel after challenge-inoculation. Therefore, the animal racks are not to be changed and soiled bedding is not to be changed (unless wet) during the course of the test (14 days). If challenged mice need to be handled a 6-12 inch forceps is utilized to prevent direct contact with these challenged animals.
- To reduce the risk of cannibalism in mice, cages housing dams that have recently whelped are not washed as frequently.

2) Assessing the Effectiveness of Sanitation and Mechanical Washer Function

a) Describe how the effectiveness of sanitation procedures is monitored (e.g., water temperature monitoring, microbiological monitoring, visual inspections).

A test strip is placed in one load each day the cage wash is in use. The test strip turns black if the rinse water temperature has reached a temperature of 180°F. Equipment is visually inspected when removed from the cage washer.

b) Describe preventive maintenance programs for mechanical washers.

Cage washer preventive maintenance procedures are under development.

f. Conventional Waste Disposal [*Guide*, pp. 73-74]
Describe the handling, storage, method and frequency of disposal, and final disposal location for each of the following:

i. Soiled bedding and refuse.

Refuse from containment facilities is incinerated following removal from the building in surface decontaminated containers or sealed bags placed in hard sided containers.

Non-infectious disease animal cages are cleaned using the bedding changing stations. Cages with infectious disease are brought into the Bio-safety Cabinet (BSC) or onto a table top where the animal can be transferred to a clean cage. Guinea pigs will not be transferred in a BSC as the cages are too large. If the BSC is not used, respirators are required for this task. The fresh cage may then be returned to the rack or placed on a new rack if it the rack that is being rotated. The soiled bedding is dumped within the changing station into a lined trash container.

The bag of soiled bedding is removed from the BCS or the autoclavable bag is removed from the receptacle and the bag is sprayed down with project-specific disinfectant solution for the prescribed contact time of that product before being placed in a transport cart. The autoclavable bag is labeled with the room number from which the bedding came and the pathogen and an autoclave indicator is placed within the bag. The outside of the transport cart, especially the wheels, is also sprayed with disinfectant solution and contact time allowed before leaving the suite. Following cage changing, the floor of the room is also disinfected.

Properly treated and packaged waste may be stored in carts in the storage room next to airlock 0-41 in the Vivarium until such time as a sufficient load is generated to autoclave.

Any bedding or feed disposed of from animal cages in the (b) (6) [redacted] are placed in appropriate sized autoclave bags along with an indicator and closed. All bags are then sealed with autoclave tape and tagged to denote room number and agent present. The exterior of all bags is disinfected by misting with a disinfectant solution before taking the bags through or directly from the procedure room. Bags are placed in autoclave pans for transport and autoclaving. Disinfected bags of non-select agent materials are placed on a cart in the ABSL3 shared corridor.

After completion of daily work in the ABSL3 suites, carts in the shared corridor are rolled to the autoclave and all autoclavable bags and containers are run through the appropriate cycle in order to complete the sterilization process. After autoclaving, bags of waste are taken to a transport cart in the waste airlock.

Open transport carts are used to take bagged, non-infectious bedding into the waste airlock. The bagged material is transferred from the open transport cart into a closed, designated transport cart to be taken from the (b) (6) [redacted] for disposal. Carts are then wheeled into the hallway and taken to the ground floor on the freight elevator. Once on the ground floor carts are taken to the compactor and contents are emptied into the compactor.

For aquaculture, tank water is discharged to the heat treatment system where it is treated prior to discharge from the system.

ii. Animal carcasses.

Carcasses are to be placed in bags separate from bedding, feed paper or plastic waste. Final disposition of carcass materials is incineration or rendering in (b) (6) Bedding is not generally used for large animals in containment facilities (b) (6) so the animal wastes are washed down the drain. These animal wastes are heat treated at the waste treatment plant at before being released to the city waste water system. Animal wastes from Buildings C-3, C-4, and 520 can be routed for heat-treatment if needed.

Soiled bedding from farm facilities (A-3 through A-9, C-7 and Z-3) is removed and land applied with manure spreaders. Animal wastes washed down the drain from buildings A-3 through A-9, 500 and 510 are routed to a settling basin. The material is pumped out and sent off site through a contractor. Animal projects in these buildings do not involve transmissible, infectious diseases.

Soiled bedding and refuse is separated from animal carcasses in building 9.

Any animal carcasses disposed of from the (b) (6) are placed in an appropriately sized autoclave bag along with an indicator and closed. All bags are closed with autoclave tape and tagged to denote room number and agent present. The exterior of the bag is surface decontaminated and the bag is transported to either the cooler in 0-41 outgoing airlock (until a sufficient load is generated to run the autoclave) or is transported to the autoclave in the dirty cage wash area (0404).

Any animal carcasses disposed of from the (b) (6) are placed in appropriate sized autoclave bags along with an indicator and closed. All bags are then sealed with autoclave tape and tagged to denote room number and agent present. The exterior of all bags is disinfected by misting with a disinfectant solution before taking the bags through or directly from the procedure room. Bags are placed in autoclave pans for transport and autoclaving. Disinfected bags of non-select agent materials are placed on a cart in the ABSL3 shared corridor. Select Agent tissues or carcasses are removed by scheduling with animal care staff to maintain proper Chain of Custody.

After completion of daily work in the (b) (6), carts in the shared corridor are rolled to the autoclave and all autoclavable bags and containers are run through the appropriate cycle in order to complete the sterilization process. After autoclaving, bags of waste are taken to a transport cart in the waste airlock.

Carcasses that require incineration are taken from the (b) (6) dirty cage wash area on an open transport cart to the outgoing airlock or directly from the storage cooler. The designated transport carts are disinfected using a garden sprayer, and labeled to note agents present, date, and the source of the waste. The waste is then

wheeled into the corridor and taken to the ground floor on the freight elevator. Once on the ground floor, the carts are wheeled to room 1742 where they are to be picked up by the NCAH incineration operators for incineration.

Carcasses from aquaculture are double bagged. The outer bag is then surface decontaminated and the carcass is labeled and transported on an open transport cart to the cool storage in the outgoing airlock. The waste is transported in a transport cart specific for transporting carcasses to the incinerator. The carts are taken to room 1742 where they are to be picked up by the NCAH incineration operators for incineration.

g. **Pest Control** [*Guide*, p. 74]

i. Describe the program for monitoring and controlling pests (insects, rodents, predators, etc.). Include a description of:

- monitoring devices and the frequency with which devices are checked
- control agent(s) used and where applied, and
- who oversees the program, monitors devices, and/or applies the agent(s).

Vermin control is provided for the NCAH facilities by a private contractor who visits the facility at least monthly. In animal buildings, poison rat baits are placed near service entrances in farm animal buildings and storage buildings. Pyrethrin sprays are used intermittently for fly control in some buildings housing farm animals. Service entrances or airlocks may have timed sprayers in place for flying insect control. Fly attractant traps are used in some farm animal areas.

APHIS Wildlife Services Division provides control of wild birds and small mammals. Wildlife Services Staff are onsite weekly or more frequently to address nuisance wildlife problems.

ii. Describe the use of natural predators (e.g., barn cats) or guard animals (e.g., dogs, donkeys) used for pest and predator control, if applicable.

Not applicable

iii. Note how animal users are informed of pesticide use and how animal users may opt out of such use in specific areas.

Notification is by email. The contractor comes at least once a month.

h. **Weekend and Holiday Animal Care** [*Guide*, pp. 74-75]

i. Describe procedures for providing weekend and holiday care. Indicate who (regular animal care staff, students, part-time staff, etc.) provides and

oversees care and what procedures are performed.

Full-time permanent animal caretakers and part-time caretakers provide the routine weekend and holiday animal care. Routine animal husbandry procedures for weekends and holidays include feeding, watering, and washing pens for all animals except those with contact bedding or excrement trays. Additional permanent and part-time staff is also available on holidays and weekends to provide animal care and support for special projects.

ii. Indicate qualifications of weekend/holiday staff if not regular staff.

Weekend and holiday coverage is provided by regular ARU staff members.

iii. Describe procedures for contacting responsible animal care and/or veterinary personnel in case of an emergency.

In case of an emergency, the animal caretakers are to contact the person(s) listed on the door card, and the Veterinarian on Call. The Veterinarian on Call schedule is posted in animal care offices, animal facility work rooms, at the NCAH Command Center (with the Security Guards) and is also available on the internal network on the computer. ARU staff members are encouraged to contact the ARU Leader or Animal Caretaker supervisors if they have questions that cannot be answered by the full time caretakers on duty.

2. Population Management [*Guide*, pp. 75-77]

a. Identification

Describe animal identification methods for each species (e.g., microchips, cage/tank cards, collars, leg bands, tattoo, ear tags, brands).

Rodents, rabbits, caged poultry, and mink are identified by cage card at the cage level. An indelible marker is used to identify an individual rodent or rabbit from the group. Large farm animals are identified by ear tag, tattoo, leg band, or freeze brand. Poultry are identified by wing band or leg band individually and by spray markers in groups for each round of procedures. Information on cages includes the Animal Requisition number, ACUP number, number of animals in cage, and arrival date. Cats and dogs would be identified by tattoo and/or microchip (neither of these species were used at the NCAH in the past 12 years).

b. Breeding, Genetics, and Nomenclature

i. Describe the program for advising investigators on the selection of animals based on genetic characteristics.

NVSL/CVB does not perform research, but testing. The type or stain of animal may already be specified by the test criteria. Most animals used in our testing programs are specified by biologics licensees, Part 9 of the Code of Federal Regulations (CFR), or testing protocols developed at other institutions. Therefore, the genetic makeup of the animals to be used is typically predetermined. Outbred animals are required in most testing except for hybridoma/monoclonal antibody production that uses BALB/c (inbred) mice. All animal orders are placed on the RAMS system through the ARU office. The breed and strain is indicated on the Animal Requisition which the ARU reviews. Consultations are made when the investigator has an unusual testing requirement.

ii. Describe the program for advising investigators on using standardized nomenclature to ensure proper reporting of the identification of the research animals with regard to both the strain and substrain or the genetic background of all animals used in a study.

The NVSL/CVB mission is not research so reports reference the standardized protocol used rather than restating the specifics on the animal nomenclature.

iii. Describe genetic management techniques used to assess and maintain genetic variability and authenticity of breeding colonies, including recordkeeping practices (*Guide*, pp. 75-76).

The fathead minnow breeding colony is maintained with genetic cross breeding among five different family strains. Those family strains are housed independently and then cross-bred when animals are needed for research purposes. The strains are maintained by breeding within that family group. New genetics may be introduced periodically as needed. Breeding records are maintained within the animal room on the room board.

iv. For newly generated genotypes, describe how animals are monitored to detect phenotypes that may negatively impact health and well-being. Note that the methods used to report unexpected phenotypes to the IACUC/OB should be described in section 2.1.B.1.c.ii, "Unexpected Outcomes that Affect Animal Well-Being."

Not applicable.

III. Veterinary Care [*Guide*, pp. 105-132]

Note: Complete each section, including, where applicable, procedures performed in farm settings, field studies, aquatic environments, etc.

A. Animal Procurement and Transportation [*Guide*, pp. 106-109; *Ag Guide*, pp. 8; 45; 50-57]

1. Animal Procurement

Describe the method for evaluating the quality of animals supplied to the institution (from commercial vendors, other institutions, etc.).

Animal procurement involves the Animal Operations Coordinator, some ARU Supervisors and the Procurement Unit of the NVSL Administrative Unit. The ARU supervisors, Animal Operations Coordinator or designees receive animal orders; perform the initial processing which may require identifying the planned animal housing location. The Animal Operations Coordinator obtains bids, and prepares animal specifications. The Procurement Unit finalizes the transactions, and informs the ARU so preparations for receiving can be done. Evaluation of sources for rodents, rabbits, carnivores, chickens, and some swine is performed by checking vendor quality control reports. References may be checked by the ARU staff when new sources are considered. New sources are monitored closely, and necropsies are performed on any animals that become ill and/or die from the new source if cause of death is not obvious from the clinical assessment. Evaluation of sources for livestock species (horses, ponies, cattle, sheep, goats, and swine), and poultry other than chickens is performed by visual examination at the farm when the ARU picks up the animals. Rejected animals are left at the farm. Pre-purchase blood or fecal samples may be obtained for testing if requested by the investigator.

2. Transportation of Animals

Describe how animals are transported between outside sources and the institution and within the institution, including loading, unloading, level of biosecurity, immune status and specific pathogen status (consider all species, including aquatic and semi-aquatic species).

Rodents, rabbits, mink, and chickens are transported to the NCAH by the vendor's vehicles, then in the ARU van on the campus. Horses (includes other equidae), cattle, sheep, goats, swine, geese, and turkeys are primarily transported in NCAH livestock trailers or vans.

Some aquatic species are shipped to the campus in shipping boxes. Other aquatic species may be transported in a tank in an NCAH truck. The tank has oxygen supply and monitoring equipment. When aquatic animals arrive at NCAH, the shipping water is tempered incrementally with the NCAH system water until temperatures equilibrate. Once temperatures have equilibrated, the fish are transitioned into the aquatic system. When aquatic species are moved with the NCAH system, they are transported in buckets with attention to the number of animals in relationship to the water volume in the bucket so that the oxygen levels do not deplete.

B. Preventive Medicine

1. Animal Biosecurity [*Guide*, pp. 109-110]

a. Describe methods used to monitor for known or unknown infectious agents. Note that if sentinel animals are used, specific information regarding that program is to be provided below.

Animals are initially evaluated by the animal caretaker or animal technician at the time of delivery for general health and adherence to specifications. The ARU Veterinarians investigate any medical abnormalities reported on the initial evaluation. Spot weighing of rodents and rabbits is done to assure adherence to weight specifications as required by codified testing.

b. Describe methods used to control, contain, or eliminate infectious agents.

Ventilated caging in the Vivarium provides isolation of newly arrived animals. Many of the random source animals are pre-tested prior to finalizing purchase in order to meet investigator criteria. Depending on the project status of other animals in a facility, room order for animal caretaker flow will take potential disease status of newly arrived animals into account. Large animals will be held separately prior to being added to an existing group.

2. Quarantine and Stabilization [*Guide*, pp. 110-111]

a. Describe the initial animal evaluation procedures for each species.

Animals are initially evaluated by the animal caretaker or animal technician at the time of delivery for general health and adherence to specifications. The ARU Veterinarians investigate any medical abnormalities reported on the initial evaluation. Spot weighing of rodents and rabbits is done to assure adherence to weight specifications.

b. Describe quarantine facilities and procedures for each species. For each species, indicate whether these practices are used for purpose-bred animals, random-source animals, or both.

Purpose bred animals include mice, guinea pigs, hamsters, rabbits, rats, and chickens. The standard quarantine period for new animals is 5-7 days. The Building 20 Vivarium has 1 room containing a total of 3 isolation cubicles for quarantine. Generally, animals are held in the isolation cubicles if they will be placed in an occupied animal room. If they are going into an unoccupied room, they will go directly to that room on arrival. Room cleaning and disinfection is performed between groups. Some exceptions to the group concept are mice when the room is operated continuously with all mice coming from a single colony, and chickens from our in-

house rearing units. When isolation or microisolator cages are used, these cages are considered separate animal rooms for the purpose of quarantine and isolation.

Random source animals are most farm animals including sheep, cattle, horses, turkeys, geese, and wild animals (elk, deer, mink, etc.). These are quarantined for 5 to 7 days, sometimes longer depending on disease risk, in the testing areas. The all-in and all-out procedure is also used with these animals. Routine vaccinations of most newly received animals are contraindicated because these animals are to be used for testing vaccines and diagnostic unknowns. Exceptions involve the lambs used in the bovine serum screening and animals brought in to provide antiserum to known diseases. The sheep for the bovine serum screening, are vaccinated against Clostridial spp. upon arrival. There are a number of horses on site to provide antiserum to known diseases for proficiency testing. When it will not interfere with the disease of interest, these horses are vaccinated for Rabies, West Nile virus and other common equine diseases. Other species providing blood and tissue products may also be vaccinated if it will not interfere with use of the products. Physical exams, parasite exams, and therapy are instituted if necessary during the quarantine period.

c. Describe the required/recommended stabilization period for each species.

Stabilization for animals moving into different facilities or environments is 5 to 7 days. This allows the animal time to adjust to the new surroundings, potential diet changes, and possibly new care staff.

3. Separation by Health Status and Species [*Guide*, pp. 111-112]

a. Describe the program for the separation of animals by species, source, and health status. If the animals in different status are not maintained separately, describe circumstances in which mixing occurs and explain the rationale for mixing.

The policy of the NVSL/CVB is that there will be no mixing of species unless an exception is granted by the IACUC, such as a cross species transmission study. Mixing of species within an animal room may be allowed if each species is housed in separate isolation cages, and there are not visual species interactions like rabbits seeing dogs, mice seeing cats, etc. Each isolation cage is considered a separate animal room for microbiological purposes as they have individual supply air filtration. The IACUC considers horses, ponies, and donkeys as a single species, so they may be housed together. Animals from different sources are not housed together unless quarantined together for 14 days before use. Health status is generally not used for separation of animals unless it is specified by the investigator. As most animal rooms are occupied on an all-in and all-out basis, the health status of the entire room of animals is considered the same. Significant measures are taken to isolate animals based on the infectious agents given the test animals.

b. Describe situations where multiple species may be housed in the same room, area, or enclosure.

The policy of the NVSL/CVB is that there will be no mixing of species unless an exception is granted by the IACUC, such as a cross species transmission study. Mixing of species within an animal room may be allowed if each species is housed in separate isolation cages, and there are not visual species interactions like rabbits seeing dogs, mice seeing cats, etc. Each isolation cage is considered a separate animal room for microbiological purposes as they have individual supply air filtration.

c. Describe isolation procedures and related facilities for animals.

When treatment is chosen, rather than euthanasia, for injured or ill animals, they are normally put in a separate cage or pen within the room or facility. This is to limit the spread of infectious agents or to minimize further injury to an animal. The mission of the NVSL and CVB requires inoculation of animals with infectious agents for most projects. Test animals cannot be moved from room to room so almost all ill animals that cannot be euthanized remain in the same room for treatment. The Clinical Veterinarian assigned to the section managing the facility is the primary contact person for sick or injured animals. The animals in the Farm Management Section have a primary veterinarian designated. The other clinical veterinarians and AV back each other up. Telephone contacts are the usual means of notification. All 4 veterinarians can be contacted by cell phone and they share the weekend and holiday rotation for emergency calls. The investigators or designated contact, are contacted prior to initiating treatment when possible.

C. Clinical Care and Management [*Guide*, pp. 112-115]

1. Surveillance, Diagnosis, Treatment and Control of Disease [*Guide*, pp. 112-113]

a. Describe the procedure(s) for daily observation of animals for illness or abnormal behavior, including:

- the observers' training for this responsibility
- method(s) for reporting observations (written or verbal)
- method(s) for ensuring that reported cases are appropriately managed in a timely manner.

At a minimum, all animals are observed daily for illness or abnormal behavior by the ARU staff. Training for detecting signs of illness and/or abnormal behavior is incorporated into the formal and hands-on training in laboratory animal care. In addition, agent specific training by the investigator would cover specific clinical signs anticipated. Additional Investigator observations are generally initiated following inoculation of animals with infectious disease and often increase in frequency when clinical signs begin in the inoculated animals. Procedures for reporting illness is by

telephone to the investigator listed on the door card and the ARU Supervisors or Veterinarians.

b. Describe methods of communication between the animal care staff and veterinary staff and the researcher(s) regarding ill animals.

Animal care staff members observe the animals daily. Animal care staff members contact the veterinarians via phone. Investigators are contacted prior to initiation of treatment when possible to discuss options. Treatments are administered by the ARU Veterinarians and staff trained by the ARU Veterinarians (caretakers or technicians). An email may be sent as a follow up to the veterinarian and scientist with further details of the need.

c. Describe the preventive medicine and health management/monitoring programs (e.g., physical examination, TB testing, vaccination, hoof/nail trimming, teeth cleaning/floating, vendor surveillance, use of sentinel animals) for each species.

Vaccination is done if it will not interfere with the use of the blood or tissue products for diagnostic purposes. Physical exams, species appropriate parasite control and hoof trimming is done on a regular basis. Sheep that are onsite long term are shorn annually.

All the blood donor animals are tested every 6 months for the diseases listed by species below.

Poultry Tests:
IBV – Infectious Bursal Disease – AGID
NDV – Newcastle – Hemagglutination Inhibition (HI)Test
AI – Avian Influenza – AGID
EEE – Eastern Equine Encephalomyelitis – HI Test
WEE – Western Equine Encephalomyelitis – HI Test
VEE – Venezuelen Equine Encephalomyelitis – HI Test
CIA – Chicken Anemia Virus

Cattle Tests:
BVD – Bovine Viral Diarrhea – VN Test
Leptospirosis
Johnes Disease
PI3
BRSV – Bovine Respiratory Syncytial Virus
IBR – Infectious Bovine Rhinotracheitis

Horse Tests:
Equine Herpes Virus
West Nile – VN Test
EIA – Equine Infectious Anemia – AGID Test

EVA – Equine Viral Arteritis – VN Test
CEM – Contagious Equine Metritis – Complement Fixation (CF) Test
Glanders – CF Test

Sheep Test:
Johnes Disease – culture
Q- Fever –Coxiella burnetti – CF Test
Blue Tongue – AGID, ELISA, VN
OvHV-2- Sheep Associated Malignant Catarrhal Fever
Chlamydia – CF Test
OPPV – Ovine Progressive Pneumonia Virus
Vesicular Stomatitis
CE – Contagious Echthyma

Swine Tests:
Swine Adenovirus
PRRS – ELISA Test
PRV – Pseudorabies Virus – LAT Test
EMC – Encephalomycocarditis Virus – LAT Test
TGE – VN Test
PPV – Porcine Parvo Virus – HI Test
SIV – Swine Influenza Virus – HI Test
VSV – Vesicular Stomatitis Virus – ELISA Test
Toxo – sent to ISU
Leptospira interrogans

2. Emergency Care [*Guide*, p. 114]

a. Describe the procedures to ensure that emergency veterinary care is continuously available for animals during and outside of regular work hours, including access to drugs or other therapeutics and equipment.

The four veterinarians of the ARU (AV and three clinical veterinarians), serve on an "on call" rotation for evenings, weekends, and holidays. The Veterinarian on Call schedule is issued monthly by email. The schedule is posted in ARU offices, animal facility work rooms, with the Security Guards at the Command Center, and on the internal computer network. The schedule includes work cell phone and home phone numbers as well as which veterinarian to contact each calendar day for veterinary emergencies.

Once treatment is initiated for an animal, the veterinarian ordering the treatment will ensure that the drugs or therapeutics needed are available to the animal care staff for follow up treatments. In addition, Caretaker Supervisors and Leaders have access to enter the Pharmacy to acquire products as directed by the veterinarians.

b. Describe the authority of the Attending Veterinarian or his/her designee relative to the emergency treatment of animals in the program.

The AV or designee (Veterinarian on Call) has the authority to make critical treatment or euthanasia decisions, even when the investigator or designee cannot be reached.

3. Clinical Record Keeping [*Guide*, p. 115]

a. Describe the procedure for maintaining medical records and documenting treatment of ill animals including: clinical laboratory findings, diagnoses, treatments, medical progress records, etc. Identify the species for which individual records are maintained and where such records are kept.

Medical records documenting treatment of ill animals are maintained by the ARU unless the records are requested by the investigator. Active records are maintained in the animal room/facility or adjacent area. From there, the records go to the ARU offices or animal facility offices. In the Vivarium, records are electronic, accessed in the rooms by a virtual desktop. The records are available to authorized staff outside the Vivarium via the internal network.

In general, groups of animals may not have an individual record until an individual procedure or treatment is required for a specific animal. For most of the blood donor, reagent production, or training course animals that are expected to remain on campus for years, an individual record is created. This would include species such as sheep, cattle, horses, and pigs. Animals that undergo surgery would be expected to have an individual record.

b. Identify individual(s) (titles, not necessarily names) responsible for maintaining such records and identify where the records are maintained and who, including the IACUC/OB has access to the records.

The responsibility for maintaining clinical records is shared by the ARU Veterinarians, Animal Technicians, Animal Caretaker Supervisors, and Animal Caretakers. It is expected that the individual administering treatments or performing a procedure, would make those notations in the animal records.

c. Describe the role of the Attending Veterinarian in recordkeeping.

The Attending Veterinarian works closely with the Clinical Veterinarians on procedures and specific formats for maintaining medical records. All four of the ARU Veterinarians examine and treat the animals and would therefore, make such notations in the records.

4. **Diagnostic Resources.** Describe available diagnostic methods used in the program including:

a. In-house diagnostic laboratory capabilities.

Clinical laboratory capabilities: hematology (HM5 analyzer), serum chemistries (VetScan), microbiology (culture and sensitivity, water samples, milk samples, Salmonella screening, etc.), parasitology.

b. Commercially provided diagnostic laboratory services.

Additional clinical pathology testing can be done at nearby Iowa State University College of Veterinary Medicine (ISU CVM). The NVSL has the Diagnostic Virology Laboratory (DVL), Diagnostic Bacteriology & Pathology Laboratory (DBPL) and Diagnostic Bioanalytical & Reagent Laboratory (DBRL). Disease surveillance samples are submitted to DVL and DBPL. Samples collected by ARU staff for histopathology would be submitted to the DBPL. Additionally, ISU CVM has diagnostic and pathology services we may utilize if necessary. For specialized testing, samples may be shipped elsewhere as needed.

c. Necropsy facilities and histopathology capabilities.

Building 5 is a dedicated necropsy facility, and there is a necropsy room in Building 9 (High Containment Large Animal Facility). Necropsies performed in Building 9 would be done within the containment guidelines, using agent appropriate PPE. Samples removed from the building would be placed in a secondary leak-proof container for transport following building and project specific guidelines for decontamination.

Necropsy procedures in the Vivarium of Building 20 are performed within a Bio-Safety Cabinet (BSC) located within the animal suite's procedure room. Necropsy procedures are conducted in a separate area from all sensory range of living, conscious animals. The BSC is disinfected after each use to prevent cross contamination. All samples to be transported from the Vivarium to a laboratory are placed in a secondary, leak-proof container. This container is surface decontaminated and removed from the BSC and taken to the outgoing airlock for removal from the Vivarium.

Projects involving Select Agents would have additional requirements related to chain of custody and maintenance of the materials by a person with the appropriate clearances and approvals.

Samples collected by ARU staff for histopathology would be submitted to the Diagnostic Bacteriology & Pathology Laboratory (DBPL) of the NVSL or ISU.

d. Radiology and other imaging capabilities.

A scientist on site has a MinXRay 100/30 system that we have utilized. We also have the option of bringing in the ISU Field Services staff for radiology if necessary.

5. Drug Storage and Control

a. Describe the purchase and storage of controlled and non-controlled drugs.

Purchase of pharmaceuticals is managed by the Veterinarian who serves as Leader of the LASS. The Veterinarian identifies vendors that can supply needed items maintained in the Pharmacy supply as well as any special request items as needed by the scientists at the NCAH. That Veterinarian also manages the acquisition and dispensing of controlled substances. Purchasing Agents must place the order with the vendor. As of the submission of this document, the work is being covered by the ARU Leader as the Clinical Veterinarian position is being recruited.

The pharmacy is located in the ARU Office. Access is limited to ARU staff (veterinarians, technicians, and animal caretaker supervisors and leaders). Single bottles of pharmaceuticals may be kept in the building of use, especially in the containment facilities.
The main supply of controlled substances is kept in a locked safe within the access controlled pharmacy. Working supplies of controlled substances for trained NCAH staff are kept in a compartmentalized mailbox when not in use. The mailbox system is kept within an access controlled cage. Each mailbox has a unique key. In some containment areas, secure storage for controlled substances is available. Controlled substances are kept in those areas mainly during the time of an active project. Keeping euthanasia solution, for instance, in the large animal containment facility allows for a more rapid response when animals such as cervids suffer an injury requiring euthanasia.

Pharmacy inventory is tracked on a spreadsheet, including the expiration dates. As new inventory arrives, the expiration dates are entered into the spreadsheet. Each month, a list of expiring products is pulled to check and remove from the physical inventory. Expiration dates are checked when drugs are issued. Expired drugs are returned to the ARU veterinarians for disposal. The IACUC checks drug expiration dates during the semiannual facilities inspections. Animal care staff are instructed to check expiration dates of pharmaceuticals and other supplies kept in their assigned facilities on a regular basis.

b. Describe record keeping procedures for controlled substances.

Trained NCAH staff members submit a requisition form to request controlled substance check out. The bottles are labeled with the requisition number and amount issued is logged in the overall supply record. A disposition record accompanies all

controlled substances that are issued to trained staff. When the checked out supply is depleted or expired, the bottles and disposition record are returned to the ARU veterinarians. Dr. Crocheck, or her designee, then checks them off on a tracking spreadsheet. Expired drugs are disposed of appropriately through a reverse distributor. Expiration dates of issued products are monitored so that staff can be contacted to return product they will not need prior to expiration.

D. Surgery [*Guide*, pp. 115-123]

1. Pre-Surgical Planning [*Guide*, p. 116]

Describe the process(es) used to ensure adequate pre-surgical planning, including: identifying personnel; locating equipment, supplies, veterinary involvement for selecting analgesic and anesthetic agents and facilities; planning; and pre- and post-operative care.

The large animal surgeries are performed in a dedicated surgery suite with its own equipment, supplies and instruments that are not used for other purposes. Regularly performed surgeries (including C-sections, rumen cannulation, and splenectomies) have Standard Operating Procedures (SOP) which outline specifics of pre- and post-operative care, as well as anesthetic and analgesics to be used.

Any other surgery that occurs would be handled on a case by case basis and the surgeon would determine what the pre- and post-op care would be and who was responsible for what duties.

Pre-surgical planning includes ensuring proper body condition of the animal, and nutritional management may be necessary with some animals prior to surgeries such as splenectomies. This is especially true for equine. Animals that are over conditioned increase the surgical risk and make the procedure more difficult. The surgery is physically challenging for animals that are too thin. The ideal surgical candidate is a young animal, in good physical condition, with ribs that are easily palpated.

Pre- (physical, CBC, serum chemistries) and post-op care (monitoring of body temperature, eating, fecal output, gut sounds, incision site, treatments, etc.) as well as nutritional management is under the direction of the surgeon.

Pre-surgical meetings are held with personnel prior to surgery to check equipment, instruments, and supplies. Surgery plan and walk through of procedures are also completed during this meeting.

2. Surgical Facilities [*Guide*, pp. 116-117, 144-145]

List building name(s) and room number(s) or other locations (coded, if confidential) where surgical procedures are performed. For each, describe:

- the type of species (including rodents, fish, agricultural species, etc.)

- nature of procedure(s) (major/minor/emergency, survival and non-survival, etc.)
- the amount of use [heavy (daily), moderate (weekly), or light]
- major surgical support equipment available (gas anesthesia machines, respirators, surgical lights, etc.)
- facilities for aseptic surgery, surgical support, animal preparation, surgeon's scrub, operating room, and postoperative recovery
- construction features of the operating room(s), including interior surfaces, ventilation, lighting, and fixed equipment used to support surgical procedures and other means of enhancing contamination control

Note: If preferred, the information requested in this section may be provided in Table.

NADC located in Building 3, Wing H. Room 11

- the type of species – ruminants (cattle, sheep, goats), swine, equine
- nature of procedure(s) major survival/minor survival/emergency, light use

Typical major survival surgeries performed are C-sections for derivation of gnotobiotic animals (swine and bovine), splenectomy (equine and bovine), and castration of cryptorchid animals (ruminants)

Number of surgeries performed per year includes NADC projects. In 2017, there were 8 surgeries, 7 in 2018 and 17 in 2019. To date, there have been 2 surgeries for 2020. Remodeling completed in 2017 included installation of new sealed rubber flooring, LED surgery lights, and a new hydraulic table. The walls were also resealed.

- Major surgical support equipment available - Isoflurane vaporizer, ventilator, hydraulic surgery table, LED surgery lights, and autoclave.
- Facilities for aseptic surgery, surgical support, animal preparation, surgeon's scrub, operating room, and postoperative recovery

Building 3, H wing:

Room 13 – pre-surgery	160 sq. ft.
Room 11 – surgery, with surgery table	400 sq. ft.
Room 9 – recovery/prep room	160 sq. ft.
Room 12 – receiving/prep room	61 sq. ft.

- construction features of the operating room(s), including interior surfaces, ventilation, lighting, and fixed equipment used to support surgical procedures and other means of enhancing contamination control

Room 11, Operating Room, walls are epoxy paint covered plaster and the ceiling is painted. The floor is Polylast system (sealed rubber flooring).

The cattle prep room has plastic sealed onto the walls and has a poured, textured floor. There are two metal, stanchioned pens, 3 ½' x 7,' that allow animals to move from the

outside, into pens, and from pens into surgery. To prevent animals from wandering into surgery or hallways, protective gates can be put up.

Room 13, pre-op room, is to the east of surgery. It has an autoclave. Walls and ceiling are painted plaster and the floor is ceramic tile. There are two scrub sinks for surgical prep, and one large stainless steel and glass cabinet, lockable, for storage of instruments. The east side of the room has slate lab counter with a double sink at the north end. Painted metal cabinets are under the counter, and glass-fronted, metal storage cabinets are above the counter. There is a shelf for storage of liquid containers above the double sink to the left of cabinets.

Room 9, is the prep room for swine. Floor is of ½" bonded rubber and walls are plaster covered with latex paint.

Swine are transported from Room 12, where they can be washed, to room 9 for induction of anesthesia and clipping.

The recovery room, Room 9, is used for animal recoveries. The floor has ½" bonded rubber and the interior walls and doors are covered with 2" thick, rubberized pads. Individual pads are 3'x61/2' and hang overlapping just above the floor level. Another set of pads with a rougher texture go on the floor and are the same size as the wall pads. They also overlap giving a good surface for equine recovery. Twin, swinging metal doors lead into the surgery room. These can be barred from the surgical side. The two windows are covered with dark plastic to limit light during recovery.

3. Surgical Procedures [*Guide*, pp. 117-118]

a. Describe the criteria used to differentiate major from minor survival surgery, including classification for certain procedures (e.g., laparoscopic technique).

Major surgery penetrates and exposes a body cavity or produces substantial impairment of physical or physiologic functions. Minor surgery does not expose a body cavity and causes little or no physical impairment.

b. How is non-survival surgery defined?

In a non-survival procedure the animal is euthanized prior to recovery from anesthesia.

4. Aseptic Technique [*Guide*, pp. 118-119]

a. Describe procedures, equipment, and protective clothing used for aseptic surgery. Include patient and surgeon preparation.

The patient is clipped and prepped for surgery in a secondary site away from the surgery room if the animal is amenable to handling. Upon arriving for surgery, if the

animal is dirty, they are given a bath before entering the surgery suite. Once the patient is under anesthesia and positioned on the surgical table, the patient is given a surgical scrub using an appropriate product for a minimum contact time of 10 minutes. The surgical site is covered with 4X4's soaked in surgical scrub/solution until surgery starts to maintain sterility of the area.

The surgeon will wear campus dedicated scrubs and clean shoes with shoe covers if warranted along with surgery gloves and mask for minimally invasive surgeries. Surgeon will add a surgery gown for all major surgeries.

b. Describe methods used to sterilize instruments and protective clothing, including a description of approved liquid sterilants and instrument exposure time(s) required for each, if applicable.

All instruments are autoclaved. The autoclave dispenses a run tape indicating temperature and success of the cycle. In addition, instrument trays sterilized in the autoclave have indicator strips on them to determine if the appropriate temperature was reached for sterility. Protective clothing, gloves and drapes are ordered in sterile packaging with expiration dates on them. There are 2 other autoclaves available for use if the autoclave in the surgery suite is down for maintenance.

c. Describe methods for instrument re-sterilization between serial surgeries.

Not applicable

d. Indicate how effectiveness of sterilization is monitored.

Instrument trays sterilized in the autoclave have indicator strips on them to determine if the appropriate temperature was reached for sterility.

e. Describe surgical support functions provided by the program to investigators.

The type of surgery and species is determined by the scientists. The ARU provides surgical support from pre-op to surgery to post-op care.

5. Intraoperative Monitoring [*Guide*, p. 119]
Describe monitoring and recording requirements for each species, including the type of record(s) maintained. Also note monitoring of anesthesia during non-survival procedures.

Monitoring during surgery includes blood pressure, mean arterial pressure, heart rate, %SpO2, respiratory rate, and body temperature. For equine, bovine and ovine patients, the anesthesia record includes % isoflurane used, amount of fluids administered, liters of O2 used, pharmaceuticals administered, blood pressure recorded, heart rate recorded, systolic

pressure, diastolic pressure, mean pressure, respiration rate, endotracheal tube size if intubated, body temperature and tidal volume.

Swine surgeries are non-survival. The anesthesia record includes O2 used, isoflurane used, and pharmaceuticals administered. Surgery time is generally 7-8 minutes maximum.

6. **Postoperative Care** [*Guide*, pp. 119-120]
Describe the postoperative care program, including who is responsible for overseeing and providing the care, types of records maintained (e.g., perioperative), where the records are maintained, etc.

Post-op care (monitoring of body temperature, eating, fecal output, gut sounds, incision site, treatments, etc.) as well as nutritional management is under the direction of the surgeon. Surgery records are maintained at building 3GH with the animal until it is transferred. Surgery record book maintained in 3H includes: animal ID, date, time, surgeon, surgical nurse, anesthesia used, anesthesiologist, procedure, duration, any complications, and pharmaceuticals used.

E. Pain and Distress [*Guide*, pp. 120-121]

1. Describe how and by whom pain and distress are assessed.

Expected clinical signs are categorized in the submitted Animal Care and Use Protocol (ACUP). IACUC guidelines for these investigators say that pain and/or distress occurs if clinical signs result from the testing or training to be conducted. The IACUC reviews this categorization when the ACUP is reviewed.

2. Describe training programs for personnel responsible for monitoring animal well-being, including species-specific behavioral manifestations as indicators of pain and distress.

Species specific training is required of all staff working with animals.

Many PIs hold a pre-project meeting where the project is discussed with the technical support staff and animal care staff. Clinical signs expected are discussed along with the overall project objectives.

Grimace Scales, Health Scoring charts, defined clinical signs may be used to help with monitoring animals to minimize pain and distress.

F. Anesthesia and Analgesia [*Guide*, pp. 121-123]

1. List the agents used for each species.
Note: If preferred, this information may be provided in Table or additional Appendix.

Ketamine in combination with xylazine is given intravenously or intramuscularly for short term anesthesia in most animal species, except fish for which we use MS222. Other anesthetics and analgesics available for special procedures include medetomidine, detomidine, telazol, butorphanol, midazolam, oxymorphone, flunixin meglumine, meloxicam, gabapentin, and lidocaine. Carbon dioxide gas may be used as an anesthetic for rodents when performing exsanguination. Anesthetics may also be used for restraint, minor surgeries such as castrating and dehorning, and exsanguinations. Acepromazine may be used in rabbits for restraint and to emphasize vessels for blood sampling.

2. Describe how the veterinarian provides guidance and advice to researchers concerning choice and use of anesthetics, analgesics or other pain moderating methods.

All protocols are routed to the Veterinary Tier for review of drugs prior to review by the IACUC. Most scientific sections that use animals have veterinarians on staff. The Code of Federal Regulations and some Office International des Epizooties (OIE) protocols do not permit the use of drugs in biologics tests due to potential interference with interpretation of test results.

3. Describe the monitoring of the effectiveness of analgesics, including who does the monitoring. Include in the description any non-pharmacologic means used to diminish pain and distress.

Expected clinical signs and plans for pain/distress relief are required in the Animal Care and Use Protocol. Animal care staff complete observations when performing daily animal care. In addition, scientific staff perform observations for some of the infectious disease studies where clinical progression is rapid. The Attending Veterinarian and/or compliance officer investigate complaints related to animal care and use.

4. Describe how the veterinarian(s) and the IACUC/OB evaluate the proposed use of neuromuscular blocking agent to ensure the well-being of the animal.

Not applicable

5. Describe policies and practices for maintaining and ensuring function of equipment used for anesthesia.

Annual evaluation of gas anesthesia equipment is performed by an independent contractor.

G. Euthanasia [*Guide*, pp. 123-124]

1. Describe approved methods of euthanasia, including humane slaughter (for additional guidance, see pertinent AAALAC Reference Resources). Include:
   - consideration of species, age, condition (e.g., gestational period, or neonatal) and

- location(s) for the conduct of the procedure.

Note: If preferred, this information may be provided in Table or additional Appendix.

Rodents and birds (chickens and turkeys primarily) under 5 lbs. may be euthanized with CO2 gas. Neonatal mice euthanized with CO2 must have a secondary method of euthanasia. Exsanguination under anesthesia may also be used for euthanasia of these species, using ketamine combined with xylazine for anesthesia. Euthanasia of other animals is performed by administering an overdose of a commercial barbiturate solution or by exsanguination under anesthesia provided by ketamine combined with xylazine. Ducks and geese (waterfowl) of any size or age are euthanatized with barbiturates given IV. Fish are euthanized with MS222. Penetrating Captive Bolt euthanasia is being evaluated for limited applications with large animals.

2. Describe policies and practices for maintaining and ensuring function of equipment used for euthanasia.

CO2 euthanasia chambers have flowmeters as part of the system to ensure proper gas concentration. Penetrating captive bolt equipment will have limited users and access. Training is required for staff that would use the penetrating captive bolt, including maintenance of the equipment.

3. Describe the methods used to confirm death of an animal.

Large animals must be portioned into 200# sections for incineration, even if they are not sampled for testing. Animals that are not large enough to require sectioning will have thoracic cavity punctured. Rodents will have a secondary method of euthanasia after CO2 euthanasia.

IV. Physical Plant [*Guide*, pp. 133-155]

A. Facilities Overview

Provide a brief introduction to the animal housing and use facilities. Note that this overview should augment the information provided in **Appendix 2** (Summary of Animal Housing and Support Sites), which includes area, average daily census, and person responsible for each site. Please use consistent terminology for the buildings/areas/sites described in the Location section of the Appendix. Please do not repeat information, but supplement the descriptions provided elsewhere to assist the reviewers understanding of the interaction between facilities, special housing locations, and separate procedural areas.

Regarding the physical relationship of the animal facilities to the research laboratories, the (b) (6) [redacted], which houses most of the laboratories. Laboratories are also housed in Building 21, which is connected to Building 20 by an enclosed

corridor. All other animal facilities are in buildings that are not connected to the laboratory building so staff must walk or drive there. Live animals are not used in the research laboratories, rather the tissues and other samples would go back to the laboratories for analysis.

Regarding security features, the campus site has perimeter security fencing (8 foot chain line topped with barbed wire). Gate control is managed through 1) an onsite security guard force monitoring site access and processing visitors per established site security visitor management policies and 2) Issuing ID badges to authorized individuals to access the NCAH property. A security guard monitors alarms and cameras 24 hours a day and another security guard patrols the compound at least twice per shift.

B. Centralized (Centrally-Managed) Animal Facility(ies)

In this section, describe each centralized or centrally-managed animal housing and use facility. Include in **Appendix 3** the floor plans of each on 8.5" x 11" or A4 paper. Ensure that the drawings are legible and the use of each room is indicated (animal housing, procedure room, clean cage storage, hazardous waste storage, etc.). Note that a separate section for describing "satellite housing areas" is included below.

Separately describe **each** Location or Animal Facility, addressing each of the features outlined below (1-8). A complete description of each must be provided; however, common features among locations or facilities may be indicated as such and do not need to be repeated.

1. General arrangement of the animal facilities (conventional, clean/dirty corridor, etc.).
2. Physical relationship of the animal facilities to the research laboratories where animals may be used.
3. Types of available animal housing spaces used, such as conventional, barrier, isolation/quarantine, hazard containment (infectious, radioactive, chemical), "animal cubicles" or facilities specifically designed for housing certain species such as ponds, pastures, feedlots, etc.
4. Finishes used throughout the animal facility for floors, walls, ceilings, doors, alleyways, gates, etc. (note any areas that are not easily sanitized and describe how these are maintained).
5. Engineering features (design, layout, special HVAC systems, noting exhaust air treatment, if applicable) used in hazardous agent containment.
6. Security features, such as control of entry, perimeter fences, gates, entryways, cameras, guards; identify and describe exceptions for individual facilities or areas incorporating fewer or additional security features than the general features described.
7. Consideration for facilities with exterior windows, if applicable, including management of environmental conditions (i.e., temperature and photoperiod control) and potential security risks.
8. Storage areas for flammable or hazardous agents and materials (e.g., disinfectants, cage washing chemicals, pesticides, fuel).

(b) (6) [redacted]

1. General arrangement of the animal facilities

[redacted]

2. Physical relationship of the animal facilities to the research laboratories where animals may be used.

NA – live animals are not used in the research laboratories.

3. Types of available animal housing spaces used, such as conventional, barrier, isolation/quarantine, hazard containment (infectious, radioactive, chemical), "animal cubicles" or facilities specifically designed for housing certain species such as ponds, pastures, feedlots, etc.

One ABSL-2 suite has been converted to be used exclusively for aquaculture, while an additional suite has been reconstructed to allow for water handling and an additional life support system for aquaculture. Two rooms in another suite have stainless steel penning to group house rabbits on the floor. Two additional rooms within that suite are being converted to group house rabbits on the floor. In addition, there is an isolation room with 3 isolation cubicles. The isolation cubicles have glass doors from ceiling to floor.

4. Finishes used throughout the animal facility(ies) for floors, walls, ceilings, doors, alleyways, and gates. (Note any areas that are not easily sanitized and describe how these areas are maintained.)

Walls are epoxy painted concrete masonry units. Stainless steel rails protect the walls and doors. Ceilings are epoxy painted gypboard. The flooring is a double broadcast epoxy polyurethane system applied to slab-on-grade concrete. The corridors, animal transport carts, caging and equipment are all protected from damage via a rail type wall guard throughout the corridors.

5. Engineering features (design, layout, special HVAC systems, noting exhaust air treatment, if applicable) used in hazardous agent containment.

The supply air handlers for the Vivarium are located in the basement interstitial space. Steam is used for heating and chilled water is used for air conditioning. Three ABSL-2 suites have process chillers to provide 65°F supply air during the winter when chilled water is not

available. The air is single pass air with a ventilation rate of at least 8 air changes per hour when occupied. The system is capable of providing 15 air changes per hour. Supply air passes through a 30% roughing prefilter, a heat recovery coil, a cooling coil, a fan, a heating (reheat) coil, and a final 95% filter. Exhaust air from the ABSL-2 space passes through a 30% prefilter in the animal room, a 45% final filter, a heat recovery coil, and a fan. All exhaust air from the ABSL-3 space passes through a 30% prefilter in the room, a 95% intermediate filter and a HEPA filter in units located on the basement interstitial floor before going to the exhaust air handlers located in the penthouse. Humidification is by direct steam injection.

6. Security features, such as control of entry, perimeter fences, gates, entryways, cameras, guards; identify and describe exceptions for individual facilities or areas incorporating fewer or additional security features than the general features described.

All external doors to (b) (6) and all external doors to the (b) (6) the basement are secured with electronically controlled locks that are released by a card swipe. Doors leading from the clean corridor to the ABSL-3 suites are secured with a maglock and card reader/keypad. Internal doors into animal rooms in the ABSL-2 suites are secured with an electrified mortise lock which is released by entering a pin into the keypad. Two ABSL-2 suites used for select agent work are secured with a maglock and card reader/keypad on the door from the corridor. Power to all locking devices, keypads/card readers, and intrusion detection devices is backed up by uninterruptible power supply.

7. Consideration for facilities with exterior windows, if applicable, including management of environmental conditions (i.e., temperature and photoperiod control) and potential security risks.

(b) (6) is in the basement of the building and has no exterior windows. Currently, lights are turned on at 6 am and off at 6 pm.

8. Storage areas for flammable or hazardous agents and materials (e.g., disinfectants, cage-washing chemicals, pesticides, fuel)

Near the cage washers, spill containment pallets are used to store the barrels of cage washing chemicals. Safety showers and eyewash stations are located in both the dirty and clean cage wash areas.

Physical Plant (b) (6), Low Containment Large Animal Facility

1. General arrangement of the animal facilities (conventional, clean/dirty corridor, etc.).

The building is divided into 5 animal suites. Each suite has its own entry dressing rooms and at least one entry vestibule and feed storage room which all open to the outside. There is a single corridor system that connects each suite to a dirty corridor that connects to (b) (6) is used exclusively by the NADC animal care and use program (b) (6) is used

exclusively by the NVSL/CVB program. (b) (6) s rarely used by the NVSL/CVB program and (b) (6) [redacted] periodically used by the NVSL/CVB program.

2. Physical relationship of the animal facilities to the research laboratories where animals may be used.

NA – live animals are not used in the research laboratories.

3. Types of available animal housing spaces used, such as conventional, barrier, isolation/quarantine, hazard containment (infectious, radioactive, chemical), "animal cubicles" or facilities specifically designed for housing certain species such as ponds, pastures, feedlots, etc.

This building is designed to house large animals such as cattle and horses at (b) (6) containment level. The smallest rooms have 2 pens, each a minimum of 12' x 12'. No isolation cubicles are present. In suite 1, there are 4 pens of 12'x12' on each side for a total of 8 pens in each room.

4. Finishes used throughout the animal facility for floors, walls, ceilings, doors, alleyways, gates, etc. (note any areas that are not easily sanitized and describe how these are maintained).

The corridor system is approximately 980 ft. long with a minimum width of 8 ft. The majority of the corridor walls are epoxy painted 12 inch thick precast concrete units. Some interior corridor walls opposite anterooms are epoxy painted concrete masonry units. Ceilings are epoxy painted poured concrete slabs. The flooring is slab-on-grade concrete sealed with Painted metal gating that can swing and block the corridors is positioned along the walls to aide in animal movement. Doors are epoxy painted hollow metal. There is no view panel in the door. The floor is concrete sealed with Lapidolith sealant. Rooms 4113 and 4115 have Polylast, sealed rubber flooring installed. The walls in animal holding areas are constructed of precast concrete painted with epoxy paint. The walls in the front of the room (support area) are constructed of concrete masonry units painted with epoxy paint. Ceilings are precast concrete with epoxy paint.

5. Engineering features (design, layout, special HVAC systems, noting exhaust air treatment, if applicable) used in hazardous agent containment.

Each suite has two supply air handling units and two associated exhaust fan units. The supply units run in Lead-Lag configuration which is scheduled to switch to allow for equal run-time. The exhaust fans operate in parallel with the capability to run in single fan mode upon failure or maintenance requirements. The supply air units use variable frequency drives to control fan speed to a discharge air static pressure set-point. The exhaust fan units use variable frequency drives to control fan speed to a room pressure set-point referenced between the suite corridor and the upper level mechanical space. The supply air units employ 100% outside air through outside air dampers which pass through pre-filters, a hot water pre-heating coil, steam injected

humidifier, and chilled water coil. The supply air is distributed to zones within the suite through a supplemented hot water re-heat coil for temperature control. There is a heat recovery coil, with by-pass damper, in the exhaust duct. The heat recovery is enabled when the outdoor air temperature is below 50 F or above 80 F. The air is single pass directional air flow with 30-35% filters in place at the room level.

6. Security features, such as control of entry, perimeter fences, gates, entryways, cameras, guards; identify and describe exceptions for individual facilities or areas incorporating fewer or additional security features than the general features described.

All external doors to the building are secured with electronically controlled locks that are released by a card swipe. Power to all locking devices, keypads/card readers, and intrusion detection devices is backed up by uninterruptible power supply. There are security cameras monitoring all entry doors.

7. Consideration for facilities with exterior windows, if applicable, including management of environmental conditions (i.e., temperature and photoperiod control) and potential security risks.

The only exterior windows on the animal floor are sidelights and overhead transoms on the exterior doors of the delivery vestibules and people entry vestibules. There are no exterior windows in the animal rooms. The lights come on at 5 am and turn off at 7p.

8. Storage areas for flammable or hazardous agents and materials (e.g., disinfectants, cage-washing chemicals, pesticides, fuel).

Disinfectant supplies would be stored in the general storage room of each suite.

Physical Plant (b) (6)

1. General arrangement of the animal facilities (conventional, clean/dirty corridor, etc.).

(b) (6) is divided into two sections; one used by ARS (NADC) Scientists and one used by APHIS (NVSL/CVB) Scientists. Employees enter through the main change/shower area in the front of the building and then proceed to either the ARS wing or the APHIS wing. The program floor is segregated and each side contains animal rooms, necropsy, change/shower off necropsy, clean and dirty corridors, storage, office space, and airlocks for animal or feed delivery. Only the APHIS portion of the building is covered in this program description.

2. Physical relationship of the animal facilities to the research laboratories where animals may be used.

NA – live animals are not used in the research laboratories.

3. Types of available animal housing spaces used, such as conventional, barrier, isolation/quarantine, hazard containment (infectious, radioactive, chemical), "animal cubicles"

or facilities specifically designed for housing certain species such as ponds, pastures, feedlots, etc.

There are nine rooms on the APHIS wing. Eight rooms have two 12 X 12 ft. pens and one larger room has nine 8 X 8 ft. pens. All penning and gating is welded stainless steel. In all the rooms, the gates separating the pens can be opened to make larger animal holding areas. The rooms are constructed to BSL-3Ag standards (ARS Facilities Design Standards 242.01) and have passed pressure decay testing.

4. Finishes used throughout the animal facility for floors, walls, ceilings, doors, alleyways, gates, etc. (note any areas that are not easily sanitized and describe how these are maintained).

All walls, floors and ceilings are cast-in-place containment concrete with epoxy coatings. The flooring has a troweled epoxy coating containing grit for slip resistance. The exception is the medium animal room and 3 of the 8 small rooms that have rubber floors in the animal holding pens. The rubber floors are glued to the concrete and the epoxy has been troweled to make it even with the edge of the rubber. Walls are 12 inch thick cast-in-place concrete with a glazed epoxy finish. The floor covering material has been troweled up the wall at least 6 inches to make a smooth pressure decay resistant seal. Ceilings are cast-in-place concrete with a glazed epoxy finish. Animal Room Doors are stainless steel air pressure resistant (APR) doors with compression gaskets.

5. Engineering features (design, layout, special HVAC systems, noting exhaust air treatment, if applicable) used in hazardous agent containment.

Corridors are 6 ft. wide and 11.5 ft. tall. The clean corridor surrounds the animal rooms on three sides and is 330 ft. long. The dirty corridor has animal rooms on each side and is 112 ft. long. Corridor gates are located next to the room entry doors (approximately every 24 ft.).

Heat is provided by a steam heated glycol system, and cooling is provided by chilled water. Supply air passes through a 30% roughing pre-filter, a heat recovery coil, a cooling coil, a fan, a heating (reheat) coil, a final 95% pre-filter and a HEPA filter. Exhaust air passes through a 65% pre-filter in the animal room, a 95% intermediate filter, two HEPA filters, a heat recovery coil, and a fan. The ventilation rate for occupied animal rooms is 15 air changes per hour. The rooms have been designed to operate between 65ºF and 86ºF with a relative humidity of between 30% and 70%. Humidification is accomplished by clean steam injection. Typical operating temperatures are 68-72ºF during the winter and 72-78ºF during the summer.

6. Security features, such as control of entry, perimeter fences, gates, entryways, cameras, guards; identify and describe exceptions for individual facilities or areas incorporating fewer or additional security features than the general features described.

All external doors to the building are secured with electronically controlled locks that are released by a card swipe. Doors leading from corridors to the BSL-3Ag and Select Agent suites are secured with a maglock and card reader/keypad. Power to all locking devices,

keypads/card readers, and intrusion detection devices is backed up by uninterruptible power supply. There are security cameras monitoring all entry doors to BSL-3Ag and Select Agent suites. A security guard monitors alarms and cameras 24 hours a day and another security guard patrols the compound at least twice per shift.

7. Consideration for facilities with exterior windows, if applicable, including management of environmental conditions (i.e., temperature and photoperiod control) and potential security risks.
The only exterior windows are on the airlock doors, animal handler's office, and staff break area. Windows have been pressure decay tested for leaks and are made of Lexan.

8. Storage areas for flammable or hazardous agents and materials (e.g., disinfectants, cage-washing chemicals, pesticides, fuel).

Disinfectants would be kept in storage rooms away from feed products. Typical disinfectants used in Building 9 are Virkon-s and Wexcide (phenolic).

Physical Plant (b) (6) [redacted]

1. General arrangement of the animal facilities (conventional, clean/dirty corridor, etc.).

These buildings are designed for swine or poultry. The buildings have small storage and supporting spaces at the end with one large room for animal housing.

2. Physical relationship of the animal facilities to the research laboratories where animals may be used.

NA – live animals are not used in the research laboratories.

3. Types of available animal housing spaces used, such as conventional, barrier, isolation/quarantine, hazard containment (infectious, radioactive, chemical), "animal cubicles" or facilities specifically designed for housing certain species such as ponds, pastures, feedlots, etc.

The buildings have slatted floors with a mechanical scraping system below. There are pens formed from panels that house the various ages of chickens.

4. Finishes used throughout the animal facility for floors, walls, ceilings, doors, alleyways, gates, etc. (note any areas that are not easily sanitized and describe how these are maintained).

The animal area floors are plastic slats. The walls are ¾" plywood covered with a resin finish system and fiberglass matting on seams. The ceilings are ½" plywood covered with resin finish system and fiberglass matting on seams and gel coat finish. Doors are steel.

5. Engineering features (design, layout, special HVAC systems, noting exhaust air treatment, if applicable) used in hazardous agent containment.

There is an exhaust fan that is run locally, by ARU personnel, for ventilation.

6. Security features, such as control of entry, perimeter fences, gates, entryways, cameras, guards; identify and describe exceptions for individual facilities or areas incorporating fewer or additional security features than the general features described.

External doors to the building are secured with electronically controlled locks that are released by a card swipe.

7. Consideration for facilities with exterior windows, if applicable, including management of environmental conditions (i.e., temperature and photoperiod control) and potential security risks.

There are no exterior windows.

8. Storage areas for flammable or hazardous agents and materials (e.g., disinfectants, cage-washing chemicals, pesticides, fuel).

Disinfectants would be kept in the small supporting space, away from any feed storage.

Physical Plant [redacted]

1. General arrangement of the animal facilities (conventional, clean/dirty corridor, etc.).

This building was designed for swine or poultry. The building has a personnel area and working space in the center of the building with vestibules at the end for deliveries. There are two animal housing rooms.

2. Physical relationship of the animal facilities to the research laboratories where animals may be used.

NA – live animals are not used in the research laboratories.

3. Types of available animal housing spaces used, such as conventional, barrier, isolation/quarantine, hazard containment (infectious, radioactive, chemical), "animal cubicles" or facilities specifically designed for housing certain species such as ponds, pastures, feedlots, etc.

Brooders with supplemental heat are available for newly hatched chicks.

4. Finishes used throughout the animal facility for floors, walls, ceilings, doors, alleyways, gates, etc. (note any areas that are not easily sanitized and describe how these are maintained).

Walls are ¾ "plywood covered with a resin finish system and fiberglass matting on seams. The ceilings are ½" plywood covered with resin finish system and fiberglass matting on seams and gel coat finish. Floors are epoxy coated. Doors are steel.

5. Engineering features (design, layout, special HVAC systems, noting exhaust air treatment, if applicable) used in hazardous agent containment.

Building has two supply air handling units and two associated exhaust fan units. The supply units run in Lead-Lag configuration which will switch fans upon failure. The exhaust fans operate in parallel with the capability to run in single fan mode upon failure or maintenance requirements. The supply air units use variable frequency drives to control fan speed to a discharge air static pressure set-point. The exhaust fan units use variable frequency drives to control fan speed to a static pressure set-point. The supply air units employ 100% outside air through outside air dampers which pass through pre-filters, a direct expansion cooling coil, final filter, electric reheat coil and a steam injected humidifier.

6. Security features, such as control of entry, perimeter fences, gates, entryways, cameras, guards; identify and describe exceptions for individual facilities or areas incorporating fewer or additional security features than the general features described.

All external doors to the building are secured with electronically controlled locks that are released by a card swipe. Power to all locking devices, keypads/card readers, and intrusion detection devices is backed up by uninterruptible power supply.

7. Consideration for facilities with exterior windows, if applicable, including management of environmental conditions (i.e., temperature and photoperiod control) and potential security risks.

No exterior windows are present. A 12-12 light/dark cycle is used.

8. Storage areas for flammable or hazardous agents and materials (e.g., disinfectants, cage-washing chemicals, pesticides, fuel).

Supplies such as disinfectant may be stored in the center area of the building

Physical Plant Buildings (b) (6) [redacted]

1. General arrangement of the animal facilities (conventional, clean/dirty corridor, etc.).

These buildings were designed for farm animals with 3 isolation pens in the front half, and a large pen in the back half. These buildings may be operated with the front half heated (not cooled) and closed off from the back half, and the back half unheated (and not cooled) with the south doors open to the lot. The buildings can be used with the south doors closed to the lot and the middle doors open which allows the entire building to be heated. The buildings are used for holding farm animals including poultry. (b) (6) [redacted] have been modified to house genetically feral swine. The outside lots for those buildings have fencing that extends underground.

2. Physical relationship of the animal facilities to the research laboratories where animals may be used.

NA – live animals are not used in the research laboratories.

3. Types of available animal housing spaces used, such as conventional, barrier, isolation/quarantine, hazard containment (infectious, radioactive, chemical), "animal cubicles" or facilities specifically designed for housing certain species such as ponds, pastures, feedlots, etc.

Specialized equipment may be moved in as needed. A3 has a sheep handling system that is used for blood donor sheep.

4. Finishes used throughout the animal facility for floors, walls, ceilings, doors, alleyways, gates, etc. (note any areas that are not easily sanitized and describe how these are maintained).

Floors are sealed concrete. The walls are concrete block with epoxy paint. The ceilings are painted plywood. The doors are painted steel or fiberglass.

5. Engineering features (design, layout, special HVAC systems, noting exhaust air treatment, if applicable) used in hazardous agent containment.

The forced-air heating and ventilating system consists of an air handling unit with furnace style filters, electric duct heater, and supply fan. An outdoor air thermostat regulates the outside air to return air ratio. Normally, the outside air damper is fully open and the return air damper is closed during summer operation. A thermostat in the front part of each building regulates the heat to maintain space temperature of 40-65oF during the heating season. During winter operation the outside air thermostat closes the outside air damper to a minimum required position and opens the return air damper to a predetermined position based on outside temperature.

6. Security features, such as control of entry, perimeter fences, gates, entryways, cameras, guards; identify and describe exceptions for individual facilities or areas incorporating fewer or additional security features than the general features described.

None beyond the campus security measures.

7. Consideration for facilities with exterior windows, if applicable, including management of environmental conditions (i.e., temperature and photoperiod control) and potential security risks.
Exterior windows are present in the animal areas, but are too high to be used for animal observation.

8. Storage areas for flammable or hazardous agents and materials (e.g., disinfectants, cage-washing chemicals, pesticides, fuel).
Disinfectants would be stored in the metal cabinets or in the storage area, away from feed supply.

Physical Plant (b) (6)

1. General arrangement of the animal facilities (conventional, clean/dirty corridor, etc.).

The building was designed to handle swine, small ruminants, and poultry. It consists of a central north/south hallway which leads to 7 animal housing rooms, and a storage room, mechanical room and 2 change rooms in the middle.

2. Physical relationship of the animal facilities to the research laboratories where animals may be used.

NA – live animals are not used in the research laboratories.
3. Types of available animal housing spaces used, such as conventional, barrier, isolation/quarantine, hazard containment (infectious, radioactive, chemical), "animal cubicles" or facilities specifically designed for housing certain species such as ponds, pastures, feedlots, etc.
none

4. Finishes used throughout the animal facility for floors, walls, ceilings, doors, alleyways, gates, etc. (note any areas that are not easily sanitized and describe how these are maintained).

The floors are sealed concrete. The walls are concrete block walls covered with epoxy paint. The ceilings are covered with 4 X 8 fiberglass sheets with sealed seams. The doors are steel or fiberglass.

5. Engineering features (design, layout, special HVAC systems, noting exhaust air treatment, if applicable) used in hazardous agent containment.

The forced-air heating and cooling system consists of an air handling unit with direct expansion cooling coil, and supply fan followed by an electric duct heater. The air handling unit supplies 100% outside air, which it preheats or cools and distributes to the occupied spaces. The final temperature adjustments are made by terminal electric reheat coils for each room. Temperatures in the animal rooms are controlled by zone thermostats that modulate the

reheats to satisfy temperature requirements. Typical temperatures are 68-72°F during the heating season and 72-78°F during the cooling season. Conditioned air is removed from the building by an exhaust fan.

6. Security features, such as control of entry, perimeter fences, gates, entryways, cameras, guards; identify and describe exceptions for individual facilities or areas incorporating fewer or additional security features than the general features described.

All external doors to the building are able to be secured with electronically controlled locks that are released by a card swipe. Power to all locking devices, keypads/card readers, and intrusion detection devices is backed up by uninterruptible power supply.

7. Consideration for facilities with exterior windows, if applicable, including management of environmental conditions (i.e., temperature and photoperiod control) and potential security risks.

There are no exterior windows in these animal rooms. There are bubble observation windows in the hallway. Timers are used to control photoperiod of 12 hours light, 12 hours dark.

8. Storage areas for flammable or hazardous agents and materials (e.g., disinfectants, cage-washing chemicals, pesticides, fuel).

Disinfectants would be stored in the central storage room, away from feed products.

Physical Plant [redacted]

1. General arrangement of the animal facilities (conventional, clean/dirty corridor, etc.).

The building is designed to handle farm animals (3 rooms) used primarily for reagent production or poultry. Leading from the central hallway are two large animal containment rooms, and one large animal environmental room. Other rooms in the north part of the building are laboratory rooms, change rooms, an autoclave/freezer room, and a mechanical room.

2. Physical relationship of the animal facilities to the research laboratories where animals may be used.

NA – live animals are not used in the research laboratories.

3. Types of available animal housing spaces used, such as conventional, barrier, isolation/quarantine, hazard containment (infectious, radioactive, chemical), "animal cubicles" or facilities specifically designed for housing certain species such as ponds, pastures, feedlots, etc.

None

4. Finishes used throughout the animal facility for floors, walls, ceilings, doors, alleyways, gates, etc. (note any areas that are not easily sanitized and describe how these are maintained).

The floors are concrete covered with a troweled on epoxy coating. The walls are concrete block covered with epoxy paint. The ceilings are covered with the fiberglass panels. The doors are steel.

5. Engineering features (design, layout, special HVAC systems, noting exhaust air treatment, if applicable) used in hazardous agent containment.

The forced-air heating and cooling system consists of an air handling unit with heat recovery coils, direct expansion cooling coil, and supply air fan followed by a propane fired duct heater. The air handling unit supplies 100% fresh outside air which is cooled or preheated, then passed through terminal reheat coils for each animal room. Temperatures in animal rooms are controlled by zone thermostats that modulate the reheats to satisfy temperature requirements. There are humidifiers in the supply ducts to each occupied space with humidistats controlling the humidity of each zone. The conditioned air exhaust system consists of an air handling unit heat recovery coils, and exhaust air fan.

6. Security features, such as control of entry, perimeter fences, gates, entryways, cameras, guards; identify and describe exceptions for individual facilities or areas incorporating fewer or additional security features than the general features described.

None beyond the general campus security measures.

7. Consideration for facilities with exterior windows, if applicable, including management of environmental conditions (i.e., temperature and photoperiod control) and potential security risks.

There are no exterior windows.

8. Storage areas for flammable or hazardous agents and materials (e.g., disinfectants, cage-washing chemicals, pesticides, fuel).

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Disinfectants would be stored in the storage area away from feed.

Physical Plant [redacted]

1. General arrangement of the animal facilities (conventional, clean/dirty corridor, etc.).

The barn is a typical 40' x 100' metal animal building designed to house agricultural animals, but also has special features to facilitate training activities. It consists of three rooms which are 1) a 3532 sq. ft. animal housing and working room, 2) a 95 sq. ft. heated entry/storage room, and 3) a 74 sq. ft. heated mechanical room. Heated entry/storage room can be used for

clothes changing if needed. Because it is used for training, it has more lights, larger ventilation units, and several cattle head catches to secure cattle for training courses for field veterinarians and technicians. The animal penning in its normal mode consists of an east indoor loafing area of 1035 sq. ft. connected to a 6156 sq. ft. lot, a west indoor loafing area of 1025 sq. ft. connected by a walk through door to a 10,561 sq. ft. lot, and a 120 sq. ft. isolation pen. Shelters are placed in each of the outside lots for animal shelter. A corridor inside the barn runs along the periphery of the pens to allow for transport of feed and supplies and to move animals to a cattle chute in the animal procedural area. Two 4.9 ton bulk feed bins are set immediately northeast of the building.

2. Physical relationship of the animal facilities to the research laboratories where animals may be used.

NA – live animals are not used in the research laboratories.

3. Types of available animal housing spaces used, such as conventional, barrier, isolation/quarantine, hazard containment (infectious, radioactive, chemical), "animal cubicles" or facilities specifically designed for housing certain species such as ponds, pastures, feedlots, etc.

The building has cattle chutes and several stanchions that are used for short term restraint of large farm animals during training courses.

4. Finishes used throughout the animal facility for floors, walls, ceilings, doors, alleyways, gates, etc. (note any areas that are not easily sanitized and describe how these are maintained).

The walkways are fenced off from the animal area. The floors are concrete. The pen walls are painted metal gates and the building walls are metal (pressed steel) covered on the interior and exterior. The ceiling and roof are also pressed steel. Steel construction is used on all doors including the sliding doors used for tractors and equipment, the animal doors to the lot and the personnel entry doors. The building floor is concrete. The lot floor is concrete in the feeding area and loafing area is dirt. Concrete block half walls used for loading manure and wastes are found in 2 locations at each end of the pens.

5. Engineering features (design, layout, special HVAC systems, noting exhaust air treatment, if applicable) used in hazardous agent containment.

Electric heaters provide heat in the storage and mechanical rooms only (not the animal areas). Natural ventilation is provided through doors and windows, however, electrically powered ventilators are provided to supplement ventilation.

6. Security features, such as control of entry, perimeter fences, gates, entryways, cameras, guards; identify and describe exceptions for individual facilities or areas incorporating fewer or additional security features than the general features described.

None beyond campus security measures.

7. Consideration for facilities with exterior windows, if applicable, including management of environmental conditions (i.e., temperature and photoperiod control) and potential security risks.
Natural sunlight is provided through 16 exterior windows. These open for natural ventilation when needed.

8. Storage areas for flammable or hazardous agents and materials (e.g., disinfectants, cage-washing chemicals, pesticides, fuel).

Disinfectants would be stored in the heated storage room, away from feed products.

Physical Plant C8 (421)

1. General arrangement of the animal facilities (conventional, clean/dirty corridor, etc.).

The building was designed to handle field staff training courses. The north end has a large necropsy room and supporting supply rooms. There are men's and women's locker rooms with showers and bathrooms near the center of the building. C-8 South consists of a north/south hallway which leads to 6 animal rooms, an equipment storage room, and a feed room.

2. Physical relationship of the animal facilities to the research laboratories where animals may be used.

NA – live animals are not used in the research laboratories.

3. Types of available animal housing spaces used, such as conventional, barrier, isolation/quarantine, hazard containment (infectious, radioactive, chemical), "animal cubicles" or facilities specifically designed for housing certain species such as ponds, pastures, feedlots, etc.

Four animal rooms are designed to handle farm animals in head gate/stanchions while the other 2 have no fixed equipment.

4. Finishes used throughout the animal facility for floors, walls, ceilings, doors, alleyways, gates, etc. (note any areas that are not easily sanitized and describe how these are maintained).

The floors are sealed concrete with an epoxy surface coating. The walls are concrete block covered with epoxy paint. The ceilings are covered with 4 x 8 fiberglass sheets with sealed seams. The width of the corridors is 7 ft. The floors are sealed concrete with an epoxy surface

coating. All doors are 48 inch steel or fiberglass doors. The animal room doors have a small view window.

5. Engineering features (design, layout, special HVAC systems, noting exhaust air treatment, if applicable) used in hazardous agent containment.

This building has two separate HVAC units. The north section includes the necropsy room, 3 storage rooms, an autoclave room, mechanical room, and both locker rooms. The south section includes two storage areas and six farm animal rooms. Each forced-air heating and cooling system consists of an air handling unit with HEPA filters, electric preheat units, direct expansion cooling coils, and air fans on the supply side. The air handling units supply 100% outside air which is preheated or cooled, then distributed to occupied spaces. Terminal electric reheat coils in the supply ducts to each animal room, locker room, or necropsy room are controlled by room thermostats which modulate the reheats to satisfy temperature requirements. Each exhaust system consists of an air handling unit with coarse filters, and exhaust air fan.

6. Security features, such as control of entry, perimeter fences, gates, entryways, cameras, guards; identify and describe exceptions for individual facilities or areas incorporating fewer or additional security features than the general features described.

None beyond campus security measures.

7. Consideration for facilities with exterior windows, if applicable, including management of environmental conditions (i.e., temperature and photoperiod control) and potential security risks.

All animal rooms have one small exterior window that allows natural lighting. The windows are too high to be used as observation windows.

8. Storage areas for flammable or hazardous agents and materials (e.g., disinfectants, cage-washing chemicals, pesticides, fuel).

Disinfectants would be kept in the equipment and supply storage room.

Physical Plant [redacted]

1. General arrangement of the animal facilities (conventional, clean/dirty corridor, etc.).

This barn is designed to house cattle, horses, or sheep, and duplicate a typical agricultural production setting. It consists of about 2400 sq. ft. of indoor animal space connected to approximately 16,800 sq. ft. of lot space. A corridor inside the barn runs along the periphery of the pens to allow for transport of feed and supplies and to move animals to a cattle chute in the animal procedural area. A heated feed and storage room is provided at one end of the building. A bulk feed bin is set immediately southeast of the building.

2. Physical relationship of the animal facilities to the research laboratories where animals may be used.

NA – live animals are not used in the research laboratories.

3. Types of available animal housing spaces used, such as conventional, barrier, isolation/quarantine, hazard containment (infectious, radioactive, chemical), "animal cubicles" or facilities specifically designed for housing certain species such as ponds, pastures, feedlots, etc.

The building has a cattle chute system that is used for short term restraint of large farm animals.

4. Finishes used throughout the animal facility for floors, walls, ceilings, doors, alleyways, gates, etc. (note any areas that are not easily sanitized and describe how these are maintained).

The walkways are fenced off from the animal area. The floors are concrete. The pen walls are painted metal gates and the building walls are wood covered on the interior by fiberglass and on the exterior by pressed steel. The ceilings consist of open unpainted wood rafters with a pressed steel roof. Steel construction is used on all exterior doors including the sliding doors used for tractors and equipment, the animal doors to the lot and the personnel entry doors. Painted wood doors are used between the feed/equipment room and the corridors. The building floor is concrete. The lot floor is concrete in the feeding area and packed gravel in the remaining loafing area. The pen walls are painted metal gates and the building walls are wood covered on the interior by fiberglass and on the exterior by pressed steel. Concrete half walls used for loading manure and wastes are found in 3 locations at each end of the pens.

5. Engineering features (design, layout, special HVAC systems, noting exhaust air treatment, if applicable) used in hazardous agent containment.

Propane fired heaters provide heat in the storage room only (not the animal areas). Ventilation is provided through doors, windows, and electrically powered roof ventilators.

6. Security features, such as control of entry, perimeter fences, gates, entryways, cameras, guards; identify and describe exceptions for individual facilities or areas incorporating fewer or additional security features than the general features described.

None beyond campus security measures.

7. Consideration for facilities with exterior windows, if applicable, including management of environmental conditions (i.e., temperature and photoperiod control) and potential security risks.

Natural sunlight is provided through 24 exterior windows.

8. Storage areas for flammable or hazardous agents and materials (e.g., disinfectants, cage-washing chemicals, pesticides, fuel).

Disinfectants would be stored in the heated storage room, away from the feed.

Physical Plant(b) (6) [redacted]

1. General arrangement of the animal facilities (conventional, clean/dirty corridor, etc.).

The barn is designed to house cattle, horses, or sheep, and duplicate a typical agricultural production setting. It consists of about 1000 sq. ft. of loafing space that is open to the south. There is about 2064 sq. ft. of space on an adjoining concrete lot. This concrete lot is enclosed by board fencing and adapted with a smaller catch pen and restraining chute. Feed Storage space – 230 sq. ft. A 4 acre grassed lot fenced with woven wire is adjoining each barn.

2. Physical relationship of the animal facilities to the research laboratories where animals may be used.

NA – live animals are not used in the research laboratories.

3. Types of available animal housing spaces used, such as conventional, barrier, isolation/quarantine, hazard containment (infectious, radioactive, chemical), "animal cubicles" or facilities specifically designed for housing certain species such as ponds, pastures, feedlots, etc.

Each building has a cattle chute used for short term handling of large farm animals.

4. Finishes used throughout the animal facility for floors, walls, ceilings, doors, alleyways, gates, etc. (note any areas that are not easily sanitized and describe how these are maintained).

The floors are concrete. Side walls are partial concrete with steel frame and steel siding for remainder of walls and ceiling. Ceiling is not enclosed with steel beams exposed and a pressed steel roof. Exterior doors are steel construction, sliding doors or overhead doors in addition to a walk in door. The building and lot floors are concrete. Feed Storage area has partial concrete walls with remainder open space screened to ceiling.

5. Engineering features (design, layout, special HVAC systems, noting exhaust air treatment, if applicable) used in hazardous agent containment.

Natural ventilation

6. Security features, such as control of entry, perimeter fences, gates, entryways, cameras, guards; identify and describe exceptions for individual facilities or areas incorporating fewer or additional security features than the general features described.

None beyond campus security measures.

7. Consideration for facilities with exterior windows, if applicable, including management of environmental conditions (i.e., temperature and photoperiod control) and potential security risks.

Natural sunlight is provided through open front to the south.

8. Storage areas for flammable or hazardous agents and materials (e.g., disinfectants, cage-washing chemicals, pesticides, fuel).

Disinfectants would be stored in the storage area, away from feed, in a cabinet if available.

Physical Plant 232 and 233

1. General arrangement of the animal facilities (conventional, clean/dirty corridor, etc.).

The barn is designed with pens indoors connecting to outside runs on concrete that face south. The building overhang provides shade for the animals outside. Animals used in this facility are manually restrained.

2. Physical relationship of the animal facilities to the research laboratories where animals may be used.

NA – live animals are not used in the research laboratories.

3. Types of available animal housing spaces used, such as conventional, barrier, isolation/quarantine, hazard containment (infectious, radioactive, chemical), "animal cubicles" or facilities specifically designed for housing certain species such as ponds, pastures, feedlots, etc.

Not applicable

4. Finishes used throughout the animal facility for floors, walls, ceilings, doors, alleyways, gates, etc. (note any areas that are not easily sanitized and describe how these are maintained).

The floors are concrete. Side walls are partial concrete with steel frame and steel siding for remainder of walls and ceiling. Ceiling is not enclosed with steel beams exposed and a pressed steel roof. Feed storage area is partial concrete walls with remainder screened to the ceiling.

5. Engineering features (design, layout, special HVAC systems, noting exhaust air treatment, if applicable) used in hazardous agent containment.

Natural ventilation

6. Security features, such as control of entry, perimeter fences, gates, entryways, cameras, guards; identify and describe exceptions for individual facilities or areas incorporating fewer or additional security features than the general features described.

None beyond the campus security measures.

7. Consideration for facilities with exterior windows, if applicable, including management of environmental conditions (i.e., temperature and photoperiod control) and potential security risks.

There are exterior windows to the north that can provide some natural light.

8. Storage areas for flammable or hazardous agents and materials (e.g., disinfectants, cage-washing chemicals, pesticides, fuel).
Disinfectants in limited quantities would be stored in the storage room, away from the feed.

Physical Plant [redacted]

1. General arrangement of the animal facilities (conventional, clean/dirty corridor, etc.).

The barn is designed to house cattle, horses, or sheep, and duplicates a typical agricultural production setting but historically has mainly been used to house horses. It consists of about 480 sq. ft. of loafing space that is open to the south. There is an adjoining concrete lot. This concrete lot is enclosed by board fencing. Two grassed lots fenced with woven wire are adjoining the barn. There is a 162 sq. ft.; feed and bedding storage area and a 299 sq. ft. support area used mainly for a restraining stock.

2. Physical relationship of the animal facilities to the research laboratories where animals may be used.

NA – live animals are not used in the research laboratories.

3. Types of available animal housing spaces used, such as conventional, barrier, isolation/quarantine, hazard containment (infectious, radioactive, chemical), "animal cubicles" or facilities specifically designed for housing certain species such as ponds, pastures, feedlots, etc.

There is a stock installed in the support area for handling one horse at a time.

4. Finishes used throughout the animal facility for floors, walls, ceilings, doors, alleyways, gates, etc. (note any areas that are not easily sanitized and describe how these are maintained).
The floors are concrete. Side walls are partial concrete with steel frame and steel siding for remainder of walls and ceiling. Ceiling is not enclosed with steel beams exposed. Steel construction is used on the sliding entry exterior doors.

5. Engineering features (design, layout, special HVAC systems, noting exhaust air treatment, if applicable) used in hazardous agent containment.

Natural ventilation

6. Security features, such as control of entry, perimeter fences, gates, entryways, cameras, guards; identify and describe exceptions for individual facilities or areas incorporating fewer or additional security features than the general features described.

None beyond the campus security measures.

7. Consideration for facilities with exterior windows, if applicable, including management of environmental conditions (i.e., temperature and photoperiod control) and potential security risks.

Natural sunlight is provided through open front to the south.

8. Storage areas for flammable or hazardous agents and materials (e.g., disinfectants, cage-washing chemicals, pesticides, fuel).

Disinfectants would be stored in the storage area, away from feed.

Physical Plant (b) (6) [redacted]

1. General arrangement of the animal facilities (conventional, clean/dirty corridor, etc.).

The building is an ABSL2 biocontainment facility designed primarily to handle small farm animals or poultry. It contains 8 isolation wings utilizing dual containment zones where primary containment can be established at the animal room level (shower-out capabilities) and secondary containment at the building level (airlock and shower-out capabilities). Air flows into the animal rooms and toward the building center. (b) (6) [redacted] use a single corridor system. All air is exhausted (no recirculation) to the atmosphere through 90-95% pocket filters. Sewage is sterilized before it enters the city sewage system.

2. Physical relationship of the animal facilities to the research laboratories where animals may be used.

NA – live animals are not used in the research laboratories.

3. Types of available animal housing spaces used, such as conventional, barrier, isolation/quarantine, hazard containment (infectious, radioactive, chemical), "animal cubicles" or facilities specifically designed for housing certain species such as ponds, pastures, feedlots, etc.

The building is designed to handle Biosafety Level 2 organisms of agricultural animals and poultry. Wings G and H are used for surgery and housing gnotobiotic and caesarean derived-colostrum deprived (CDCD) animals.

Isolator cages may be used for newborn cesarean derived – colostrum deprived pigs. The pigs are housed in the cages for approximately 2 weeks and are removed before they reach 15 pounds.

Gnotobiotic isolators are available to be used for pigs, calves, or turkey poults. There are 2 calf isolators used to maintain calves for 8 weeks or 100 pounds. There are 6 isolators used to maintain single pigs up to 40 pounds.

4. Finishes used throughout the animal facility for floors, walls, ceilings, doors, alleyways, gates, etc. (note any areas that are not easily sanitized and describe how these are maintained).

The walls are precast or cast-in –place concrete, concrete masonry, or structural clay-tile with cement-based plaster finish. The ceilings are concrete. All walls and ceilings are finished with epoxy-based paint or sealer to be able to be power washed and sanitized. Some of the floors are sealed concrete.

5. Engineering features (design, layout, special HVAC systems, noting exhaust air treatment, if applicable) used in hazardous agent containment.

The forced-air heating and cooling system consists of a central air handling unit and several single- zone air handling units with terminal reheat and cooling. The central build-up air handling unit is equipped with a roll filter, 2 stage steam preheat coils and a supply fan with a second fan available for standby service. The central air handling unit employs 100% outside air through outside air dampers. Supply air from the central air handling unit is distributed to several single-zone air handling units for each zone of the building. Typically, each zone serves one of the 8 animal wings of the building. Space temperatures in each zone are controlled by space thermostats which modulates the reheat coils and cooling coils to satisfy space heating and cooling requirements. Space temperatures are typically maintained between 68 and 72ºF throughout the heating season and 72 and 78ºF in the cooling season, with occasional unusual temperatures to meet specific test animal requirements. Tempered air to each zone is filtered by biological filters and then introduced to occupied spaces through ceiling diffusers. Conditioned air from each wing is removed by an exhaust fan with a second fan available for standby service. The exhaust air from each wing is controlled by automatic

dampers to maintain a negative pressure (approximately 0.03 inches water column) with respect to outside conditions. The exhaust from each wing is filtered by 90-95% pocket filters to confine and eliminate any potential cross-contamination.

6. Security features, such as control of entry, perimeter fences, gates, entryways, cameras, guards; identify and describe exceptions for individual facilities or areas incorporating fewer or additional security features than the general features described.
All external doors to the building are secured with electronically controlled locks that are released by a card swipe. Power to all locking devices, keypads/card readers, and intrusion detection devices is backed up by uninterruptible power supply.

7. Consideration for facilities with exterior windows, if applicable, including management of environmental conditions (i.e., temperature and photoperiod control) and potential security risks.

All animal rooms in 3H have 2 exterior glass block windows that allow natural lighting but cannot be opened. The windows are not usable as observation windows. The animal rooms in 3G do not have exterior windows. Timers are used to control photoperiod.

8. Storage areas for flammable or hazardous agents and materials (e.g., disinfectants, cage-washing chemicals, pesticides, fuel).

Chemicals for cleaning and liquid supplies are stored in room 17 where a flammables cabinet is available for use.

Physical Plant (b) (6) [redacted]

1. General arrangement of the animal facilities (conventional, clean/dirty corridor, etc.).

The building is an ABSL2 biocontainment facility designed primarily to handle small farm animals or poultry. It contains 8 isolation wings utilizing dual containment zones where primary containment is established at the animal room level (airlock and shower-out capabilities) and secondary containment at the building level (airlock and shower-out capabilities). Sewage is sterilized before it enters the city sewage system.

2. Physical relationship of the animal facilities to the research laboratories where animals may be used.

NA – live animals are not used in the research laboratories.

3. Types of available animal housing spaces used, such as conventional, barrier, isolation/quarantine, hazard containment (infectious, radioactive, chemical), "animal cubicles" or facilities specifically designed for housing certain species such as ponds, pastures, feedlots, etc.

The building is designed to handle Biosafety Level 2 organisms of agricultural animals and poultry. Eleven of the 15 animal rooms are currently set up to handle poultry on the floor or small farm animals. Several animal rooms have isolation cages with directional air flow or additional filtration.

4. Finishes used throughout the animal facility for floors, walls, ceilings, doors, alleyways, gates, etc. (note any areas that are not easily sanitized and describe how these are maintained).

The floors are sealed concrete. The walls and ceilings are concrete covered with epoxy paint. All animal room doors are 4' x 7', are steel, and have a small view window from the airlock.

5. Engineering features (design, layout, special HVAC systems, noting exhaust air treatment, if applicable) used in hazardous agent containment.

The forced-air heating and cooling system consists of a central air handling unit and several single- zone air handling units with terminal reheat and cooling. The central build-up air handling unit is equipped with a roll filter, 2 stage steam preheat coils and a supply fan with a second fan available for standby service. The central air handling unit employs 100% outside air through outside air dampers. Supply air from the central air handling unit is distributed to several single-zone air handling units for each zone of the building. Typically, each zone serves one of the 8 animal wings of the building. Space temperatures in each zone are controlled by space thermostats which modulates the reheat coils and cooling coils to satisfy space heating and cooling requirements. Space temperatures are typically maintained between 68 and 72ºF throughout the heating season and 72 and 78ºF in the cooling season, with occasional unusual temperatures to meet specific test animal requirements. Tempered air to each zone is filtered by biological filters and then introduced to occupied spaces through ceiling diffusers. Conditioned air from each wing is removed by an exhaust fan with a second fan available for standby service. The exhaust air from each wing is controlled by automatic dampers to maintain a negative pressure (approximately -0.03 inches water column) with respect to outside conditions. The exhaust from each wing is filtered by 90-95% pocket filters to confine and eliminate any potential cross-contamination.

6. Security features, such as control of entry, perimeter fences, gates, entryways, cameras, guards; identify and describe exceptions for individual facilities or areas incorporating fewer or additional security features than the general features described.

All external doors to the building are secured with electronically controlled locks that are released by a card swipe. Power to all locking devices, keypads/card readers, and intrusion detection devices is backed up by uninterruptible power supply.

7. Consideration for facilities with exterior windows, if applicable, including management of environmental conditions (i.e., temperature and photoperiod control) and potential security risks.

All animal rooms have 2 exterior glass block windows that allow natural lighting. The windows are not usable as observation windows.

8. Storage areas for flammable or hazardous agents and materials (e.g., disinfectants, cage-washing chemicals, pesticides, fuel).

Chemicals for cleaning and liquid supplies are stored in the center core storage area.

Physical Plant (b) (6) [redacted]

1. General arrangement of the animal facilities (conventional, clean/dirty corridor, etc.).

The building is an ABSL2 biocontainment facility designed primarily to handle small farm animals or poultry. The isolation wing utilizes dual containment zones where primary containment may be established at the animal room level (airlock and shower-out capabilities) and secondary containment at the building level (airlock and shower-out capabilities). Air flows into the animal rooms and toward the building center. Both wings use a single corridor system. All air is exhausted (no recirculation) to the atmosphere through 90-95% pocket filters. Sewage is sterilized before it enter the city sewage system.

2. Physical relationship of the animal facilities to the research laboratories where animals may be used.

NA – live animals are not used in the research laboratories.

3. Types of available animal housing spaces used, such as conventional, barrier, isolation/quarantine, hazard containment (infectious, radioactive, chemical), "animal cubicles" or facilities specifically designed for housing certain species such as ponds, pastures, feedlots, etc.

None

4. Finishes used throughout the animal facility for floors, walls, ceilings, doors, alleyways, gates, etc. (note any areas that are not easily sanitized and describe how these are maintained).

The floors are sealed concrete. The walls and ceilings are concrete covered with epoxy paint. Animal room doors are 4'x7' and have a small view window.

5. Engineering features (design, layout, special HVAC systems, noting exhaust air treatment, if applicable) used in hazardous agent containment.

The forced-air heating and cooling system consists of a central air handling unit and several single- zone air handling units with terminal reheat and cooling. The central build-up air

handling unit is equipped with a roll filter, 2 stage steam preheat coils and a supply fan with a second fan available for standby service. The central air handling unit employs 100% outside air through outside air dampers. Supply air from the central air handling unit is distributed to several single-zone air handling units for each zone of the building. Typically, each zone serves one of the 8 animal wings of the building. Space temperatures in each zone are controlled by space thermostats which modulates the reheat coils and cooling coils to satisfy space heating and cooling requirements. Space temperatures are typically maintained between 68 and 72ºF throughout the heating season and 72 and 78ºF in the cooling season, with occasional unusual temperatures to meet specific test animal requirements. Tempered air to each zone is filtered by biological filters and then introduced to occupied spaces through ceiling diffusers. Conditioned air from each wing is removed by an exhaust fan with a second fan available for standby service. The exhaust air from each wing is controlled by automatic dampers to maintain a negative pressure (approximately -0.03 inches water column) with respect to outside conditions. The exhaust from each wing is filtered by 90-95% pocket filters to confine and eliminate any potential cross-contamination.

6. Security features, such as control of entry, perimeter fences, gates, entryways, cameras, guards; identify and describe exceptions for individual facilities or areas incorporating fewer or additional security features than the general features described.

All external doors to the building are secured with electronically controlled locks that are released by a card swipe. Power to all locking devices, keypads/card readers, and intrusion detection devices is backed up by uninterruptible power supply.

7. Consideration for facilities with exterior windows, if applicable, including management of environmental conditions (i.e., temperature and photoperiod control) and potential security risks.

All animal rooms have 2 exterior glass block windows that allow natural lighting. The windows are not usable as observation windows.

8. Storage areas for flammable or hazardous agents and materials (e.g., disinfectants, cage-washing chemicals, pesticides, fuel).

Disinfectants would be stored in the storage room, away from the feed.

Physical Plant [redacted]

1. General arrangement of the animal facilities (conventional, clean/dirty corridor, etc.).

The barn is designed to house cattle, horses, or sheep, and duplicate a typical agricultural production setting. It consists of about 400 sq. ft. of loafing space that is open to the south. There is about 160 sq. ft. of space on an adjoining concrete lot. This concrete lot is enclosed by board fencing and adapted with a smaller catch pen and restraining chute. A 1680 sq. ft. outside run with gravel floor is adjoining each barn, enclosed by a wooden fence. A feed storage area is located between the two halves of each building.

2. Physical relationship of the animal facilities to the research laboratories where animals may be used.

NA – live animals are not used in the research laboratories.

3. Types of available animal housing spaces used, such as conventional, barrier, isolation/quarantine, hazard containment (infectious, radioactive, chemical), "animal cubicles" or facilities specifically designed for housing certain species such as ponds, pastures, feedlots, etc.

None

4. Finishes used throughout the animal facility for floors, walls, ceilings, doors, alleyways, gates, etc. (note any areas that are not easily sanitized and describe how these are maintained).

The floors are concrete. The building walls are concrete block. The ceilings consist of open unpainted wood rafters with a pressed steel roof. Steel construction is used on all exterior doors and the interior doors leading to animal areas.

5. Engineering features (design, layout, special HVAC systems, noting exhaust air treatment, if applicable) used in hazardous agent containment.
Natural ventilation

6. Security features, such as control of entry, perimeter fences, gates, entryways, cameras, guards; identify and describe exceptions for individual facilities or areas incorporating fewer or additional security features than the general features described.

None beyond campus security measures.

7. Consideration for facilities with exterior windows, if applicable, including management of environmental conditions (i.e., temperature and photoperiod control) and potential security risks.

Natural sunlight is provided through the opening to the south.

8. Storage areas for flammable or hazardous agents and materials (e.g., disinfectants, cage-washing chemicals, pesticides, fuel).
Disinfectants would be stored in limited quantities in the storage room, away from feed.

Physical Plant [redacted]

1. General arrangement of the animal facilities (conventional, clean/dirty corridor, etc.).

The facility has 4 pens with a central alley. There is a pass through shower and a small feed/storage room.

2. Physical relationship of the animal facilities to the research laboratories where animals may be used.

NA – live animals are not used in the research laboratories.

3. Types of available animal housing spaces used, such as conventional, barrier, isolation/quarantine, hazard containment (infectious, radioactive, chemical), "animal cubicles" or facilities specifically designed for housing certain species such as ponds, pastures, feedlots, etc.

None.

4. Finishes used throughout the animal facility for floors, walls, ceilings, doors, alleyways, gates, etc. (note any areas that are not easily sanitized and describe how these are maintained).

The floors are concrete. The building walls are concrete block. The ceilings are concrete. Steel construction is used on all exterior doors and the interior doors leading to animal areas.

5. Engineering features (design, layout, special HVAC systems, noting exhaust air treatment, if applicable) used in hazardous agent containment.

The forced-air heating and cooling system consists of an air handling unit with direct expansion cooling coil, and supply air fan followed by a gas fired duct heater. The air handling unit is mixed air/recirculated air.

6. Security features, such as control of entry, perimeter fences, gates, entryways, cameras, guards; identify and describe exceptions for individual facilities or areas incorporating fewer or additional security features than the general features described.

None beyond campus security measures.

7. Consideration for facilities with exterior windows, if applicable, including management of environmental conditions (i.e., temperature and photoperiod control) and potential security risks.

Natural sunlight is provided through windows in the 2 exterior doors.

8. Storage areas for flammable or hazardous agents and materials (e.g., disinfectants, cage-washing chemicals, pesticides, fuel).

Disinfectants would be stored in the storage area, away from feed.

C. Satellite Animal Housing Facilities

In addition to the Appendices summarizing Heating, Ventilation, and Air-Conditioning (**Appendix 11**) and Lighting Systems (**Appendix 16**), summarize animal housing areas that are not centrally-managed or maintained in (**Appendix 17)**, "Satellite Animal Housing Areas."

1. Describe the criteria used to determine/define a "Satellite Animal Housing Area," which may include remote housing facilities or laboratories temporarily or consistently housing animals.

Not applicable

2. Describe the process used by the IACUC/OB to authorize, provide oversight of, and ensure compliance with *Guide* standards for the housing of animals outside of centrally-maintained facilities. Include a description of Attending Veterinarian access and physical security.

Not applicable

D. Emergency Power and Life Support Systems

Note: Complete a Heating, Ventilation, and Air-Conditioning (HVAC) Summary (**Appendix 11**) and Lighting Summary (**Appendix 16**) for each Location described in the Summary of Animal Housing and Support Sites (**Appendix 2**).

1. **Power** [*Guide*, p. 141]
   For each Location, Centralized Animal Facility, and Satellite Housing Facility, provide a brief description of the following:
   - Availability of emergency power and if so, what electrical services and equipment are maintained in the event the primary power source fails.
   - History of power failures, noting frequency, duration, and, if emergency power was not available, steps taken to ensure the comfort and well-being of the animals present and the temperature extremes reached in animal rooms during the failure.

Emergency Power: Buildings 3DE, 3GH, 4H, 7, 9, 20 (including the Vivarium) are on 100% backup power provided by stand-by generators. Switching is automatic and takes approximately 10 seconds. Exit lighting and lights along routes of egress are also connected to an uninterruptible power supply. The isolators in 3GH have battery backup for 30 minutes.

Buildings 192, 222, C3, C4, C7, C8, Z3, 500, 510, and 520 Emergency power is supplied by portable generators if power fails and a prolonged outage is expected. 232, 233, 234, C7 and Z3 mainly have power for lighting and may not need emergency power in a short outage.

History of Power Failures:
10-21-2019, bldg. 20 and the north campus experienced a momentary power outage
9/30/2019, bldg. 20 and the north campus experienced a momentary power outage
9/9/2019, bldg. 21 and the south campus experienced a momentary power outage
6/19/2019, Buildings: 20, 9, 3, 4, 5, 7 had a power outage of over an hour duration
4-10-2019 buildings 3, 20 and the south campus experienced a momentary power outage
10/4/2018, Building 20 experienced a momentary power outage
10/1/2018, building 20 and the north campus experienced a momentary power outage
9/1/18, the south campus experienced a momentary power outage
8/29/18 the south campus experienced a momentary power outage
8/13/2018, the south campus experienced a momentary power outage
8/16/18, Bldg. 20 and the south campus experienced a momentary power outage
7/29/18, the south campus experienced a momentary power outage
6/6/18, the entire campus experienced a momentary power outage
5/29/18, the north campus experienced a momentary power outage

2. **Other System Malfunctions.** If not previously reported, describe animal losses or health problems resulting from power, HVAC, or other life support system (e.g., individually ventilated cages) failures, and mechanisms for reporting such incidences. AAALAC International Rules of Accreditation (Section 2.f).

none

E. Other Facilities [*Guide*, pp. 144, 150]

1. **Other Animal Use Facilities** [*Guide*, pp. 146-150]
Describe other facilities such as imaging, irradiation, and core/shared behavioral laboratories or rooms. Include a description of decontamination and methods for preventing cross-contamination in multi-species facilities.

none

2. **Other Animal Program Support Facilities**
Describe other facilities providing animal care and use support, such as feedmills, diagnostic laboratories, abattoirs, etc.

1. Necropsy facility (b) (6) [redacted] animal necropsy facility, including an incinerator. A corridor connects this facility with (b) (6) [redacted] Floors in the Animal Handling and necropsy are methyl methacrylate coated, the rest of the floors are epoxy coated concrete, the walls area epoxy coated concrete block and the ceilings are epoxy finished gypsum board. The animals enter a handling room for blood sampling and euthanasia. The carcass is then moved to the necropsy room via chain hoist.

2. Hoop Shed H-2 is a 30' x 90'hoop building, with a concrete floor, located about a quarter mile south of the main NVSL/CVB Laboratory Building, and used for equipment storage including unused cages, floor mats, feeders, tubs, etc.

3. Hoop Shed Z-4 is a 30' x 90'hoop building, with a concrete floor, located about a quarter mile north of the main NVSL/CVB Laboratory Building, and is used for equipment storage including unused cages, floor mats, feeders, tubs, etc.

4. There are several portable metal livestock shelters (PortaHuts) which are moved into lots to provide shelter when more animal space is needed. The larger ones are 294 sq. ft. each and the smaller ones are 252 sq. ft. each.

5. The Hay Shed (Y-3) is a 48' x 120' open front pole barn located a quarter mile north of the main NVSL/CVB Laboratory Building. It is used for storing large round and small square bales for ruminants and equine.

6. The NADC Feed Warehouse (Building 13) is about 1 mile north of the main NVSL/CVB Laboratory Building. It is heated and has a cement floor. Bagged and bulk feed is received at this central warehouse building from where it is distributed to all NVSL, CVB, and NADC animal buildings. The Feed Warehouse is constructed of metal on a steel frame. It has a cold room for feeds needing cold storage.

7. The NADC Hay Storage Facility (Building 14) is about 1 mile north of the main NVSL/CVB Laboratory Building. Bulk Hay is received at this building from where it is distributed to all NVSL, CVB, and NADC animal buildings. This Building is constructed of metal on a steel frame with concrete floor.

According to the privacy principles on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, we wish to advise you that the personal data in the Program Description will become part a permanent file owned by AAALAC International, and that can be shared with AAALAC International offices and representatives in order to perform an evaluation of the institution´s animal care and use program and provide accreditation services. The institution has the option of exercising rights of data access, rectification, erasure, restriction and opposition at: accredit@aaalac.org

Appendix 1: Glossary of Abbreviations and Acronyms

Please provide a Table defining abbreviations and acronyms used in this Program Description.

Abbreviation/Acronym	Definition
USDA	United States Department of Agriculture
APHIS	Animal Plant Health Inspection Service
VS	Veterinary Services
STAS	Science, Technology, and Analysis Services
ARS	Agricultural Research Service
NADC	National Animal Disease Center
NVSL	National Veterinary Services Laboratories
CVB	Center for Veterinary Biologics
NCAH	National Centers for Animal Health
ARU	Animal Resources Unit
DVL	Diagnostic Virology Laboratory
DBPL	Diagnostic Bacteriology & Pathology Laboratory
DBRL	Diagnostic Bioanalytical & Reagent Laboratory
PTR	Proficiency Testing and Reagents
FADDL	Foreign Animal Disease Diagnostic Laboratory
IC	Inspection and Compliance
PEL	Policy Evaluation Licensing
CLF	Combined Laboratory Facility
FEU	Facilities Engineering Unit
BOD	Board of Directors
LASS	Large Animal Surgery Section
HCS	High Containment Section
SAS	Small Animal Section
FMS	Farm Management Section
SV	Swine Virology
ALL	AALAS Learning Library
CFR	Code of Federal Regulations
IRP	Incident Response Plan
SSU	Safety and Security Unit

Appendix 2: Summary of Animal Housing and Support Sites

Briefly summarize in the following Table the animal facility or facilities, noting the number of areas in which animals are housed (buildings, floors, farms, satellite housing facilities, etc.), the total square footage/metres and/or acreage for animal care and use, and the total square footage/metres and/or acreage for necessary support of the animal care and use program covered by this Description (water treatment plant/area if housing aquatic or amphibian species, cage washing facilities, service corridors, etc. and additional areas to be considered are enumerated in the *Guide*). Detailed information for satellite housing facilities is requested in Appendix 17. Include only one line entry for satellite housing facilities in this table to provide the total square footage for all satellite housing areas listed in Appendix 17. If more than one facility/site, note the approximate distance (yards/miles or meters/kilometers) to each facility from a reference point such as from the largest animal facility. A campus/site map (with a distance scale) may be included as an additional Appendix (Appendix 2.1) to provide this information. See Instructions, Addendum A - Animal Facility Square Footage/Metres Compilation Form for guidance in calculating the size of your animal care and use program.

Animal Housing and Support Sites						
Location (building, site, farm name, etc.[a])	**Distance from main facility[b]**	**Approx. ft^2, m^2, or acreage for animal housing**	**Approx. ft^2, m^2, or acreage for support or procedures**	**Species housed**	**Approx. Daily Animal Census by species**	**Person in charge of site**
[redacted]		10706	21194	Mice	646	Dr. Kaptur
				Rats	18	
				Guinea Pigs	100	
				Fish	3374	
				Hamsters	0	
				Rabbits	15	
				Poultry	40	
		15708	4688	Ovine Equine Bovine Goat	41 1 2 1	Dr. Kaptur and Dr. Cox
		17021	42649	Swine Poultry	1 1	Dr. Cox
		1125	180	Poultry	175	Mr. Sterle

Appendix 2: Summary of Animal Housing and Support Sites

Animal Housing and Support Sites						
Location (building, site, farm name, etc.[a])	Distance from main facility[b]	Approx. ft^2, m^2, or acreage for animal housing	Approx. ft^2, m^2, or acreage for support or procedures	Species housed	Approx. Daily Animal Census by species	Person in charge of site
(b) (6)		1125	180	Poultry	143	Mr. Sterle
		620	823	Poultry	725	Mr. Sterle
		800 + .46 acre lot w/ 2 huts (280 ft^2 per hut)		sheep	22	Mr. Sterle
		800 + .46 acre lot w/ hut (280 ft^2)		swine	8	Mr. Sterle
A5 outside lot	2360	.46 acre lot w/ hut (280 ft^2)				Mr. Sterle
(b) (6)		2700 + .1 acre lot		Cattle Equine	10 1	Mr. Sterle
		800 + .45 acre lot w/ hut (280 ft^2)		Equine	8	Mr. Sterle
		800 + .46 acre lot w/ hut (280 ft^2)		Swine	10	Mr. Sterle
		800 + .46 acre lot		Sheep Goat	22 1	Mr. Sterle
		3280		Poultry	9	Mr. Sterle
		1005		Poultry Equine Goat	16 0 0	Mr. Sterle
		3784 East Lot - .15 acres	216	Bovine Sheep	0 13	Mr. Sterle

Appendix 2: Summary of Animal Housing and Support Sites

Animal Housing and Support Sites						
Location (building, site, farm name, etc.[a])	**Distance from main facility[b]**	**Approx. ft², m², or acreage for animal housing**	**Approx. ft², m², or acreage for support or procedures**	**Species housed**	**Approx. Daily Animal Census by species**	**Person in charge of site**
		w/ 1 hut (280 ft²) West Lot - .28 acres w/ 1 hut (280 ft²)		Goat	2	
(b) (6)		1900		Swine, cattle, sheep, poultry		Mr. Sterle
		3864 East Lot - .13 acres West Lot - .09 acres	168	Cattle	12	Mr. Sterle
		1594 (1210*) + 2064 lot and 3.8 acre pasture	230	Equine	5	Mr. Sterle
		1594 (1210*) + 2064 lot and 3.8 acre pasture	230	Cattle	1	Mr. Sterle
		1594 (1210*) + 2064 lot and 3.8 acre pasture	230	Cattle		Mr. Sterle

Appendix 2: Summary of Animal Housing and Support Sites

Animal Housing and Support Sites						
Location (building, site, farm name, etc.[a])	**Distance from main facility[b]**	**Approx. ft^2, m^2, or acreage for animal housing**	**Approx. ft^2, m^2, or acreage for support or procedures**	**Species housed**	**Approx. Daily Animal Census by species**	**Person in charge of site**
232	4410	1566 +4800 lots (4 lots) and .13 acre pasture	590			Mr. Sterle
233	4410	1566 +4800 lots (4 lots)	590			Mr. Sterle
(b) (6)		480 +1664 lot East Pasture - .31 acres West Pasture - .53 acres	416	Cattle	0	Mr. Sterle
		1606	2927	Horses, cattle, sheep, swine	0	Dr. Kaptur
		2753	3768	Poultry	187	Dr. Cox
		1318	2079	Poultry	26	Dr. Cox
		1730	2244	poultry	148	Mr. Sterle
		556 total + lot		Sheep	4	Mr. Sterle
		1066 total		Swine	15	Mr. Sterle
		2240 total				Mr. Sterle
			2700	storage		Mr. Sterle
			2700	storage		Mr. Sterle

Appendix 2: Summary of Animal Housing and Support Sites

Animal Housing and Support Sites						
Location (building, site, farm name, etc.[a])	**Distance from main facility[b]**	**Approx. ft^2, m^2, or acreage for animal housing**	**Approx. ft^2, m^2, or acreage for support or procedures**	**Species housed**	**Approx. Daily Animal Census by species**	**Person in charge of site**
Satellite Housing Facilities Total (Expand in Appendix 17)		0	0			

Subtotals (ft^2/m^2):	**84,085**	**88,802**
TOTAL Acreage:	**15.34 acres in pasture/lot space** **approx. 500 acre campus total**	
TOTAL Animal Housing/Support Procedures (excluding acreage):	**172,887 ft** (please specify ft^2 or m^2)	

[a]Please state name and/or use acronyms described in **Appendix 1** for building names, if not coded for confidentiality.
[b]Campus or site map(s) may also be provided in lieu of this information.

(b) (6)

(b) (6)

(b) (6)

[redacted]

(b) (6)

(b) (6)

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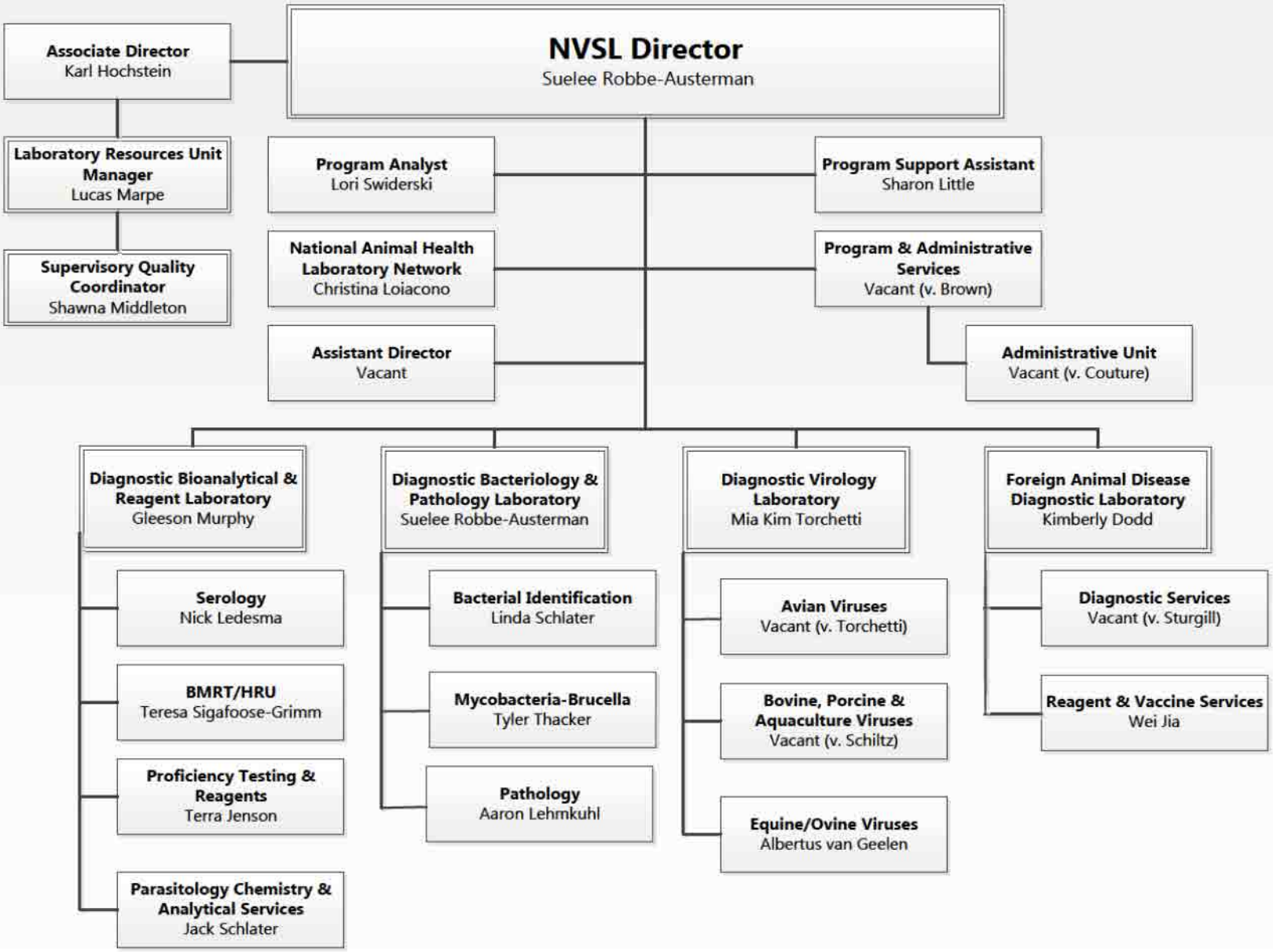
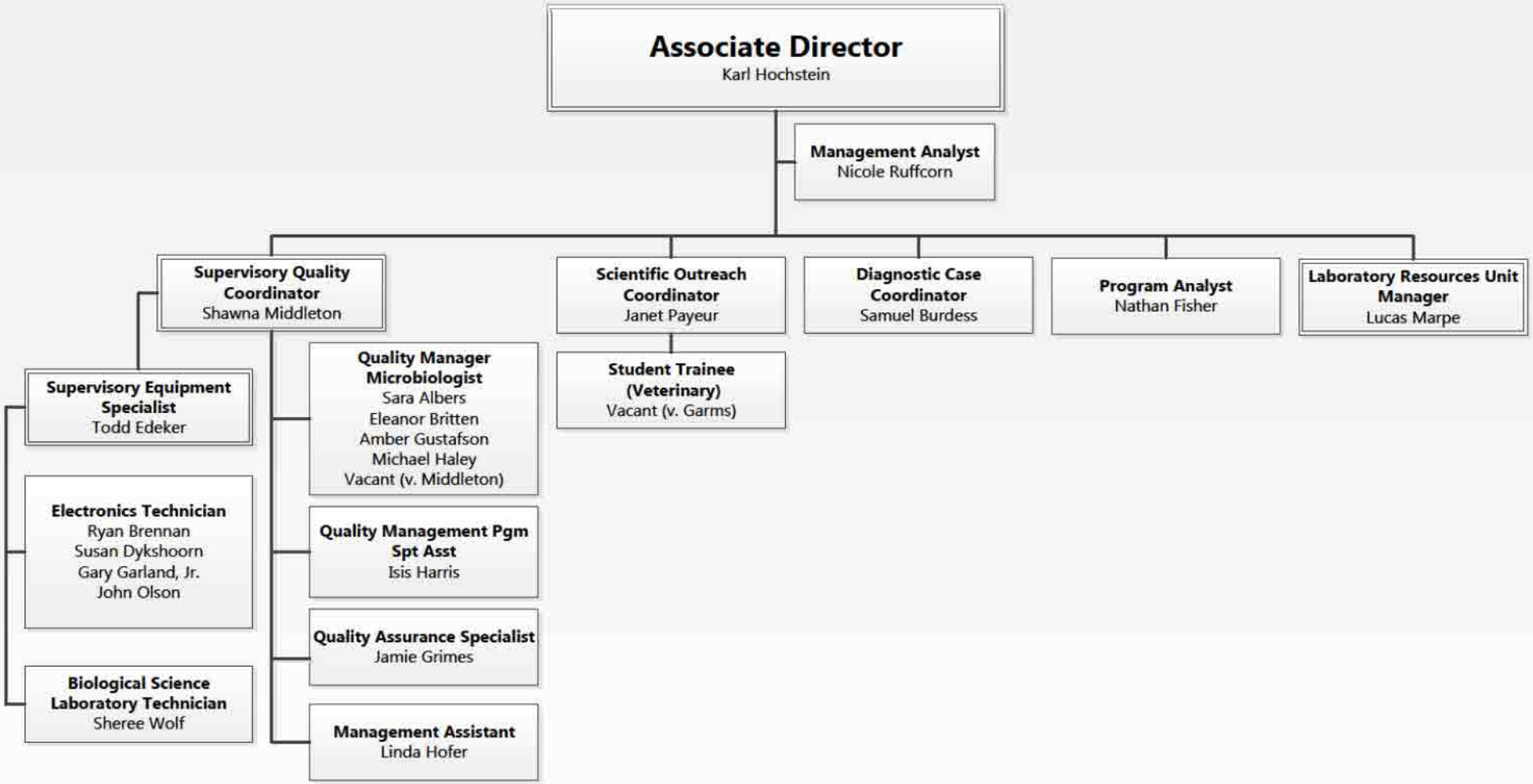
National Veterinary Services Laboratories

The National Veterinary Services Laboratories is responsible for safeguarding U S animal health and contributing to public health by ensuring that timely and accurate laboratory support is provided by a nationwide animal health diagnostic system



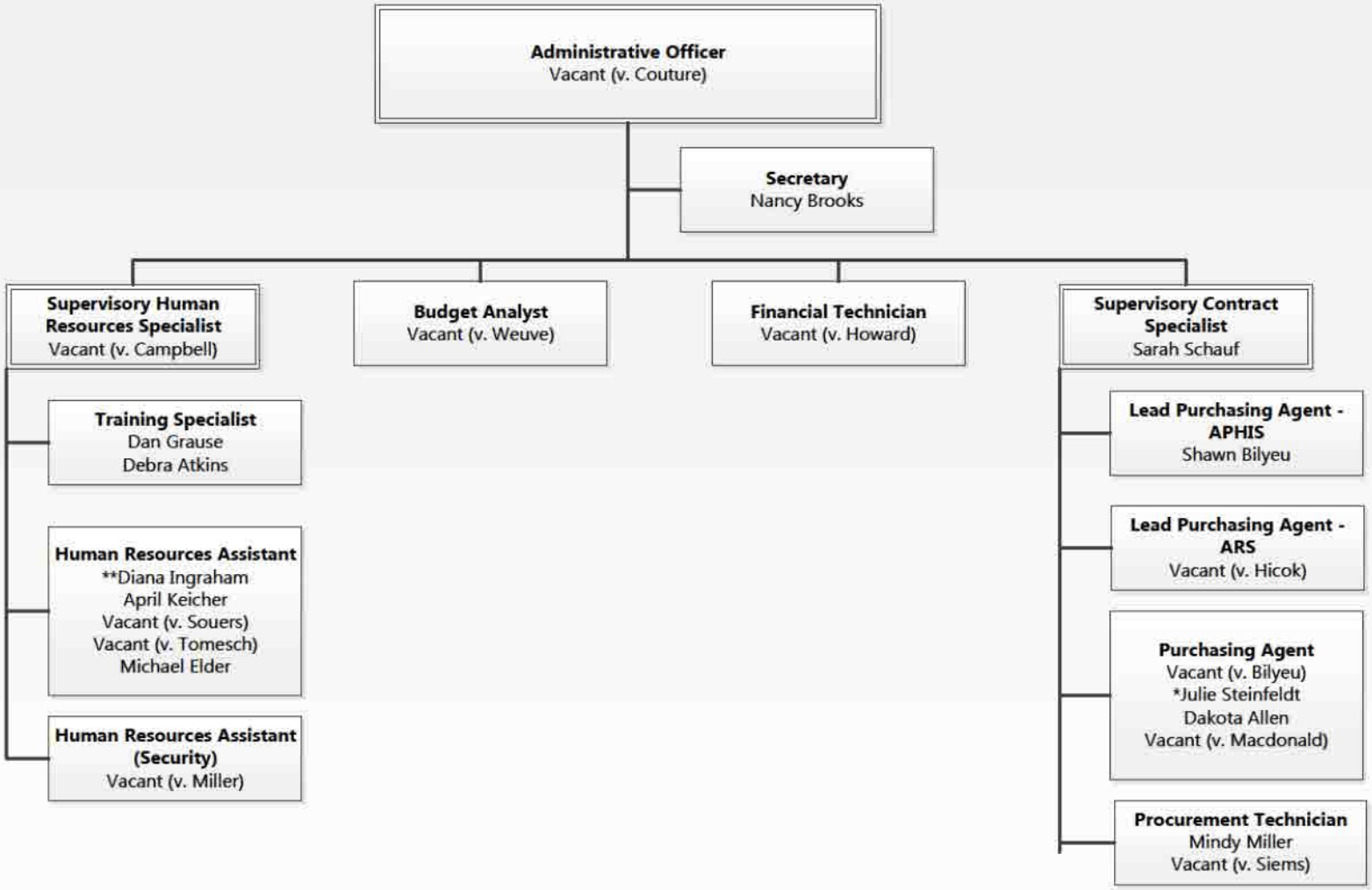
National Veterinary Services Laboratories

Associate Director



National Veterinary Services Laboratories

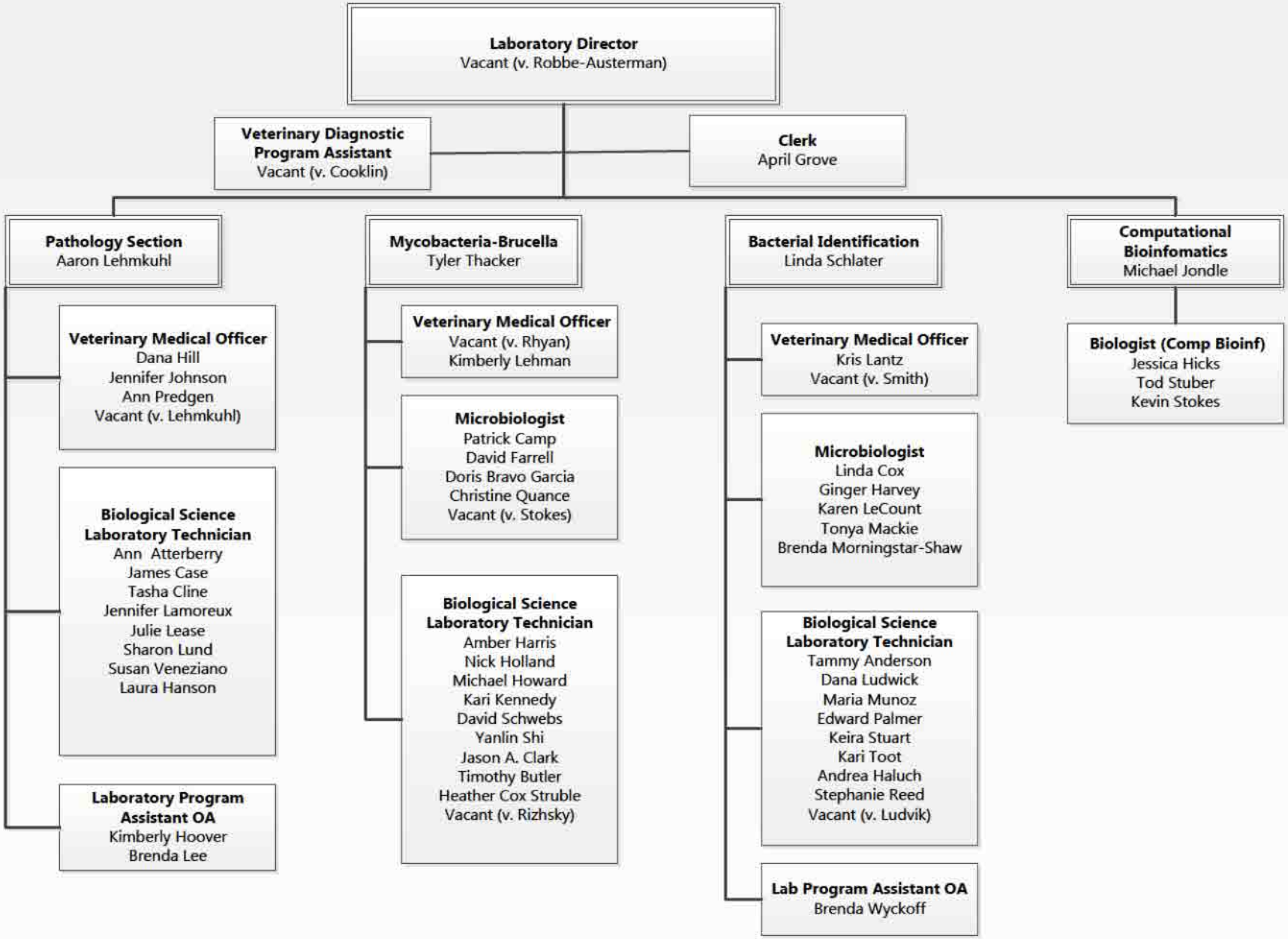
NCAH Administrative Unit



* This full-time position (v. Downs) is temporarily being filled with a term appointment
** This full-time position (v. Foley) is temporarily being filled with a term appointment.

National Veterinary Services Laboratories

Diagnostic Bacteriology & Pathology Laboratory



National Veterinary Services Laboratories

Diagnostic Bioanalytical & Reagent Laboratory

Laboratory Director
Gleeson Murphy

Veterinary Diagnostic Program Assistant
Vacant (v. Johnson)

Lab Program Assistant OA
Ruth McDaniel

Parasitology Chemistry and Analytical Services
Jack Schlater

- **Veterinary Medical Officer**
  Amy Winter
- **Chemist**
  Ronald Holtan
  Ludmila Rizhsky
- **Biologist**
  Vacant (v. Heathcote)
- **Biological Science Laboratory Technician**
  Laurely Wade
  Jessica Frerichs
- **Entomologist**
  Jeffery Alfred
  James Mertins
  Stephen Young

Proficiency Testing and Reagents
Terra Jenson

- **Microbiologist**
  Heather Hutchings
- **Biological Science Laboratory Technician**
  Heidi Eckroth
  Vicki Feldman
  Jina McBroom
  Anastasia Meyerhofer
  Meghan Riley
  Amanda Thomas
  Laura Novotny
  Emily Halverson
  Vacant (v. New)
  Vacant (v. Amador)
- **Lab Program Assistant)**
  Patricia Streit

BMRT/HRU
Teresa Sigafoose

- **Microbiologist**
  Annette Gomez
  Thomas Donohoe
  Vacant (v. Gomez)
- **Biological Science Laboratory Technician**
  Tiana Blanco
  Sharon Carter
  Dylan Harris
  Vacant (v. Gruis)
  Vacant (v. Yager-term)
- **Lab Program Assistant OA**
  Jacilyn Weese
- **Student Trainee**
  Tarrah Freund

Serology
Nicholas Ledesma

- **Veterinary Medical Officer**
  Vacant (v. Ledesma)
- **Microbiologist**
  Juanita Grause
  Breanne Marpe
  Daniel Breeggemann
  Vacant (v. Marpe)
- **Biological Science Laboratory Technician**
  Vacant (v. Breeggemann)
  Kristophor Gustafson
  Vacant (v. Rabideau)
  Michelle Redlinger
  Lilliana Amador
  Dianna VanBaale
  Lucas Pergiel
  Riley Christensen
- **Lab Program Assistant OA**
  Eric Murphy

National Veterinary Services Laboratories

Diagnostic Virology Laboratory

Laboratory Director
Mia Kim Torchetti

Veterinary Diagnostic Program Assistant
Vacant (v. Harris)

Laboratory Control Assistant
Vacant (v. Meester)

Custodial Worker
Dominique Jackman

Avian Viruses
Vacant (v. Torchetti)

Veterinary Medical Officer
Robert Garrison

Microbiologist
Nichole Hines Bergeson
Mary Lea Killian
Vacant (v. Pedersen)

Biological Science Laboratory Technician
Angela Bahr
Daniel Coster
Kerrie Franzen
LuAnn Heintz
Laura Kepler
Emily Love
Matt Swanson
Dominika Dziadowicz
Vacant (v. Bradley)

Bovine, Porcine and Aquaculture Viruses
Vacant (v. Schiltz)

Veterinary Medical Officer
Rachel Tell Sasek

Fish Biologist
Richard Clayton

Microbiologist
Alicia Janas-Martindale
Melinda Jenkins-Moore
Leo Koster
Vacant (v. Shanmuganatham)
Dawn Sturtz
Janet Warg

Biological Science Laboratory Technician
Tamara Beach
Angela Cruz
Katherine Mozingo
Kendra Myers
Matthew W. Aufderhar
Vacant (v.Frerichs)
Vacant (v. New)

Equine/Ovine Viruses
Albertus van Geelen

Veterinary Medical Officer
Vacant (v. Miles)

Microbiologist
Randy Atchison
Michelle Emery
Ivan Kuzmin
Tiffany Palmer

Biological Science Laboratory Technician
Thanh Chihn
Vacant (v. Frerichs)
Sue Klein
Kevin Lake
David McFarling
Sonia Aleman Rivera
Tabitha Sands
Joshua Thompson
Carolyn Moore

Lab Program Assistant OA
Vacant (v. Miller)

Student Trainee (Biolcl Sci)
Vacant (v. Rubin)

National Veterinary Services Laboratories

Foreign Animal Disease Diagnostic Laboratory

Laboratory Director
Kimberly Dodd

Lab Program Assistant OA
Amy Nobile

Biological Science Lab Technician
Andrew Fabian

Management and Program Analyst
Stacy Kwasniewski

Animal Health Technician
Vacant (v. Doucett)

Senior Staff Veterinarian
Ming Deng

Management Analyst
Vacant (v. Main)

Diagnostic Services
Vacant (v. Sturgill)

Veterinary Medical Officer
Consuelo Carrillo
Fawzi Mohamed

Molecular Biologist
Roger Barrette II

Microbiologist
Mary Lou Berninger
Alexa Bracht
Gregory Mayr
Karen Moran
Vacant (v. Mulhern)
Vivian O'Donnell
Heather Petrowski
Kate Schumann

Biological Science Laboratory Technician
*Leslie Blakemore
Vacant (v. Fabian)
Vacant (v. Grau)
Vacant (v. O'Hearn)

Science Fellow
Stephen Pauszek

Reagents and Vaccine Services
Wei Jia

Veterinary Medical Officer
Zaheer Ahmed
Ping Wu
Vacant (v. Jia)

Microbiologist
Amaresh Das
Vacant (v. Diaz-San Segundo)
Brenda Donahue
Diane Holder
Yelitza Rodriguez

Biological Science Laboratory Technician
Yadata Tadassa
Aric McDaniel
Vacant (v. Gibbons)
Vacant (v. Lucas)
Vacant (v. Mulhern)

Biologist (Comp Bioinf)
Lizhe Xu

North American Foot and Mouth Disease Vaccine Bank

Veterinary Medical Officer Bank Manager
Hernando Duque

Veterinary Medical Officer
Jamie Barnabei

Microbiologist
Lisa Pauszek

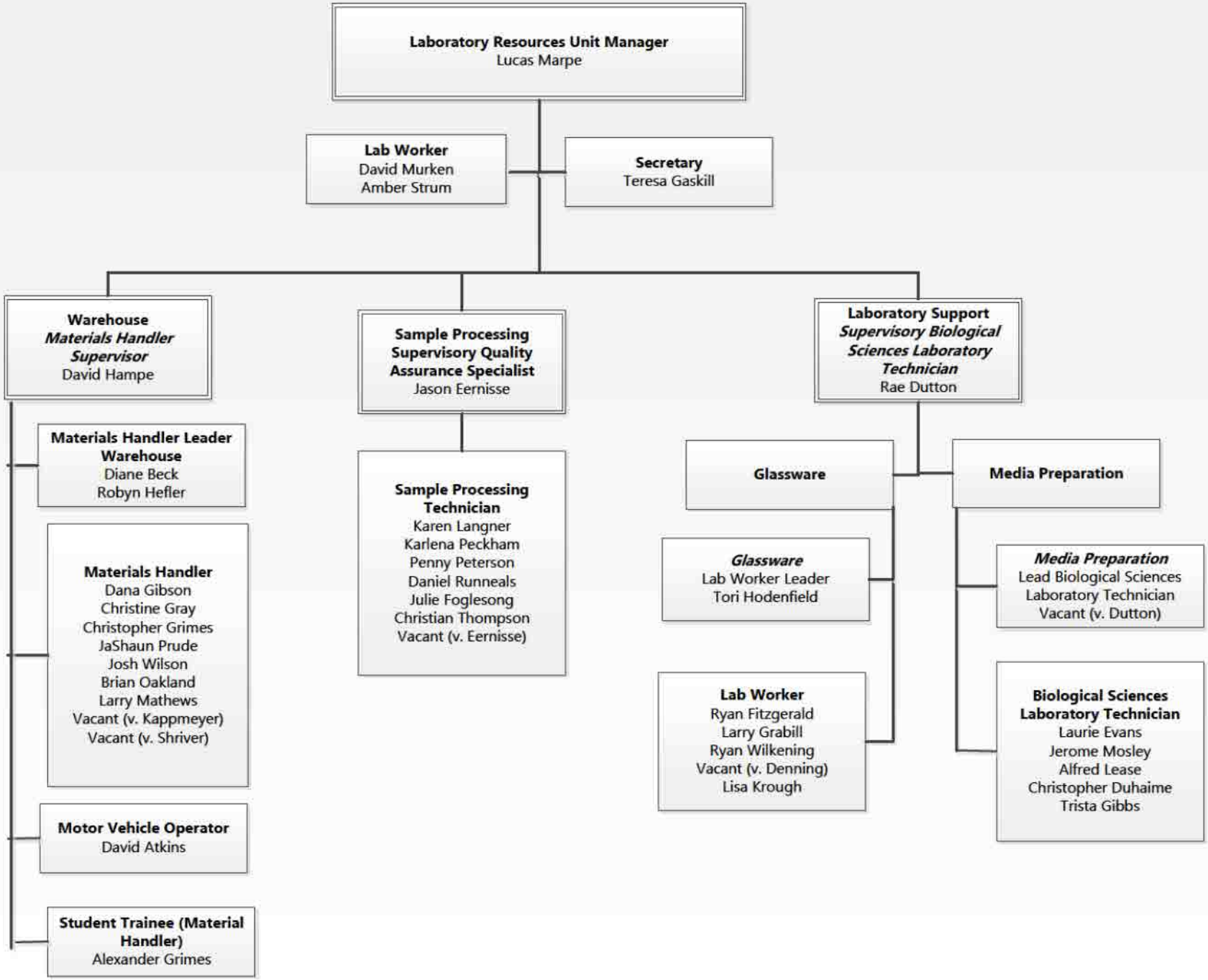
Biological Science Laboratory Technician
Vacant (v. New)

ORISE Employees
Benjamin Clark – DSS
Adam Kaufmann – DSS
Ian Barron – DSS
Timothy Boston – DSS
Brent Sanford – V. Bank
Amber Hemple – V. Bank
Meghan Jackson – DO
Snehal Chavda – RVSS
Madison Canestrari - Fellow

*Pathways-recent graduate student

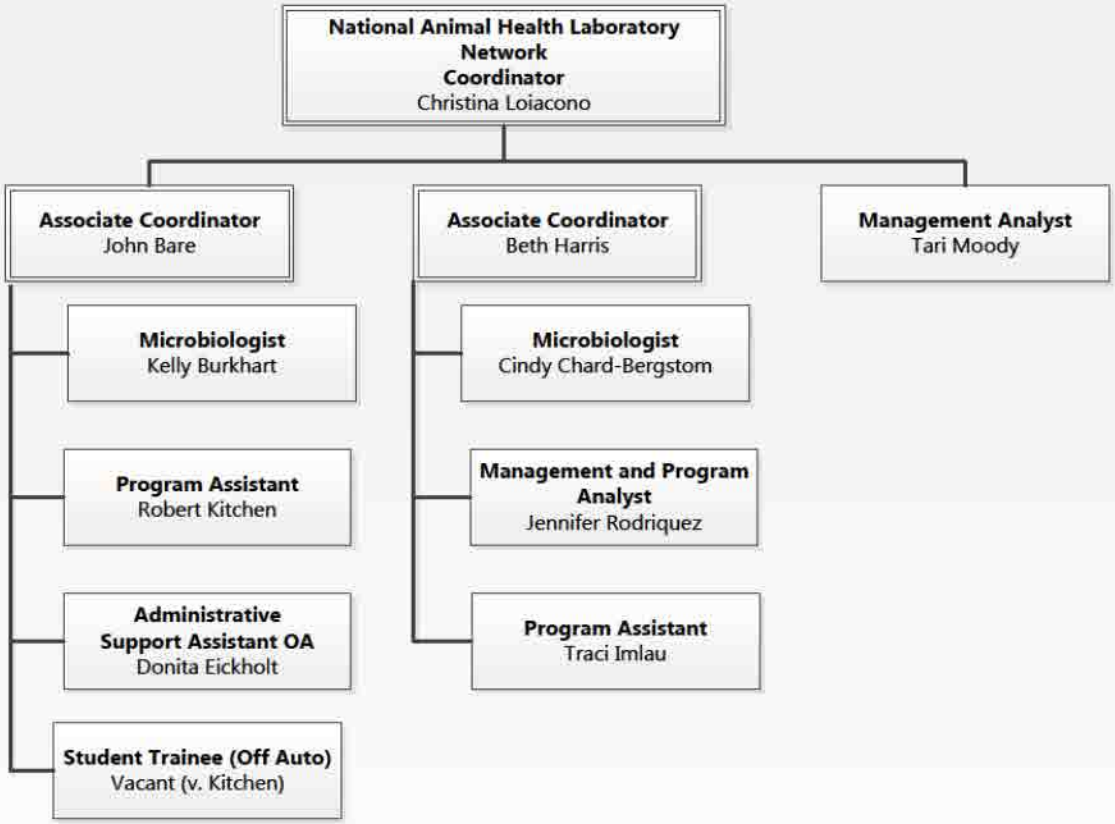
National Veterinary Services Laboratories

NCAH Laboratory Resources Unit



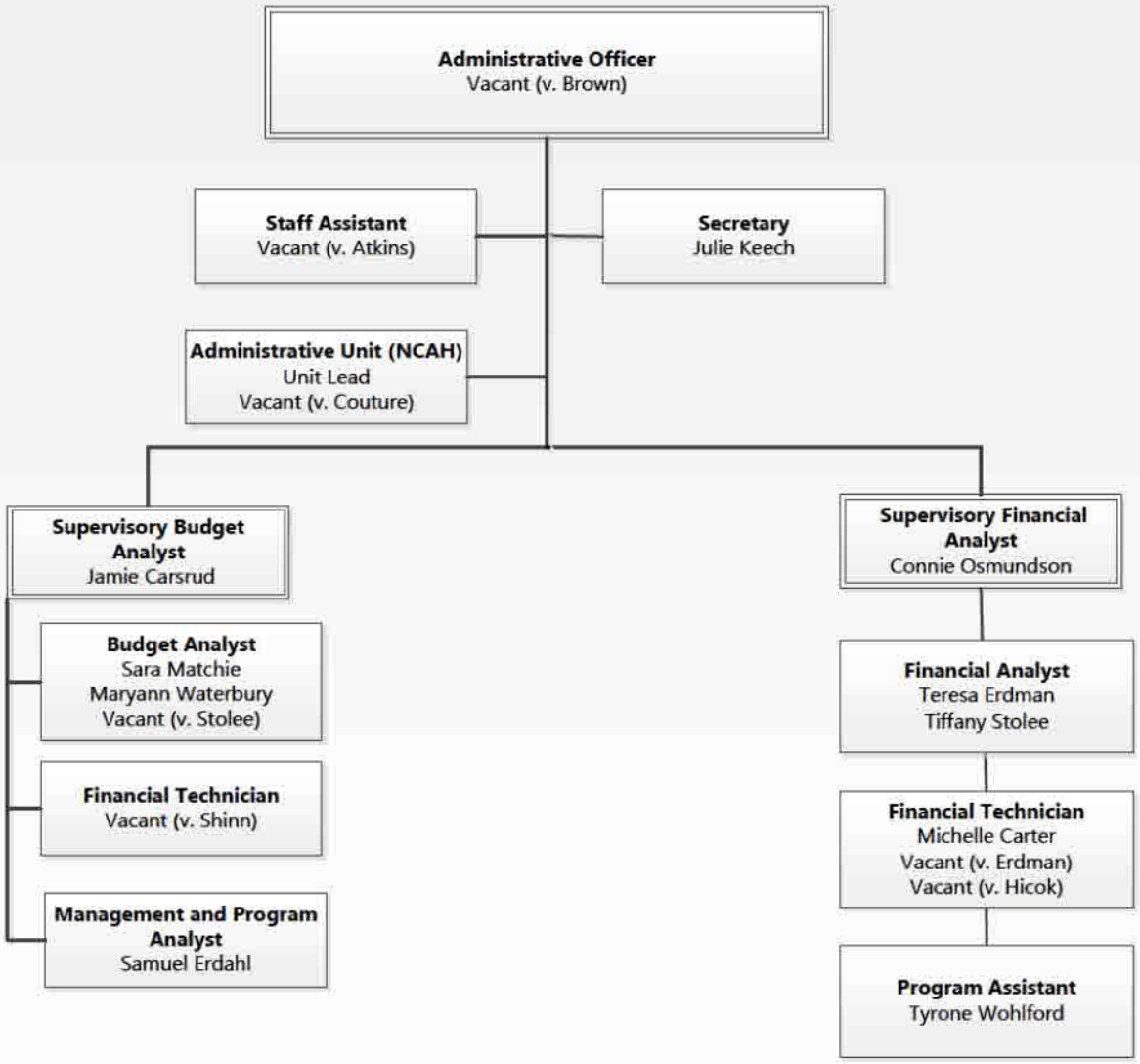
National Veterinary Services Laboratories

National Animal Health Laboratory Network

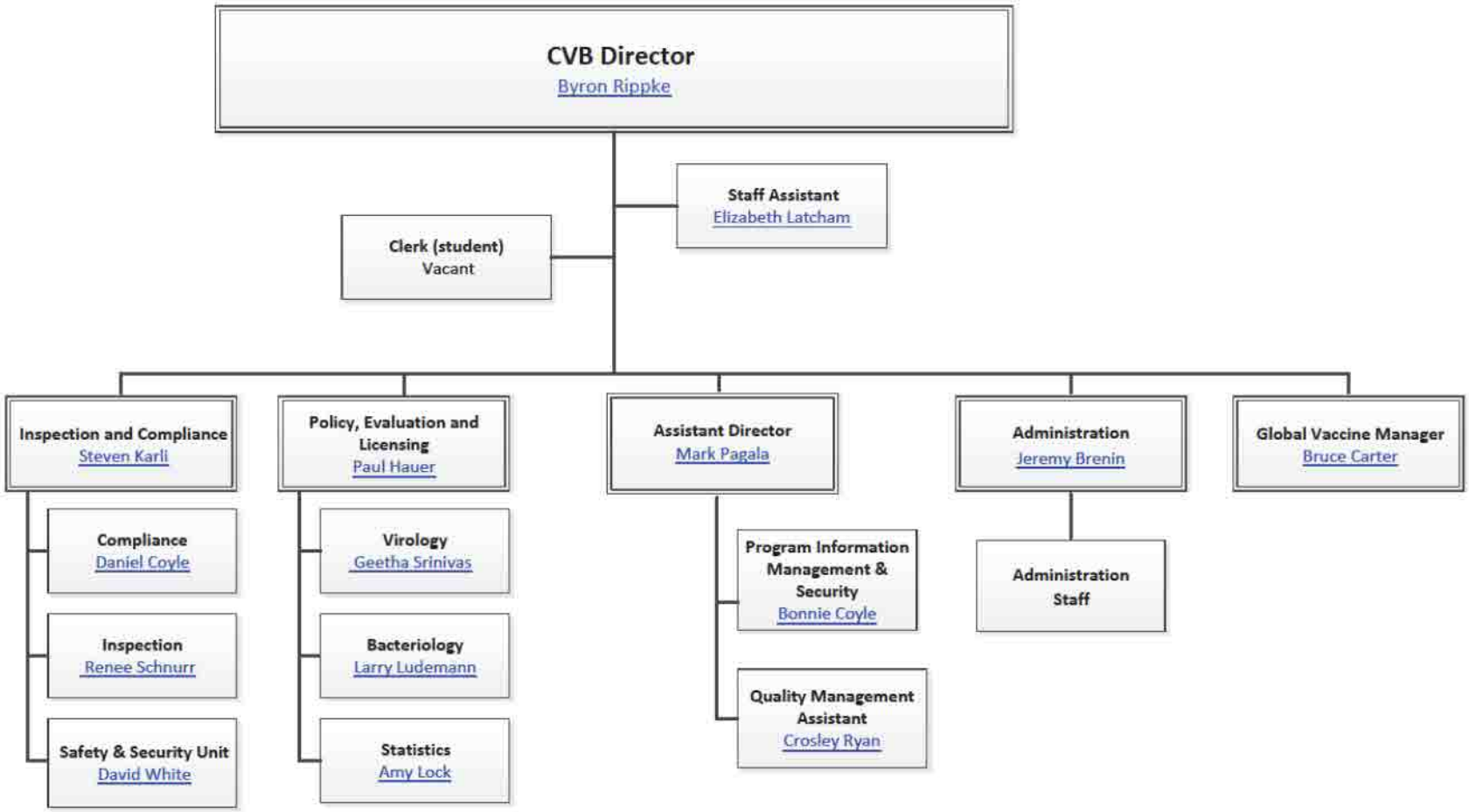


National Veterinary Services Laboratories

Program and Administrative Support Services

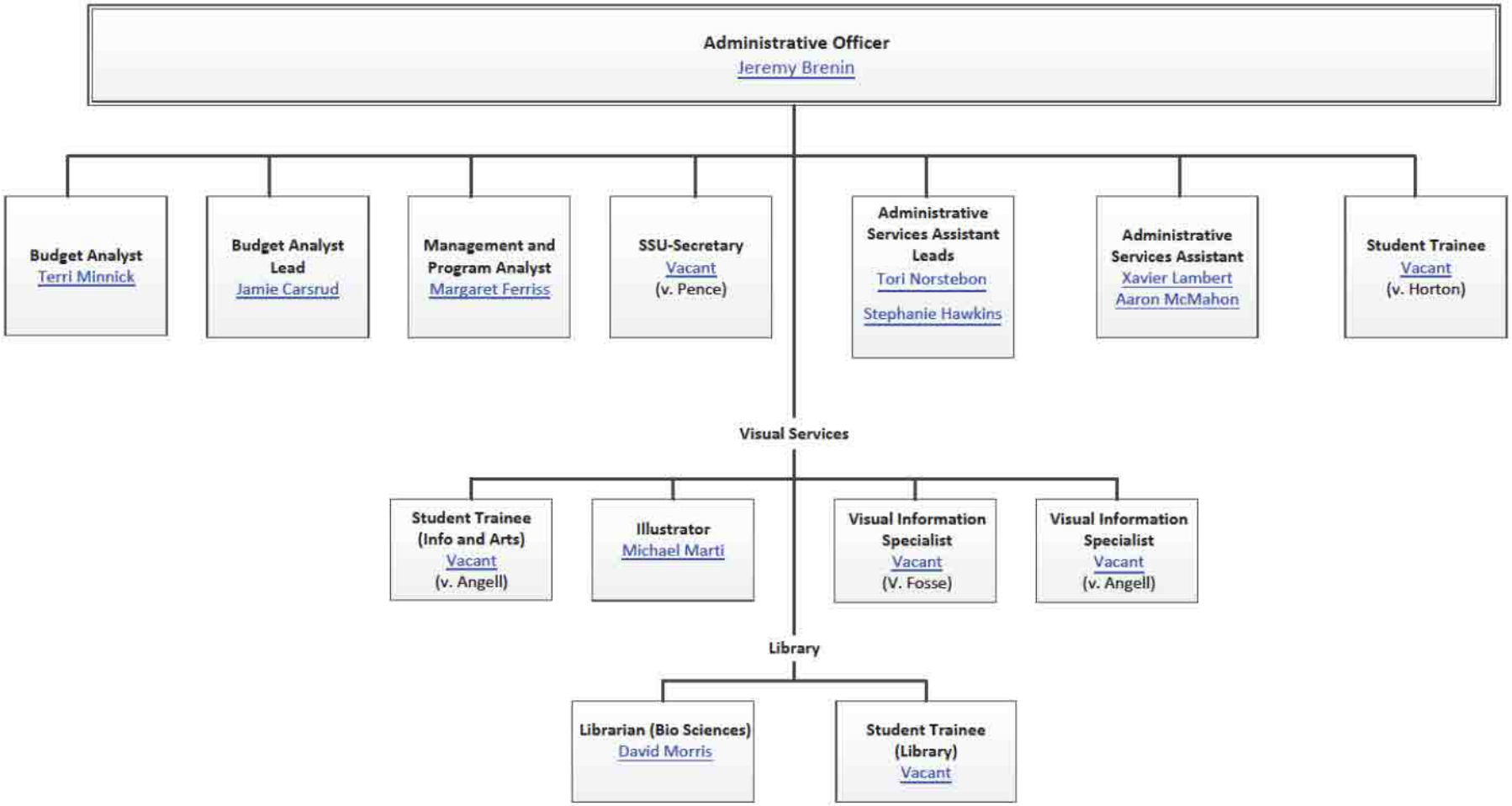


Center for Veterinary Biologics



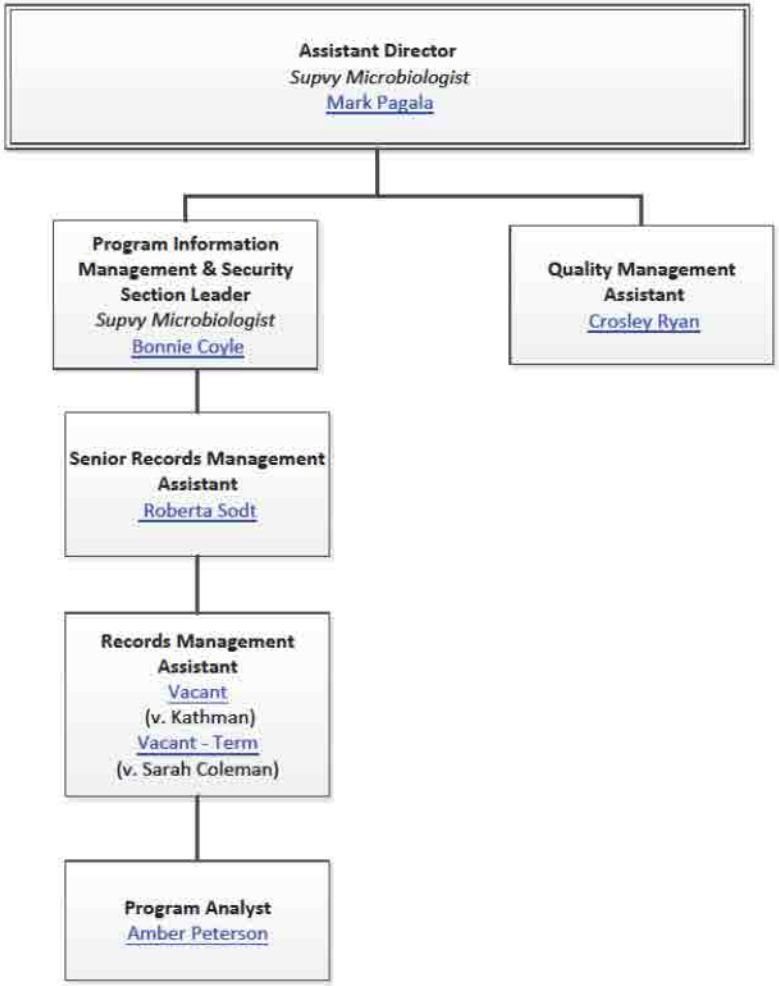
Center for Veterinary Biologics

Administration



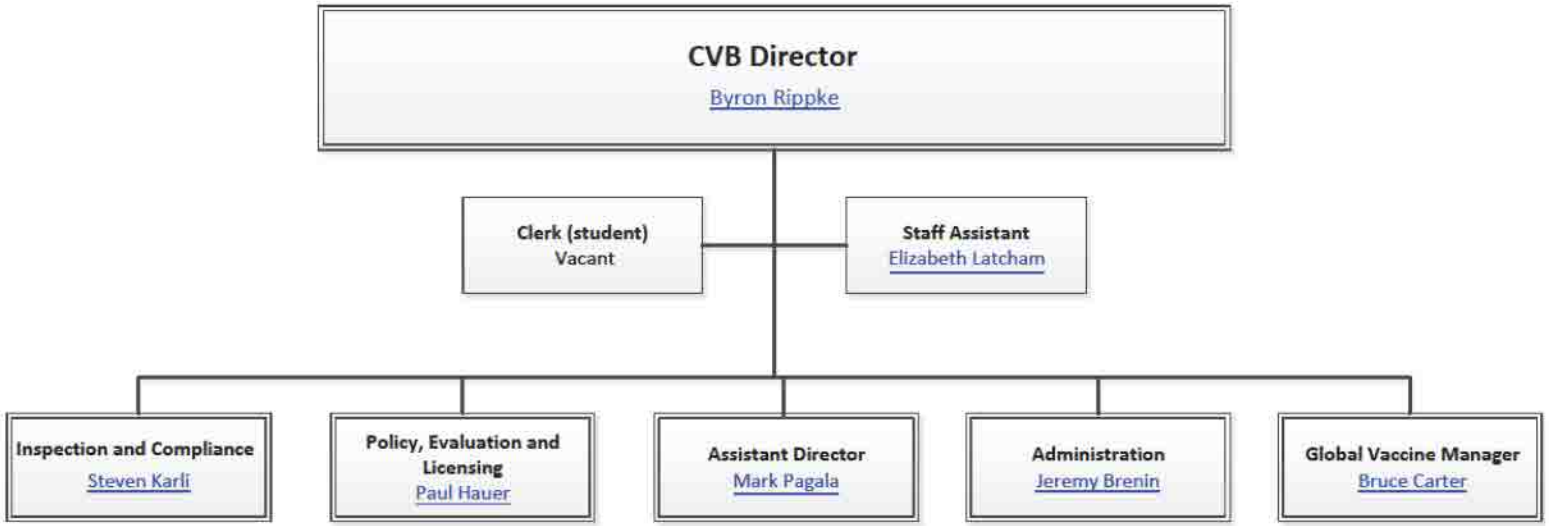
Center for Veterinary Biologics

Assistant Director



Center for Veterinary Biologics

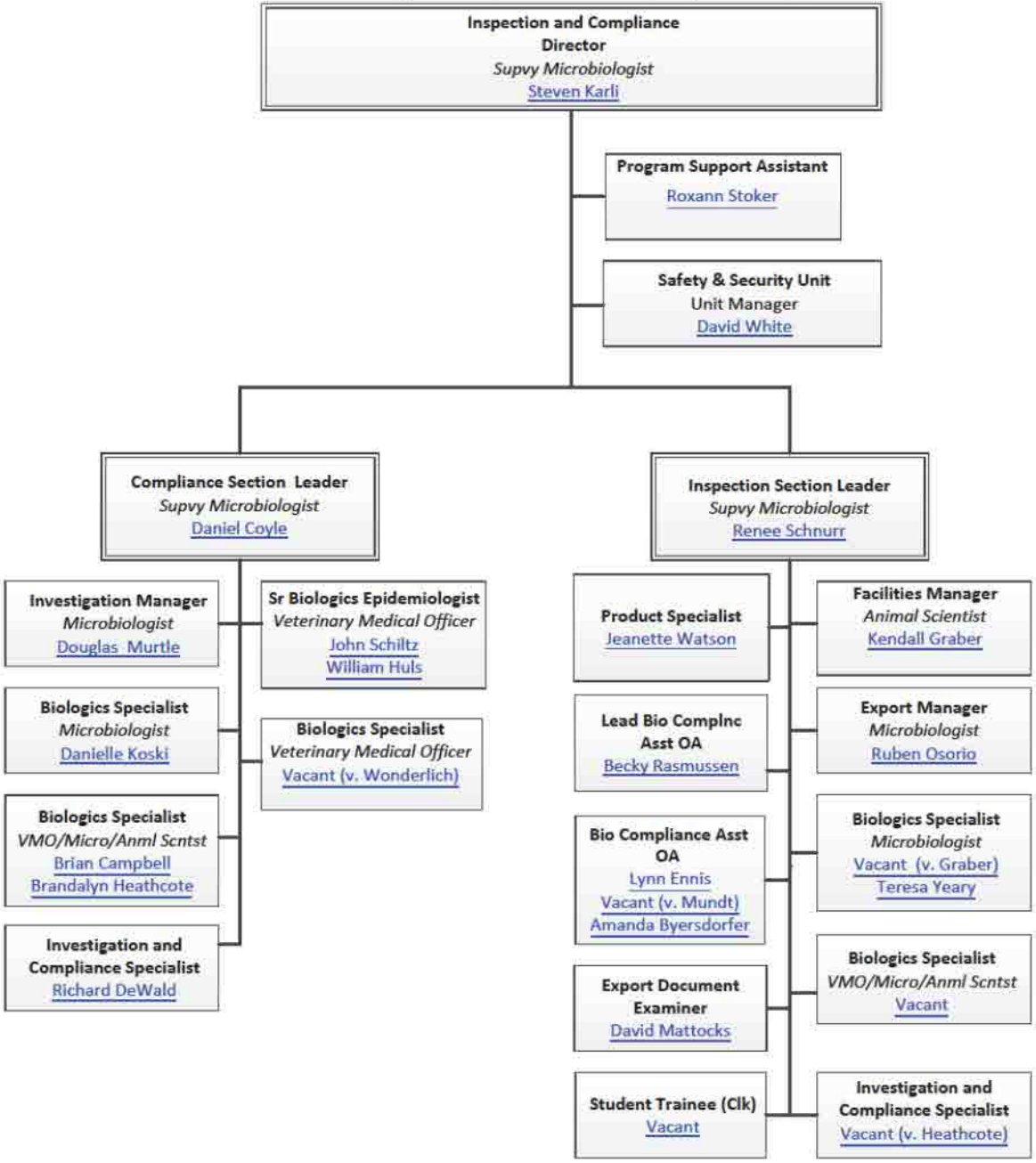
The Veterinary Biologics Program implements the provisions of the Virus-Serum-Toxin Act (VSTA) to assure that pure, safe, potent and effective veterinary biologics, are available for the diagnosis, prevention, and treatment of animal diseases.



Center for Veterinary Biologics

Inspection and Compliance

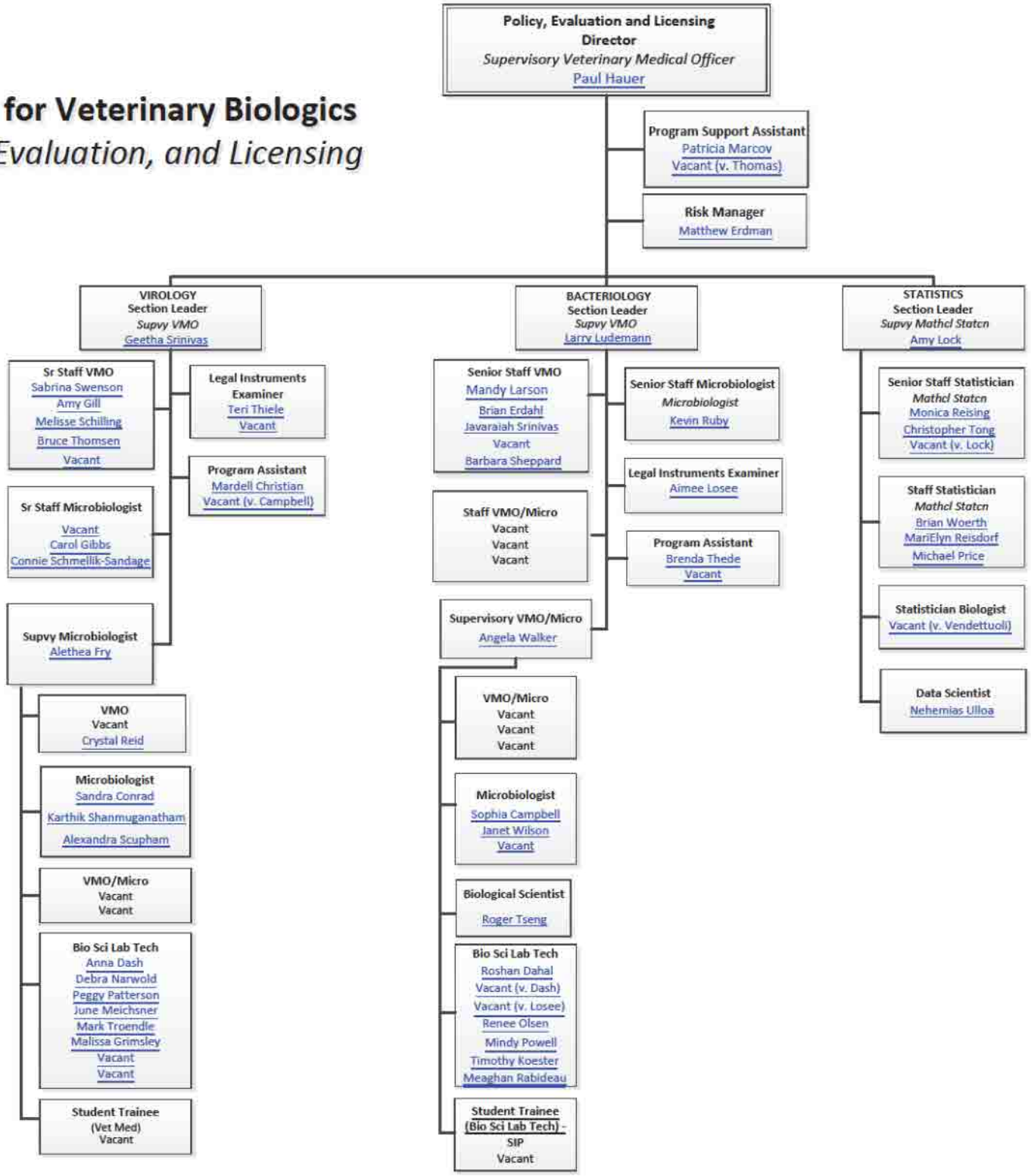
02/28/2020



Center for Veterinary Biologics

Policy, Evaluation, and Licensing

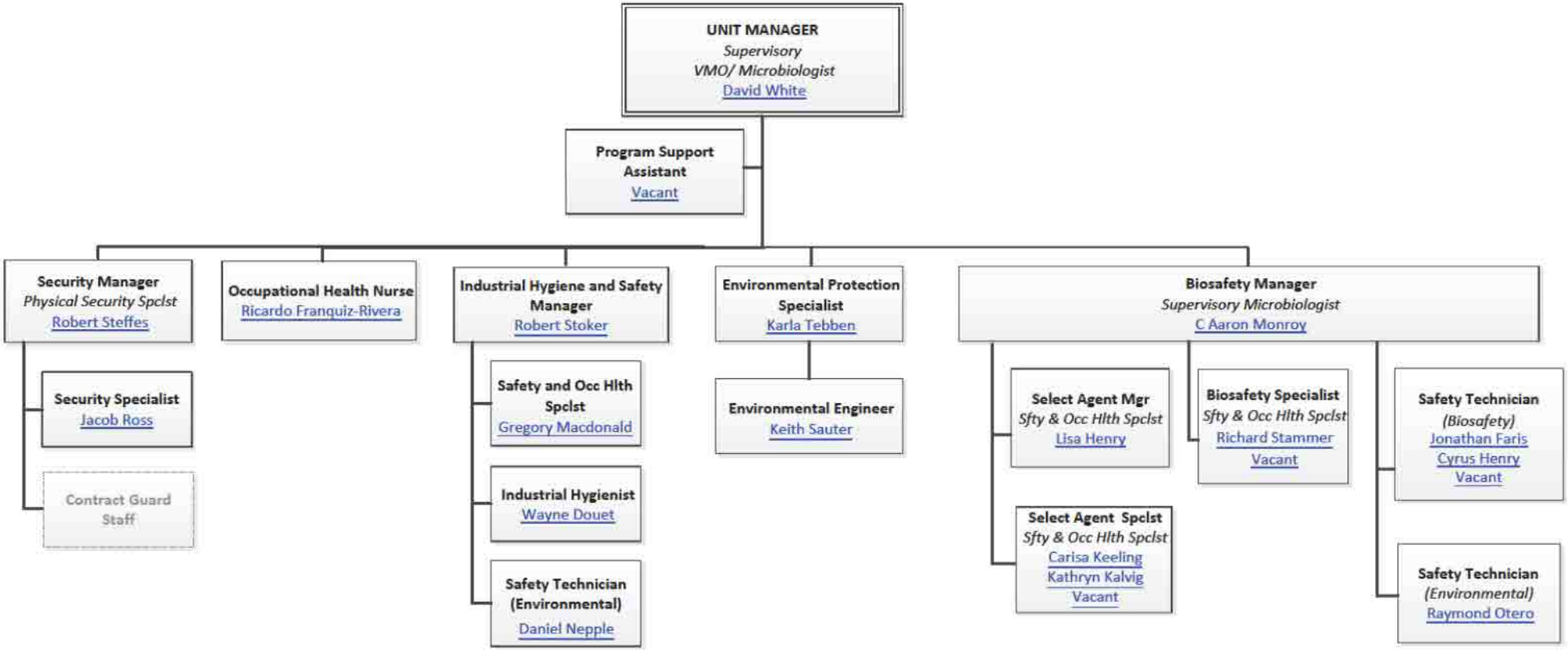
1/30/2020



01/21/2020

Center for Veterinary Biologics

NCAH Safety and Security



Appendix 5: Animal Usage

In order to assist the site visitors in their evaluation of the animal care and use program, please provide the information requested below. Information should be provided for all animals approved for use in research, teaching or testing, including those which may be used or housed in laboratories outside the animal care facility. Of particular interest is information on those animals which are used in research projects involving recovery surgical procedures, behavioral or other testing requiring chairing or other forms of restraint, or exposure to potentially hazardous materials. An alternate format is acceptable as long as the information requested is provided.

Project/Protocol Title	IACUC/OB Number	Principal Investigator	Species	Total Number of Animals Approved	Pain & Distress Category (1)	Special Considerations (use checkmark if applicable)					
						SS (2)	MSS (3)	FFR (4)	PR (5)	HAU (6)	NCA (7)
		(b) (6) [redacted]									
Animal bioassay for viral agents	APH-2017-596		Goat	18	E					A	
			Cattle	18	E						
			Deer	18	E						
			Pig	18	E						
			Sheep	18	E						
Safety Testing of Fetal Bovine Serum (FBS)or other bovine sera	APH-2017-597		Sheep	700	C: 688 D: 12						
Detection of Residual Rabies Virus from Inactivated Lots of Rabies Antigen	APH-2017-600		Mouse	895	C: 840 D: 45 E: 10					H A	
Routine Avian Viral Antiserum Production	APH-2017-605		Chicken	1500	D					H A	
			Duck	45	D						
			Turkey	100	D						
Animal Handling and Sampling Training	APH-2017-609		Equine	2	C						
			Chicken	368	D						

Appendix 5: Animal Usage

Project/Protocol Title	IACUC/OB Number	Principal Investigator	Species	Total Number of Animals Approved	Pain & Distress Category (1)	Special Considerations (use checkmark if applicable)					
						SS (2)	MSS (3)	FFR (4)	PR (5)	HAU (6)	NCA (7)
		(b) (6) [redacted]	Cattle	68	C: 58, D: 10						
			Pig	124	D						
			Sheep	140	D						
			Turkey	40	C						
Production of Rabies Challenge Virus Standard (CVS) for use in NIH test	APH-2017-611		Mouse	2000	E					H A	
Antigen and Antiserum production for Equine and Bovine Piroplasmosis Reagent Production	APH-2017-613		Cattle	15	D: 10 E: 5	X				A	
			Equine	30	D: 20 E: 10						
Mouse, Chicken, Guinea pigs, and Rabbit Seroconversion Potency Tests	APH-2017-618		Chicken	300	C						
			Mouse	600	D						
			Rabbit	150	D						
			Guinea Pig	100	D						
Fin Fish: Foreign and Emerging Diseases	APH-2017-626		Fish	1690	C: 130 E: 1560					H A	
Clostridium chauvoei, Clostridium haemolyticum, and	APH-2017-634		Guinea Pig	450	C: 250, D: 30, E: 170					H A	

Appendix 5: Animal Usage

Project/Protocol Title	IACUC/OB Number	Principal Investigator	Species	Total Number of Animals Approved	Pain & Distress Category (1)	Special Considerations (use checkmark if applicable)					
						SS (2)	MSS (3)	FFR (4)	PR (5)	HAU (6)	NCA (7)
Clostridium septicum challenge tests		(b) (6)									
			Rabbit	75	C:45, D:5, E: 25						
Killed Virus Vaccination - Serology in guinea pigs	APH-2017-639		Guinea Pig	200	D					A	
Potency testing of tetanus toxoids and antitoxins	APH-2017-651		Guinea Pig	364	C: 10, D: 291, E: 63					H A	
Serum Neutralization Tests in Mice	APH-2017-652		Mouse	5000	C: 3000, D: 500 E: 1500					H	
Antiserum Production in Rabbits	APH-2017-654		Rabbit	18	D					A	
Evaluation of TB/Johne's Reagents	APH-2017-656		Guinea Pig	850	C						
Monoclonal Antibody Production in Mice	APH-2017-666		Mouse	200	D: 125 E: 75						
Holding Animals for Future Use	APH-2017-668		Duck	100	B						
			Mouse	2000	B						
			Rabbit	50	B						
			Turkey	150	B						
			Goat	24	B						
			Chicken	6500	B						
			Pig	120	B						
			Cattle	24	B						

Appendix 5: Animal Usage

Project/Protocol Title	IACUC/OB Number	Principal Investigator	Species	Total Number of Animals Approved	Pain & Distress Category (1)	Special Considerations (use checkmark if applicable)					
						SS (2)	MSS (3)	FFR (4)	PR (5)	HAU (6)	NCA (7)
		(b) (6) [redacted]	Equine	24	B						
			Hamster	300	B						
			Guinea Pig	300	B						
			Goose	20	B						
			Sheep	800	B						
Antiserum Production in Chickens	APH-2017-675		Chicken	300	D					A	
Vaccination and Challenge Testing of Rabies Vaccines by the National Institute of Health (NIH) Test	APH-2017-683		Mouse	10200	C: 5488 D:4590 E: 122					H A	
Bacterial Challenges in Mice	APH-2017-709		Mouse	20000	C: 14700 D:1800 E:3500					H A	
Evaluation of fowl cholera (Pasteurella multocida) bacterins	APH-2017-710		Chicken	660	C:495, D: 15, E: 150					A	
			Turkey	915	C:672, D: 24, E: 219						
Safety Tests of Killed or Inactivated Biological Products	APH-2017-711		Mouse	384	C: 288, D:56, E:40						
			Guinea Pig	72	C: 44, D:14, E:14						
			Chicken	180	C: 100, D: 65, E: 15						
Mouse Bioassay for the Detection of	APH-2018-725		Mouse	1000	D: 500, E: 500					H A	

Appendix 5: Animal Usage

Project/Protocol Title	IACUC/OB Number	Principal Investigator	Species	Total Number of Animals Approved	Pain & Distress Category (1)	Special Considerations (use checkmark if applicable)					
						SS (2)	MSS (3)	FFR (4)	PR (5)	HAU (6)	NCA (7)
Clostridium botulinum toxin		(b) (6) [redacted]								S	
Fathead minnow breeding colony	APH-2018-731		Fish	10000	B						
Production of Brucella antisera for proficiency test and control sera	APH-2018-743		Cattle	15	D					H	
Bacterial antiserum production (avian)	APH-2018-751		Chicken	100	D					A	
			Turkey	60	D						
Pathogenicity evaluation of influenza A, avian paramyxovirus type 1, and other viruses isolated from avian species	APH-2018-755		Chicken	2850	C: 2600, D:100 E: 150					H A S	
Producing pigs for research projects via farrowing	APH-2018-759		Pig	80	C					A	
Avian Influenza antiserum Production	APH-2018-762		Chicken	2400	D					A	
Safety and Potency Testing of Fish with Infectious Haematopoietic Necrosis Virus Vaccine	APH-2018-767		Fish	1250	C: 1000 E: 250					A	

Appendix 5: Animal Usage

Project/Protocol Title	IACUC/OB Number	Principal Investigator	Species	Total Number of Animals Approved	Pain & Distress Category (1)	Special Considerations (use checkmark if applicable)					
						SS (2)	MSS (3)	FFR (4)	PR (5)	HAU (6)	NCA (7)
Trypanosome Antigen Production for Diagnostic Reagent Development	APH-2018-769	(b) (6) [redacted]	Rat	1000	D					A	
Production of Marek's Disease Virus Antiserum	APH-2018-770		Rabbit	12	D					A	
Bacterial Antiserum Production in Rabbits	APH-2019-778		Rabbit	100	D					A	
Titration of Avian Encephalomyelitis (AE) in chicken embryos	APH-2019-780		Chicken	600	C: 150 D: 200 E:250					A	
Avian Influenza (AI) Serological Potency Testing	APH-2019-781		Chicken	250	D						
Avian Reovirus Serological Potency Testing	APH-2019-782		Chicken	132	D					A	
Safety, Immunogenicity or Potency testing for Laryngotracheitis Virus (LTV) vaccines.	APH-2019-783		Chicken	750	D: 500 E: 250					A	
Equine Infectious Anemia (EIA) Positive Control Serum Donors	APH-2019-789		Equine	20	D					A	

Appendix 5: Animal Usage

Project/Protocol Title	IACUC/OB Number	Principal Investigator	Species	Total Number of Animals Approved	Pain & Distress Category (1)	Special Considerations (use checkmark if applicable)					
						SS (2)	MSS (3)	FFR (4)	PR (5)	HAU (6)	NCA (7)
Safety and Purity Testing Vaccines in Poultry	APH-2019-790	(b) (6) [redacted]	Chicken	600	C:200 D:400					A	
Safety, Immunogenicity or Potency testing for Infectious Bursal Disease Virus Vaccines.	APH-2019-800		Chicken	500	D: 400 E:100					A	
Antiserum Production in Rabbits, Goats, and Equine (Clostridia and Modified Live Viral Antiserum)	APH-2019-801		Rabbit	60	D					A	
			Equine	4	C						
			Goat	20	C						
Comparative susceptibility of U.S. feral swine populations to Mycobacterium bovis	APH-2019-807		Pig	65	C: 25 D: 40					A H	
Code of Federal Regulations 9 (9 CFR) 113.36 Detection of pathogens by chicken inoculation test of poultry biologic products.	APH-2019-811		Chicken	300	C: 200 E: 100					A	

Appendix 5: Animal Usage

Project/Protocol Title	IACUC/OB Number	Principal Investigator	Species	Total Number of Animals Approved	Pain & Distress Category (1)	Special Considerations (use checkmark if applicable)					
						SS (2)	MSS (3)	FFR (4)	PR (5)	HAU (6)	NCA (7)
Harvest of blood, tissue and other animal products and training of personnel to obtain products	APH-2019-816	(b) (6) [redacted]	Turkey	80	C:70, D:10						
			Hamster	150	D						
			Guinea Pig	500	D						
			Goose	40	C:30, D:10						
			Goat	15	C:10, D:5						
			Equine	50	C:40, D:10						
			Rabbit	50	D						
			Rat	100	D						
			Sheep	70	C:60, D:10						
			Pig	310	C:10, D:300						
			Duck	50	D						
			Chicken	4350	C:4000, D:350						
			Cattle	45	C:30, D:15						
			Mouse	1000	D						
Fish/Salamander/New t Holding	APH-2019-821		Fish	7000	C						
			Salamande r/Newt	500	C						
Safety Test for Import of Avian-Origin Products	APH-2019-834		Chicken	100	D					H A	
Evaluation of Leptospira Bacterins	APH-2019-835		Hamster	2642	C: 1672 D: 70					H	

Appendix 5: Animal Usage

Project/Protocol Title	IACUC/OB Number	Principal Investigator	Species	Total Number of Animals Approved	Pain & Distress Category (1)	Special Considerations (use checkmark if applicable)					
						SS (2)	MSS (3)	FFR (4)	PR (5)	HAU (6)	NCA (7)
and Reagents, Maintenance and Testing of Challenge Cultures		(b) (6) [redacted]			E: 900						
Diagnosis and reagent production for encephalomyelitis and other viral neurologic diseases.	APH-2020-841		Mouse	70	E					S H A	
Potency testing for Eimeria Vaccines.	APH-2020-844		Chicken	300	D: 200 E: 100					A	
Production of Rabies Challenge Virus Standard (CVS) for use in NIH test	APH-2020-845		Mouse	2000	E					H A	

(1) If applicable, please provide a description / definition of any pain/distress classification used within this Appendix in the space below. If pain/distress categories are not used, leave blank.
(2) Survival Surgery (SS)
(3) Multiple Survival Surgery (MSS)
(4) Food or Fluid Regulation (FFR)
(5) Prolonged Restraint (PR)
(6) Hazardous Agent Use (HAU)
(7) Non-Centralized Housing and/or Procedural Areas (NCA), i.e., use of live animals in any facility, room, or area that is not directly maintained or managed by the animal resources program, such as investigator laboratories, department-managed areas, teaching laboratories, etc.

Pain/Distress Classification Description/Definition, if applicable:

Appendix 5: Animal Usage

In the Table below, provide an approximate annual usage for all species:

Animal Type or Species	Approximate Annual Use
Mice	7906
Rats	200
Hamsters	92
Guinea Pigs	559
Rabbits	37
Fish	6622
Equine	23

Animal Type or Species	Approximate Annual Use
Cattle	62
Sheep	185
Swine	185
Chickens	3687
Turkeys	166
Geese	20

[Create additional rows by pressing TAB in the bottom-right box.]

Appendix 6: Personnel Medical Evaluation Form

Provide a ***blank*** copy of form(s) used by medically-trained personnel to review individual health assessment, individual risk assessment, health history evaluation, health questionnaire, periodic medical evaluation, etc. If form(s) are not used, include a description of how such evaluations are performed in the Program Description (Section 2.I.A.2.b.ii.1).d), Section 2 (Description). I (Animal Care and Use Program). A (Program Management). 2 (Personnel Management). b (Occupational Health and Safety or Personnel). ii (Standard Working Conditions and Baseline Precautions). 1) (Medical Evaluation and Preventive Medicine for Personnel). d).

U.S. Department of Agriculture
National Centers for Animal Health
1920 Dayton Avenue, Ames, IA 50010

Occupational Medical Surveillance Program: Hazard Inventory Form

I. EMPLOYEE INFORMATION		
1A. Name *(Last, First, MI)*	1B. Date of Birth	1C. Program, Unit, Section
1D. Title, Series, Grade	1E. Phone Number (Work)	

II. SUPERVISOR INFORMATION	
2A. Name *(Last, First, MI)*	2B. Phone Number (Work)

III. RESPIRATOR USE	
3A. Will the worker be required to use a respirator? ☐ No. Go to Section IV. ☐ Yes. Complete Item 3B.	3B. Types of Respirator(s) *(select all that apply)* ☐ AIR-PURIFYING (Non-powered) Filtering Facepiece ☐ AIR-PURIFYING (Non-powered) Elastomeric Half Face ☐ AIR-PURIFYING (Non-powered) Elastomeric Full Face ☐ AIR-PURIFYING (Powered) (Tight-Fitting Face or Neck Seal) ☐ AIR-PURIFYING (Powered) (Loose-fitting Hooded or Facepiece)
3C. Work Effort *(select one)*	
3D. Work Usage *(select one)*	

IV. OCCUPATIONAL EXPOSURES			
	Hazard	***Frequency***	***Duration***
4A.			
4B.			
4C.			
4D.			
4E.			
4F.			
4G.			
4H.			
4I.			
4J.			
4K.			
4L.			

5A. Comments

IV. SUPERVISORY REVIEW		
6A. Supervisor's Signature	6B. Supervisor's Printed Name	6C. Date

U.S. Department of Agriculture
National Centers for Animal Health
1920 Dayton Avenue, Ames, IA 50010

NCAH Occupational Medical Monitoring Program
Serum Bank Program Participant Form

I. PARTICIPANT'S INFORMATION		
Name *(Last, First, MI)*	Date of Birth	Program, Unit, Section
Title, Series, Grade	Phone Number (Work)	

II. PROGRAM STATEMENT

1. The National Centers for Animal Health (NCAH) recommends that entry and exit blood samples be obtained from all employees and that such samples are used to determine pre-assignment serological levels as needed to establish an early and accurate diagnosis of disease(s) which constitute an occupational hazard to these employees. In addition, it is also recommended that all visiting and collaborating individuals who may be potentially exposed to laboratory infections provide blood samples for inclusion in serum banking.
2. The blood samples will be obtained by the Occupational Health Nurse or designated representative. Designated employees or contractors will process the samples. The serum samples are collected in approved laboratory tubes labeled with name, date of birth, date of collection, and numerically cataloged for ease of retrieval. The serum samples are maintained in the Occupational Health Unit in an electronically monitored commercial freezer. In the event of a freezer failure, a backup freezer source is available for immediate transfer of samples. Serum samples will be maintained for term of employment plus 30 years. Strict confidentiality will be ensured by the Occupational Health Nurse following applicable laws, regulations, and local policies.
3. I certify that I have received and understood the information about the NCAH Serum Bank Program, including benefits and risks of participation, and have had the opportunity to ask questions of a qualified nurse or physician.
4. I have been provided the opportunity to participate in the NCAH Serum Bank Program at this time, and hereby certify my preference regarding participation as indicated below.

□ **Consent**

I understand that my serum sample will be stored at the Occupational Health Unit for the duration of my employment plus 30 years and that the serum sample will not be tested without my informed written consent. I understand that I will need to submit a written request to NCAH Occupational Health if I want my serum sample destroyed at any time in the future. I **consent** to participation in the NCAH Serum Bank Program and **consent** to have my serum sample stored at this time.

□ **Declination**

I understand that, due to the nature of work performed at the NCAH, I may be exposed or potentially exposed to a variety of biological agents while completing my job duties. However, I **decline** participation in the NCAH Serum Bank Program and **decline** to have my serum sample stored at this time.

III. PARTICIPANT'S ATTESTATION	
Participant's Signature	Date

PERSONAL PROTECTIVE EQUIPMENT PROGRAM

Safety eyeglasses program (non-prescription or prescription) is available for all full time federal employees through the Health Unit.
Other personal protective programs: hearing, respiratory, radiation, etc., are provided through the Industrial Hygiene & Safety group of the Safety and Security Unit.

EMPLOYEE ASSISTANCE PROGRAM

Free, confidential counseling and referral services for full time federal employees and family members is available through the Assistance Center. If continued assistance is needed after initial appointments, guidance and direction are additional services of the Assistance Center.

BLOOD DONOR PROGRAM

The hand-out explains the Blood Donor Program at the local Blood Center. Please read the information. If you are interested in becoming a donor, contact information is included on the handout. You will be contacted by a Blood Center employee to arrange for an appointment. The time taken to donate blood is "administrative leave" as approved by your supervisor.
In addition, multiple opportunities to donate blood through the Blood Center are coordinated on campus throughout the year and announced in advance for participation. There will be emailed notification and instructions for those events.

PREGNANCY

Ideally, to avoid any harmful exposure, it would be best to know of any impending pregnancy plans. However, since this is not always practical, it is of utmost importance to report pregnancy to your immediate supervisor and the Occupational Health nurse as soon as possible. When necessary, appropriate actions, including job modification, can be initiated to protect the unborn infant and the mother.

MISCELLANEOUS SERVICES

Other services provided through the Health Unit include: Blood pressure monitoring, health instruction, CPR instruction, and assorted periodic presentations on health related issues.

EMERGENCY NUMBERS

If an employee is injured or ill and requires immediate medical attention, dial **2222** from a landline phone, or **515-337-7222** from a cell phone. The Command Center will relay the call to the appropriate emergency personnel (ie fire, ambulance, police). *STAY ON THE LINE* until the Command Center ends the call.

I have received verbal and written information on the following Health Unit Services and have had an opportunity to ask questions concerning services.

TOPIC	INITIALS	DATE
Medical Surveillance Program	_____	_____
Preventative Medical Program	_____	_____
OWCP	_____	_____
First Aid	_____	_____
Personal Protective Equipment	_____	_____
Employee Assistance Program	_____	_____
Blood Donor Program	_____	_____
Pregnancy	_____	_____
Emergency Number	_____	_____

JOB SPECIFIC INFORMATION

TOPIC	INITIALS	DATE
_____	_____	_____
_____	_____	_____
_____	_____	_____

_____ _____

Signature Date

Appendix 7: IACUC/OB Membership Roster

NVSL/CVB Institutional Animal Care and Use Committee FY 2020

Dr. Byron Rippke (CVB Director) – Institutional Official

Committee Members	Affiliation	Role
Jennifer Johnson, DVM, ('21) *Chair*	NVSL: DBPL-Pathology	Scientist
Michelle Crocheck, DVM	NADC: Animal Resources Unit (ARU)- AV	Veterinarian
Hannah Schroeder, BS ('22)	NADC: ARU	Scientist
Teresa Yeary, BS, MS, PhD ('24)	CVB: IC	Scientist
Mandy Larson, MS, DVM ('24)	CVB: PEL-BACT	Scientist
Emily Love, BS, MS ('25)	NVSL: DVL	Scientist
Ginger Harvey, BS, MS ('21)	NVSL: DBPL-BIS	Scientist
Sandy Conrad, ('24)	CVB: PEL-VIR	Scientist
David Mattocks ('22)	CVB (non-scientist)	Non-Scientist
Jesse Robbins	Public Member	Non-affiliated
C. Aaron Monroy, PhD	CVB: Safety & Security Unit (Biosafety) (non-voting)	Biosafety (non-voting)
Cathy VandeGriend, BS, CPIA	NADC: ARU, Compliance Officer (non-voting)	IACUC Administrator (non-voting)
Kym Hefler	Recorder	Recorder (non-voting)

National Veterinary Service Laboratories/
Center for Veterinary Biologics
Institutional Animal Care and Use Committee (IACUC)
December 4, 2019

Location: Building 20, Room 1054
Members Present: (b) (6) [redacted]

Call to Order
(b) (6) (Chair) opened the meeting at 11:08 AM. A quorum was present.

Meeting Minutes

Minutes from meeting September 25, 2019 were approved with date correction in header.

Animal Care and Use Protocols:

APH-2019-835 {Code of Federal Regulations 9 (9 CFR) 113.36 Detection of pathogens by chicken inoculation test of poultry biologic products}

- Species – Question 10- reword.
- Rationale: 1a- reword for clarity. 2a- state CVB notice. 2c- clarify statement on animals moving between groups and define PREL
- Entry Procedures –Specify PPE to be worn and additional items needed for at challenge as well as after
- Procedure Description – Question 3: insert wording, clarify observations as well as statement about animals when moribund
- Procedures- Reagent Evaluation – Question 1: Clarify what is being injected; Question 3: insert word
- Attachment- Risk Assessment- match CFR language, include background information, and remove personal statement
- Literature Search- Question 2- insert word and state actual CVB notice

Motion made to require modifications as listed above then route to Designated Reviewers for approval once changes are made. Motion seconded. No opposed. Motion approved.

Amendments

ACUP #	Approval Date
2017-595	9/27/19
2017-605	10/11/19
2017-613	10/11/19
2017-634	11/19/19
2017-654	11/19/19
2017-654	9/27/19
2018-743	10/11/19
2018-762	11/7/19
2018-769	10/11/19
2019-781	9/27/19

National Veterinary Service Laboratories/
Center for Veterinary Biologics
Institutional Animal Care and Use Committee (IACUC)
December 4, 2019

2019-782	9/27/19
2019-783	9/27/19
2019-790	9/27/19
2019-800	9/27/19
2019-801	10/29/19
2019-816	9/26/19

Renewals

2017-683	11/26/19
2018-751	11/20/19
2018-755	11/4/19

New

2019-811	11/1/19
2019-821	10/29/19

Business

1. RAMS- Guidance Document: Agent section 1.f discuss at next meeting.
2. Unexpected Outcome/Adverse Event:
    a. Previously discussed event of 12 salmon died. Final update of no additional fish losses.
3. NABR Webinar "Cautionary Trails: FOIA and Other Threats to Sustainability of Animal Research" Dec. 5, 2019 @ 12:00pm in 1055/1057 (replay)
4. Semiannual Facility Inspections: January 6-February 7, 2020

Next meeting – January 22 at 11 a.m.
Presenters – (b) (6)
Renewal/Amendments – (b) (6)
Adjourn
(b) (6) adjourned the meeting at 12:23 pm.

National Veterinary Service Laboratories/
Center for Veterinary Biologics
Institutional Animal Care and Use Committee (IACUC)
February 26, 2020

Location: Building 20, Room 1054
Members Present: (b) (6) [redacted]
Members Absent: (b) (6) [redacted]

Call to Order
(b) (6) (Chair) opened the meeting at 11:08 AM. A quorum was present.

Meeting Minutes

Minutes from meeting December 4, 2019 were approved.

Animal Care and Use Protocols:

Amendments

ACUP #	Approval Date
2018-769	1/2/20
2018-767	1/10/20
2019-801	1/2/20
2019-801	1/10/20
2019-816	2/11/20

Renewals

2017-675	2/11/20
2018-759	1/7/20
2018-762	1/2/20

New

2019-834	1/7/20

Business

1. RAMS- Guidance Document: Agent section 1.f discussion to remove from question from APHIS protocol form. C. Vande Griend to contact company to adjust.
2. Semiannual Facility Inspection Report was discussed and signed by members present.
3. FOIA requests for both CVB and NVSL were received and responded to the week of January 9.
4. SOP review & Charter- Listed changes approved by committee
    a. ACUCSOP0111- two wording changes
    b. ACUCSOP0113- three wording changes

National Veterinary Service Laboratories/
Center for Veterinary Biologics
Institutional Animal Care and Use Committee (IACUC)
February 26, 2020

c. ACUCSOP0115- typographical error corrected
d. Charter- updated date

5. New AVMA Guidelines on Euthanasia is available.

Next meeting – March 25 at 11 a.m.
Presenters – (b) (6) [redacted]
Renewal/Amendments – (b) (6) [redacted]
Adjourn
(b) (6) [redacted] adjourned the meeting at 12:05 pm.

PROTOCOL
APHIS Form
USDA

For Official Use Only

Protocol # APH-2020-873
April 23, 2020

Protocol Title: Example
Protocol Type: APHIS Form
Approval Period: Draft
Important Note: This Print View may not reflect all comments and contingencies for approval. Please check the comments section of the online protocol.

* * * Personnel Information * * *

PRINCIPAL INVESTIGATOR

The Principal Investigator can view, edit, and submit protocol.

Principal Investigator

Name*	Department
(b) (6) [redacted]	ARS-MWA
Email*	**Phone**
(b) (6) [redacted]	(b) (6) [redacted]

CO-PRINCIPAL INVESTIGATOR(S)

Co-Principal Investigator(s)

Name	Department	Email
(b) (6) [redacted]	ARS-MWA	(b) (6) [redacted]

OTHER PERSONNEL

Emergency Contact Information:

Emergency Contact

Name	Extension	After Hours Number
(b) (6) [redacted]	[redacted]	3
(b) (6) [redacted]	[redacted]	0

---

* * * Species * * *

Note: Weight and age ranges will be used to auto-fill an animal order but can be edited in the order.

Species to be Used

Species Common Name	Proposed Housing Facility	Maximum number of animals requested for this species for this housing location (total 1 year)
Mouse	As Assigned by ARU	4

Species to be Used

PROTOCOL
APHIS Form
USDA

For Official Use Only

Protocol # APH-2020-873
April 23, 2020

Protocol Title: Example

1. **Species Common Name*** Mouse
2. **Scientific Name** Mus musculus
3. **Strain/Breed**
4. **Animal Sex*** Either
5. **Age Range** 0 - 3 Year(s)
6. **Weight Range** -
7. **Proposed Housing Facility*** As Assigned by ARU
8. **USDA Pain Category (Choose all that will apply. Enter the total number of the species to be used in each Pain Category. If animals will be used in more than one category, enter the number in the higher category.***

	Pain Category B	
X	**Pain Category C**	4
	Pain Category D	
	Pain Category E	

9. **Maximum number of animals requested for this species for this housing location (total 1 year)*** 4
10. **If enrichment should not be provided, state scientific justifications.**
11. **Could these animals be transferred to another protocol for second use?**

---

* * * Agent Information * * *

Agent Information - Collaboration and Safety Concerns

1. **Biological Material / Human or Animal Product(s) / Infectious Agent(s)***

Are you using biological material, human or animal products, or infectious agents? Y

Biological Material / Human or Animal Product(s) / and /or Infectious Agent

Specify Material or Agent(s)	Spread by
test	test

Biological Material / Human or Animal Product(s) / and /or Infectious Agent

1.a. **Specify Material or Agent(s)*** Other
test

1.b. **Strain/Type of Agent***
test

1.c. **Spread by*** test

1.d. **Route of Administration*** Other
test

PROTOCOL
APHIS Form
USDA

For Official Use Only

Protocol # APH-2020-873
April 23, 2020

Protocol Title: Example

1.e. Is this agent a known pathogen to No known pathogens

1.f. Reason for selection to 1.e. regarding human pathogen. Please provide supplementary information as necessary to allow a complete risk assessment (e.g. references, statement of experience with the agent, inactivation data, etc.):

Human box not checked, but risk of this agent in humans is limited to direct inoculation through accidental injection which is mitigated by use of rigid injection protocols and stringent adherence to sharps policies as outlined in NCAH Biosafety Manual.

Human box checked, but risk of this agent in humans is limited to active laboratory or experimental procedures which is mitigated by use of rigid injection protocols and stringent adherence to sharps policies as outlined in NCAH Biosafety Manual, mitigation of high risk activities by additional PPE, or other appropriate steps.

Human box NOT checked, because this agent has been inactivated.

Human box NOT checked, but the risk of this strain of agent is lower in humans as evidenced by published data examining previous exposure events and/or historical field data of exposure without infection with the use of this strain (e.g. attenuated strains).

Human box checked, this agent is a known human pathogen.

1.g. Is this agent(s) a select agent?

1.h. Does this protocol use recombinants/Genetic Engineering Organisms?

If yes, provide IBC number

Expiration date

2. Entry Procedures

Entry Procedures(for the agent)

	Complete Clothes Change		Lab Coat
X	Boots/Shoe Covers		Face Shield
	Shower In		Safety Glasses
	Gloves		Surgical or Dust Mask
	Hair Net		Tyvek
	Other(fill out textbox below)		Respirator(state type in textbox below)

3. Exit Procedures

Exit Procedures(for the agent)

	Remove Clothing Worn in Unit		Disinfect Carry Out Items
	Wash Hands & Forearms		Shower Out
	Other(fill out textbox below)	X	Wash/Disinfect footwear

---

* * * Rationale * * *

USDA Protocol ID
(for office use only)

PROTOCOL
APHIS Form
USDA

For Official Use Only

Protocol # APH-2020-873
April 23, 2020

Protocol Title: Example

Official Project Title

Example

Study Objectives

1. Aims and Significance

a. Provide a brief synopsis of each research project covered by this protocol and its overall objective(s).*

test

b. What are the potential benefits to human/basic knowledge which justify each of the above uses of experimental animals?*

test

2. Rationale for Use of Animals

a. How will the use of animals help you accomplish the project goal(s)? Explain why those goals could not be achieved using in vitro or computer models.*

test

b. Why are the species you have selected the most appropriate for these studies?*

test

c. Indicate how group sizes (number of animals per project) were determined. Justification for these numbers using an appropriate statistical assessment such as a Power Analysis is expected. If a Power Analysis is not appropriate (e.g., pilot studies, tissue protocols, etc.) provide a detailed description of how the requested number of animals was determined. Be sure to include descriptions of the groups (e.g. Control, treatment, etc.) and the numbers of animals included in each group.*

test

---

* * * Procedures * * *

Inoculation/Vaccination

1. **Procedure Type:** Inoculation/Vaccination
2. **Brief Description:** test
3. **Species:** Mouse (As Assigned by ARU)
4. **USDA Pain/Distress Category:** C
5. **Maximum number of animals to be used in this procedure:** 4

PROTOCOL
APHIS Form
USDA

For Official Use Only

Protocol # APH-2020-873
April 23, 2020

Protocol Title: Example

6. **Please click 'save' and then address all of the questions for each tab that will appear below. Incomplete or missing details will prevent the protocol from being submitted to the IACUC for review.**

---

* * * Procedure Description * * *

Procedure Description

1. **Detailed Procedure Description**
   test

2. **Please list and describe any clinical effects or changes from the normal health and behavior of an untreated animal which may occur as a result of this procedure.**
   test

3. **Describe post procedure monitoring, observation schedules, and treatment that will be performed.**
   test

4. **What criteria will be used to determine if animals exhibiting clinical or behavioral changes should be euthanized?**
   test

---

* * * Pharmaceuticals * * *

Pharmaceuticals

Other

1.	**Procedure Type:**	Other
2.	**Brief Description:**	test2
3.	**Species:**	Mouse (As Assigned by ARU)
4.	**USDA Pain/Distress Category:**	C
5.	**Maximum number of animals to be used in this procedure:**	4

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Protocol # APH-2020-873
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Protocol Title: Example

6. **Please click 'save' and then address all of the questions for each tab that will appear below. Incomplete or missing details will prevent the protocol from being submitted to the IACUC for review.**

---

* * * Procedure Description * * *

Procedure Description

1. **Detailed Procedure Description**

   test

2. **Please list and describe any clinical effects or changes from the normal health and behavior of an untreated animal which may occur as a result of this procedure.**

   test

3. **Describe post procedure monitoring, observation schedules, and treatment that will be performed.**

   test

4. **What criteria will be used to determine if animals exhibiting clinical or behavioral changes should be euthanized?**

   test

---

* * * Anesthetic Regimen * * *

Anesthetic Regimen

1. **Parameters used to monitor and ensure appropriate anesthetic depth.**

   test

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April 23, 2020

Protocol Title: Example

* * * Perioperative Care * * *

Perioperative Care

Describe what parameters will be monitored during surgery to ensure proper analgesia.

Post-operative Monitoring

Note: A minimum of 24 hours of post-operative analgesia must be provided for minor surgical procedures and a minimum of 48 hours of post-operative analgesia must be provided for major operative procedures. All animals must be monitored for 96 hours (4 DAYS) following surgery regardless of when analgesic administration ceased.

1. Recovery Location - Facility or Building Name
2. Room Number
3. Personnel Responsible for Monitoring Recovery
4. What parameters are monitored to assess recovery?
5. Recovery - What is the duration and frequency of the monitoring?
6. Post-recovery - What is the duration and frequency of the monitoring ?

---

* * * Pharmaceuticals * * *

Pharmaceuticals

Pharmaceuticals

Agent Name	Dosage (in mg/kg if possible) AND Volume of Administration (when applicable)	Route
test	test	test

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Protocol # APH-2020-873
April 23, 2020

Protocol Title: Example

* * * Literature Search * * *

1. Literature Search for Alternatives to Painful or Distressful Procedures.

Search Data

Search Range From	Search Range To
1990	2020

Search Data

1.a.	Search Range From*	1990	(YYYY)
1.b.	Search Range To*	2020	(YYYY)
1.c.	Search Date*	04/01/2020	(MM/DD/YYYY)

Note: Because this is a search for alternatives to painful or distressful procedures, you are advised to use the word "alternative" as a search term along with words that describe the painful procedures described in this protocol.

1.d. Keywords* test

1.e. Databases Searched*

X	Agricola Database	X	Pubmed
	Google Scholar		Digitop
	Other		

2. Based on your literature search, are there alternatives to the potentially painful or distressful procedures that would be compatible with your experimental design? If "yes", please explain why you are not using the alternative(s).

test

3. Duplication of Results

X I attest that the proposed animal activities do not unnecessarily duplicate previous experiments, whether my own or another investigator's experiments.*

4. Alternatives for Category E Procedures

For Category E procedures, explain why pain relieving drugs or other ameliorative treatments cannot be used to alleviate pain/distress.

test

5. Previous Protocol

List previous protocol number. If none, state "NA" or "none".

test

---

* * * Sequence and Timing * * *

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Protocol Title: Example

Sequence and Timing

1. Please describe the sequence and timing of all the manipulations for each group of animals. Also include numbers used for each group of experiments, drugs and substances administered in each group, the time between procedures, and experimental endpoints. Use enough detail to allow reviewers to understand what each animal may undergo. Please separate paragraphs with a blank line.

   test

2. Optional Flow Chart - If the protocol involves more than one procedure (i.e., simple euthanasia and tissue harvest), please submit a procedures flow chart with this protocol. The flow chart should illustrate/include in chronological order all the procedures that the animals will undergo starting with their arrival on the protocol and ending with their euthanasia. Indicate the timeline for the events (i.e., if animals are involved in multiple procedures, note the time period between procedures). Please use the Add feature to attach the document in the Attachments section of Protocol Information.

---

* * * Husbandry * * *

1. Special Husbandry or Care

   List any special or unusual requirements for the care of animal subjects and who will provide this care (e.g., special diet or supplements, special water, altered light cycles, etc.). Indicate N/A, if not applicable.

   test

Non-Standard Experimental Requirements

2. Food or Fluid Restriction X None

   Note: This does not include pre-surgical fasting.

   Food or Fluid restriction

Species	Food Restriction	Duration and Frequency of Restriction	Fluid Restriction	Duration and Frequency of Restriction	Reason for Restriction
Mouse (As Assigned by ARU)					

3. Describe the health monitoring procedures (e.g., body weight, blood urea nitrogen, urine/fecal output, food/fluid consumed), frequency of checks, and the method of ensuring adequate nutrition and hydration during the regulated period.

4. Restraint of Conscious Animals X None

   Note: Include only prolonged restraint; brief restraint or restraint of anesthetized animals need not be

---

Protocol Title: Example

described.

Restraint of Conscious Animals

Species	Type of Restraint	Please describe acclimation to restraint	Duration and frequency of restraint
Mouse (As Assigned by ARU)			

5. Please justify the need for the restraint prolonged and describe the monitoring procedures and criteria for removing animals that do not adapt or acclimate to the restraint.

6. Non-standard housing requirements X None

Species	Cage/Pen Size	Cage Sanitation Interval	Wire-bottom rodent cages or grids	Animals outside dedicated animal housing for greater than 12 hours	Exemption from social housing or enrichment
Mouse (As Assigned by ARU)					

7. Provide a description of the non-standard housing and justify why it is needed for your experimental design.

---

* * * Euthanasia * * *

Euthanasia

Method of Euthanasia	Dosage (in mg/kg if possible) or inhalation or immersion agent, the concentration	Species	Route of Administration
Carbon Dioxide Gas	test	Mouse (As Assigned by ARU)	Inhalation

Euthanasia

Species Mouse (As Assigned by ARU)

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April 23, 2020

Protocol Title: Example

Method of Euthanasia Primary	Carbon Dioxide Gas
Describe Euthanasia Method	test
Route of Administration	Inhalation
Dosage (in mg/kg if possible) or inhalation or immersion agent, the concentration	test

---

* * * Attachments * * *

---

* * * Guidelines * * *

Mandatory (view and check Yes)

Respirator Fit Test & Training

Non-Mandatory (view those relevant and check Yes)

Unforeseen Events

* * * Certifications * * *

STATEMENT CONCERNING THE CARE AND USE OF LABORATORY ANIMALS

The NVSL/CVB IACUC is charged with ascertaining if research proposals are consistent with the "US Government Principles for the Utilization and Care of Vertebrate Animals Used in Testing, Research, and Training"; the Guide for the Care and Use of Laboratory Animals, National Research Council; the Animal Welfare Act/Regulations; and the Guide for the Care and Use of Agricultural Animals in Research and Teaching, Federation of Animal Science Societies. These regulatory documents describe the minimal standards that must be met for humane care and treatment of research animals to assure that animals do not suffer unnecessary discomfort, pain, or injury, and that animals receive proper care and husbandry. Research animals must be cared for and used in a manner that complies with the above documents to protect current and future sponsored support.

ANIMAL USER CERTIFICATION

All personnel listed on this protocol are responsible for reading the above statement and will be held responsible for adhering to all regulations therein, and agree to make written notification in the form of a protocol amendment to the Institutional Animal Care and Use Committee (IACUC) of any proposed changes in the animal experimentation protocol for review and approval prior to proceeding with any animal experimentation.

All personnel working with animals on this protocol:

- must enroll in the NCAH Occupational Health Program to work with animals;
- will be held responsible for pursuing appropriate training; and
- must adhere to the terms and conditions of this protocol as approved by the IACUC.

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Protocol # APH-2020-873
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Protocol Title: Example

X The Principal Investigator has read and agrees to abide by the above obligations.

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Protocol # APH-2017-668
April 23, 2020

***Note - the remainder of the protocol is included with any changes.

Protocol Title: Holding Animals for Future Use
Protocol Type: APHIS Form
Approval Period: Draft
Important Note: This Print View may not reflect all comments and contingencies for approval. Please check the comments section of the online protocol.

* * * Continuing review * * *

Continuing Review

Section 1: Type of Renewal * (please check one):

First Renewal (Second Year)
X Second Renewal (Third Year)

Section 2: Status of Protocol * (please check one):

X Active
Closed (if closed, specify date of closure):

Section 3: Progress Report *

Please update the IACUC on the progress of the animal projects on this protocol. Report and explain any unanticipated complications (such as deaths, infections, impairment, adverse reactions, etc.) that have occurred in the project over the last year.

The need for this protocol continues. No unanticipated complications occurred over the last year.

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ARS Form
USDA

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Protocol # xxx
April 23, 2020

**Note - the remainder of the protocol is included with any changes.

Protocol Title: test
Protocol Type: ARS Form
Approval Period: Draft
Important Note: **This Print View may not reflect all comments and contingencies for approval. Please check the comments section of the online protocol.**

* * * Amendment * * *

Amendment

- **If you have any questions, please contact the NCAH Compliance Officer.**

Please indicate the category of amendment

Change of species (addition or deletion)?	N
Change in the number of animals to be utilized?	N
Change in the activity or procedures to be performed?	N

Summary of Changes

Please summarize the changes below AND provide the additional information throughout the existing protocol as appropriate.

test

Make Changes in Protocol

Make changes to the information in the protocol by clicking on the appropriate section/link on the left side menu. You do NOT need to distinguish between existing information and additional information.

Justification for Changes

Please explain below why these changes are necessary.

test

Appendix 10

NVSL/CVB-IACUC Semiannual Program Review and Animal Facility Inspection Report

1920 Dayton Ave, Ames, IA 50010

Responsible Official: (b) (6) [redacted]

January 2020

1. Summary of Animals

Location	PI	ACUP	Species	#
A6	(b) (6) [redacted]	APH-2017-609 APH-2017-668	Cattle Horse	10 1
A3		APH-2019-816	Sheep	21
B2				
A7		APH-2019-816	Horses	9
A9				
C8				
C7		APH-2019-801	Goats	4
Z3		APH-2019-816 APH-2018-743	Cattle	9 2
222		APH-2019-816	Sheep	4
225				
192		APH-2019-816	Swine	
202		APH-2019-789	Equine	5
214		APH-2018-743	Cattle	3
7-4122		APH-2017-613 APH-2017-668	Horse Goat	1 1
7-1		APH-2017-597	Sheep	20
7-5110		APH-2017-613	Cattle	2
3G & H				
C4				
C3				
T520		APH-2017-668	Chickens	555
T500		APH-2017-668	Chickens	245
T510		APH-2017-668	Chickens	36
9-APHIS				

Location	PI	ACUP	Species	#
A4	(b) (6) [redacted]	APH-2018-759 APH-2019-807	Feral Swine	6 4
A8		APH-2018-759	Feral Swine	8
3D 7		APH-2018-751	Turkeys	6
3D 8		APH-2018-751	Chickens	7
3E 10		APH-2018-762	Chickens	15
3E 14		APH-2018-762	Chickens	43
3E 15		APH-2018-762	Chickens	45
4H		APH-2019-816	Turkeys Geese	17 18
4H		APH-2019-816	Chickens	83
20-312		APH-2018-731	Minnows	479
20-322		APH-2017-683	Mice	360
20-504A		APH-2017-683	Muskie	56
20-503D		APH-2019-821	Salmon	768
20-502C		APH-2018-725	Mice	30
20-505A		APH-2017-709	Mice	44
20-506C		APH-2017-654	Rabbits	8
20-506B		APH-2019-801	Rabbits	16
20-507B		APH-2017-651	Guinea pigs	16
20-318		APH-2018-755	Chickens	30
20-505D		APH-2017-656	Mice	45
20-320		APH-2017-683	Mice	360
20-502D		APH-2017-652	Mice	50
20				

Other areas inspected: Livestock Trailers, Feed Warehouse (B 13), Hay Storage (B 14), Straw Storage (B 15), 3G&H (Surgery Suite), B24 R 1935A Pharmacy, Necropsy/Incinerator (B5), Bldg 20 Rm 3500 (Egg incubation & hatching), Bldg 20 Rm 2314 (egg incubation), Bldg 20 R 1724 (Small Animal Receiving), C8 (Animal Training course building), and empty animal space that was or will be used within 6 months

NVSL/CVB-IACUC Semiannual Program Review and Animal Facility Inspection Report

1920 Dayton Ave, Ames, IA 50010
Responsible Official: (b) (6) [redacted]
January 2020

2. Significant Deficiencies/Recommendations: (any item which may be a threat to the health or safety of the animals, include a plan and schedule of for correcting each deficiency)

Location	Issue	Correction by Date (ex. within 6 months)
(b) (6) [redacted]	Records indicate that birds were found dead in the waterer in the brooder on 12/25/2019 and 01/09/2020. Not certain if this is due to faulty system or bird interaction with the watering system.	N/A

3. Minor Deficiencies/Recommendations: (items not in compliance with the Animal Welfare Act, *Guide for the Care and Use of Laboratory Animals*, or other ACUC policies)

Location	Issue	Correction by Date (ex. within 6 months)
(b) (6) [redacted]	#103 wool loss – not recorded on care and use or animal record	3/31/20
	Dips in fence, wires poking out on cable in front of feeder	6/1/20
	#68, 71, and 72 pigs limping and having hard time standing and laying – not recorded on care and use or animal record	Topical Banamine given same day as inspection and a pig was euthanized next day
	Original bottle of dewormer had cracked but new bottle was not appropriately labeled.	3/31/20
	Isopropyl alcohol bottle is re-filled, when needed. Update expiration date when re-filled.	3/31/20
	Recommend posting a virkon mixing chart in hallway near footbaths	3/31/20
	Adjust Waterer to not overfill and drip onto the wet floor.	3/31/20
	Test remote system to be sure alerts are working. Recommend at least annually.	3/31/20
	There were feathers and detritus in the CO2 euthanasia chamber.	3/31/20
	Several of the turkeys have swollen/reddened feet without obvious lameness. No documentation of the condition and what (if any) treatment is being given to the birds was found.	3/31/20
	It is a safety requirement that all bottles have proper hazardous stickers on them, complete name spelled out on label and some kind of expiration date. Ethanol bottle was observed with no expiration date.	3/31/20

4. Maintenance Items:
B2: Some damaged areas on fence from storm

1920 Dayton Ave, Ames, IA 50010
Responsible Official: (b) (6) [redacted]
January 2020

(b) (6)

[redacted]

5. **Comments/Suggestions for Program Improvement:**
   Assess training records in ARU to ensure everyone has received ladder safety training.
   Ensure semi-annual inspections of fall protection equipment is documented (fall harnesses observed in Building 9).
   Remind staff they may take used aerosol cans to the Green Room for recycling.
   C3 Room 3: Empty currently but before the next project remove expired media, needles, syringes, cotton swabs and label squirt bottles.
   Building 7 suite 4 & 5: encourage switching enrichment periodically.
   3E & D: more enrichment recommended for poultry
   T520: Record book needs to be updated/remove records that are more than 3 years old
   Fire extinguishers in many locations were not inspected monthly
   A4 & A8: Recommend removing fly traps after warm weather and other excess equipment.

6. **Positive Comments:**
   [redacted] expiration dates on all medications etc. labeled clearly and bolded

(b) (6) was very clean and sheep were offered numerous enrichment options (music, flavored chew discs, etc).
The surgical (b) (6) s kept very clean and updated with maintenance requests.
(b) (6) rooms and hallways very clean and appears maintenance is kept up to date even with the older building.
(b) (6) is impressively clean and well planned out.
(b) (6) Enrichment items present
Very complete, detailed records
Very clean, well-kept building
Multiple enrichment items provided
Enrichment items provided
The necropsy floor in (b) (6) had been used shortly before inspection and was very clean and organized when we entered.
(b) (6) Very clean work areas. Well organized. Staff is attentive and showed new ideas implemented for enrichment of the animals.

7. **Animal Care and Use Protocols or SOPs/Work Instructions Reviewed:**
APH-2019-807: With two different levels of containment on this protocol, recommend entry and exit procedures are clear.
APH-2018-751: Comments on entry/exit procedures sent to PI.
APH-2018-762: Comments on entry/exit procedures sent to PI.
APH-2017-613 & APH-2017-597: no comments
APH-2017-709: no comments
APH-2017-656: no comments

8. **Signatures:**

(b) (6)

Appendix 11: Heating, Ventilation and Air Conditioning (HVAC) System Summary

Summarize the heating, ventilation and air conditioning (HVAC) systems for each animal facility, ***including all satellite facilities***. Include ***all animal holding rooms*** (including satellite holding rooms), surgical facilities, procedure rooms, and support spaces integral to animal facilities (e.g., cage wash, cage and feed storage areas, necropsy, treatment).

Location/Building/Facility:	

In the text box below, provide a general description of the mechanical systems used to provide temperature, humidity and air pressure control. Include details such as:

- the source(s) of air and air recirculation rates if other than 100% fresh air
- treatment of air (filters, absorbers, *etc.*)
- design features such as centralized chilled water, re-heat coils (steam or hot water), individual room vs. zonal temperature and relative humidity control, the use of variable air volume (VAV) systems and other key features of HVAC systems affecting performance
- features that minimize the potential for adverse consequences to animal well-being (such as re-heat coils that fail closed or that are equipped with high-temperature cut-off systems), and
- how room temperature, ventilation, and critical air pressures are monitored and maintained in the event of a system or component failure, including notifying appropriate personnel in the event of a significant failure that occurs outside of regular working hours and/or other management systems used to respond to alerts or failures.

100% Outside Air : Buildings 3,4, 7, 9, 20, C3, C4, C7, C8, Z3, 500, 510, 520
Recirculated Air: A3-A9, 192
Filters: Conventional filters in and out: 3, 4, 7, 500, 510, 520, 192
Hepa filters in and out: 9,
Conventional filter in, Hepa out: 20,
Conventional in: A3-A9, C8
Conventional in, High Eff out: C3, C4
Centralized chilled water: 3, 4, 7, 9, 20
Reheat coils: 3, 4
Individual room temp control: 3GH, 3DE, 9, 20
Zonal Temp Control: 7
Temperatures are monitored for each room by the animal care personnel daily. Temperatures are generally not monitored in nonenvironmentally controlled areas, rather the animals are observed for signs of temperature stress. Temperatures are documented on the daily log sheets in each room. For most buildings, alarm parameters with differentials are monitored through the building automation system,

which is monitored 24hours a day by the facility support staff at the main boiler/chiller plant control center. During business hours, alarms are conveyed to the facility engineering personnel for response. After hours, the plant staff will respond to the alarm and, if further assistance is needed, a call is placed to the facility engineering personnel for response. In several buildings, a cellular monitoring system is used with set points at which a text message, email, or phone call would be triggered to ARU staff. The ARU staff would contact the 24 hour facility support staff for response.
Reheat coils fail closed and outdoor dampers fail closed for these buildings: 20, 7, 9, 3, 4
Heat coils fail in "off" mode and air dampers fail closed for these buildings: A3-A9, C3, C4, C8

In the Table below, provide room-specific information requested. Include all animal holding rooms (including satellite holding rooms), surgical facilities, procedure rooms, and support spaces integral to animal facilities (e.g., cage wash, cage and feed storage areas, necropsy, treatment). For each of these rooms/areas, indicate use, including the species for animal housing rooms. *Measurement of air exchange rates and verification of relative pressure within the areas mentioned above must be completed* ***within the 12 months preceding completion of this Program Description.*** Air exchange rates may be important to maintain air quality in other areas; *however, measurements may be left at the discretion of the institution (e.g., air measurements in areas where aquatics are held.)* Information may be provided in another format, providing all requested data is included. **[*Note*: Please remove the examples provided in the Table below.]**

Room No.	Specific Use	Temperature Set-Point (define units)	Electronic / Emergency Monitoring of Temperatures (Y/N)	Alert/Alarm Temperature Ranges (if applicable; define units)	Humidity Control (Y/N)	Relative Pressure	Air Exchange Rate (per hour)	Date Verified / Measured
		(settings to be verified)					(values to be measured)	
(b) (6) [redacted]	Feed storage	Thermostat in space	Y	50/90	Y	-	6.9	3/12/20
	Isolation unit - poultry	Thermostat in space	Y	50/90	Y	-	11.7	3/12/20
	Isolation unit - poultry	Thermostat in space	Y	50/90	Y	-	11.7	3/12/20
	Isolation unit - poultry	Thermostat in space	Y	50/90	Y	-	11.7	3/12/20

Appendix 11: Heating, Ventilation and Air Conditioning (HVAC) System Summary

Room No.	Specific Use	Temperature Set-Point (define units)	Electronic / Emergency Monitoring of Temperatures (Y/N)	Alert/Alarm Temperature Ranges (if applicable; define units)	Humidity Control (Y/N)	Relative Pressure	Air Exchange Rate (per hour)	Date Verified / Measured
		(settings to be verified)					(values to be measured)	
(b) (6) [redacted]	Isolation unit - poultry	Thermostat in space	Y	50/90	Y	-	10.7	3/12/20
	Isolation unit - poultry	Thermostat in space	Y	50/90	Y	-	12.0	3/12/20
	Laboratory	Thermostat in space	Y	50/90	Y	-	8.5	3/12/20
	storage	Thermostat in space	Y	50/90	Y	-	7.3	3/12/20
	Isolation unit - poultry	Thermostat in space	Y	50/90	Y	-	12.5	3/12/20
	Isolation unit - poultry	Thermostat in space	Y	50/90	Y	-	14.7	3/12/20
	Isolation unit - poultry	Thermostat in space	Y	50/90	Y	-	15.0	3/12/20
	Isolation unit - poultry	Thermostat in space	Y	50/90	Y	-	17.6	3/12/20
	Isolation unit - poultry	Thermostat in space	Y	50/90	Y	-	12.2	3/12/20
	Isolation unit - poultry	Thermostat in	Y	50/90	Y	-	14.7	3/12/20

Appendix 11: Heating, Ventilation and Air Conditioning (HVAC) System Summary

Room No.	Specific Use	Temperature Set-Point (define units)	Electronic / Emergency Monitoring of Temperatures (Y/N)	Alert/Alarm Temperature Ranges (if applicable; define units)	Humidity Control (Y/N)	Relative Pressure	Air Exchange Rate (per hour)	Date Verified / Measured
		(settings to be verified)					(values to be measured)	
		space						
(b) (6) [redacted]	Isolation unit - poultry	Thermostat in space	Y	50/90	Y	-	15.1	3/12/20
	Isolation unit - poultry	Thermostat in space	Y	50/90	Y	-	13.0	3/12/20
	Isolation unit - poultry	Thermostat in space	Y	50/90	Y	-	16.8	3/12/20
	Isolation unit - poultry	Thermostat in space	Y	50/90	Y	-	15.2	3/12/20
	laboratory	Thermostat in space	Y	50/90	Y	-	9.3	3/12/20
	Isolation unit - swine	Thermostat in space	Y	50/90	Y	-	28.9	3/11/20
	Isolation unit - swine	Thermostat in space	Y	50/90	Y	-	25.3	3/11/20
	Isolation unit - swine	Thermostat in space	Y	50/90	Y	-	26.8	3/11/20
	Isolation unit - swine	Thermostat in space	Y	50/90	Y	-	25.3	3/11/20

Appendix 11: Heating, Ventilation and Air Conditioning (HVAC) System Summary

Room No.	Specific Use	Temperature Set-Point (define units)	Electronic / Emergency Monitoring of Temperatures (Y/N)	Alert/Alarm Temperature Ranges (if applicable; define units)	Humidity Control (Y/N)	Relative Pressure	Air Exchange Rate (per hour)	Date Verified / Measured
		(settings to be verified)					(values to be measured)	
(b) (6) [redacted]	Isolation unit - swine	Thermostat in space	Y	50/90	Y	-	27.4	3/11/20
	Storage	Thermostat in space	Y	50/90	Y	-	6.7	3/11/20
	Isolation unit – swine, calves	Thermostat in space	Y	50/90	Y	-	14.5	3/11/20
	Isolation unit –	Thermostat in space	Y	50/90	Y	-	17.5	3/11/20
	swine, calves	Thermostat in space	Y	50/90	Y	-	14.3	3/11/20
	Isolation unit –	Thermostat in space	Y	50/90	Y	-	12.1	3/11/20
	Surgery	Thermostat in space	Y	50/90	Y	+	8.2	3/11/20
	Laboratory	Thermostat in space	Y	50/90	Y	-	8.2	3/11/20
	Isolation unit - poultry	Thermostat in space	Y	50/90	Y	-	15.5	3/13/20
	Isolation unit - poultry	Thermostat in	Y	50/90	Y	-	16.0	3/13/20

Appendix 11: Heating, Ventilation and Air Conditioning (HVAC) System Summary

Room No.	Specific Use	Temperature Set-Point (define units)	Electronic / Emergency Monitoring of Temperatures (Y/N)	Alert/Alarm Temperature Ranges (if applicable; define units)	Humidity Control (Y/N)	Relative Pressure	Air Exchange Rate (per hour)	Date Verified / Measured
		(settings to be verified)					(values to be measured)	
(b) (6)		space						
	Isolation unit - poultry	Thermostat in space	Y	50/90	Y	-	19.5	3/13/20
	Isolation unit - poultry	Thermostat in space	Y	50/90	Y	-	26.5	3/13/20
	Isolation unit - poultry	Thermostat in space	Y	50/90	Y	-	19.9	3/13/20
	Isolation unit - poultry	Thermostat in space	Y	50/90	Y	-	23.0	3/13/20
	Isolation unit - poultry	Thermostat in space	Y	50/90	Y	-	16.2	3/13/20
	Isolation unit - poultry	Thermostat in space	Y	50/90	Y	-	24.5	3/13/20
	Isolation unit - poultry	Thermostat in space	Y	50/90	Y	-	24.4	3/13/20
	laboratory	Thermostat in space	Y	50/90	Y	-	12.4	3/13/20
	Isolation unit - poultry	Thermostat in space	Y	50/90	Y	-	10.9	3/13/20

Appendix 11: Heating, Ventilation and Air Conditioning (HVAC) System Summary

Room No.	Specific Use	Temperature Set-Point (define units)	Electronic / Emergency Monitoring of Temperatures (Y/N)	Alert/Alarm Temperature Ranges (if applicable; define units)	Humidity Control (Y/N)	Relative Pressure	Air Exchange Rate (per hour)	Date Verified / Measured
		(settings to be verified)					(values to be measured)	
(b) (6)		72 F	N	NA	Y	-	4.6	3/12/20
		70 F	Y	60/90	Y	-	18.5	3/25/20
		70 F	Y	60/90	Y	-	19.0	3/25/20
		70 F	Y	55/90	Y	-	14.7	4/9/20
		70 F	Y	55/90	Y	-	16.0	4/9/20
		70 F	Y	55/90	Y	-	16.5	4/9/20
		70 F	Y	55/90	Y	-	15.9	4/9/20
		70 F	Y	55/90	Y	-	16.6	4/9/20
		70 F	Y	55/90	Y	-	15.7	4/9/20
		70 F	Y	55/90	Y	-	15.6	4/9/20
		70 F	Y	55/90	Y	-	15.6	4/9/20
		70 F	Y	55/90	Y	-	15.9	4/9/20

Appendix 11: Heating, Ventilation and Air Conditioning (HVAC) System Summary

Room No.	Specific Use	Temperature Set-Point (define units)	Electronic / Emergency Monitoring of Temperatures (Y/N)	Alert/Alarm Temperature Ranges (if applicable; define units)	Humidity Control (Y/N)	Relative Pressure	Air Exchange Rate (per hour)	Date Verified / Measured
		(settings to be verified)					(values to be measured)	
(b) (6)		70 F	Y	55/90	Y	-	14.7	4/9/20
		70 F	Y	55/90	Y	-	14.9	4/9/20
		65 F	Y	60/90	Y	-	16.1	4/9/20
		65 F	Y	60/90	Y	-	18.8	4/9/20
		65 F	Y	60/90	Y	-	17.3	4/9/20
		65 F	Y	60/90	Y	-	16.6	4/9/20
		65 F	Y	60/90	Y	-	16.3	4/9/20
		65 F	Y	60/90	Y	-	16.4	4/9/20
		75	Y	55/90	Y	-	12.0	2/10/20
		75	Y	55/85	Y	-	12.0	2/11/20
		75	Y	55/86	Y	-	12.0	2/10/20
		65	Y	55/90	Y	-	12.0	2/10/20
		75	Y	55/90	Y	-	12.0	2/10/20

Appendix 11: Heating, Ventilation and Air Conditioning (HVAC) System Summary

Room No.	Specific Use	Temperature Set-Point (define units)	Electronic / Emergency Monitoring of Temperatures (Y/N)	Alert/Alarm Temperature Ranges (if applicable; define units)	Humidity Control (Y/N)	Relative Pressure	Air Exchange Rate (per hour)	Date Verified / Measured
		(settings to be verified)					(values to be measured)	
(b) (6)								
		72	Y	55/80	Y	-	12.0	2/10/20
		75	Y	55/90	Y	-	11.9	2/11/20
		75	Y	55/86	Y	-	12.1	2/10/20
		65	Y	55/86	Y	-	11.9	2/10/20
		68	Y	60/85	Y	-	13.1	2/10/20
		72	Y	50/90	Y	-	12.9	2/10/20
		70	Y	65/90	Y	+	15.1	3/13/20
		85	Y	75/95	Y	+	17.2	3/13/20
		70	Y	65/75	Y	+	18.9	3/13/20
		73	Y	68/78	Y	-	8.2	2/10/20
		74	Y	69/79	Y	-	22.3	2/10/20
		73	Y	68/78	Y	-	22.7	2/10/20

Appendix 11: Heating, Ventilation and Air Conditioning (HVAC) System Summary

Room No.	Specific Use	Temperature Set-Point (define units)	Electronic / Emergency Monitoring of Temperatures (Y/N)	Alert/Alarm Temperature Ranges (if applicable; define units)	Humidity Control (Y/N)	Relative Pressure	Air Exchange Rate (per hour)	Date Verified / Measured
		(settings to be verified)					(values to be measured)	
(b) (6)		73	Y	68/78	Y	-	8.0	2/10/20
		73	Y	68/78	Y	-	35.4	2/10/20
		73	Y	68/78	Y	-	18.7	2/10/20
		72	Y	67/77	Y	-	12.4	2/10/20
		73	Y	68/78	Y	-	34.7	2/10/20
		73	Y	68/78	Y	-	23.9	2/10/20
		73	Y	68/78	Y	-	12.8	2/10/20
		73	Y	68/78	Y	-	34.4	2/10/20
		73	Y	68/78	Y	-	20.6	2/10/20
		73	Y	68/78	Y	-	8.3	2/10/20
		73	Y	68/78	Y	-	39.0	2/10/20
		73	Y	68/78	Y	-	14.3	2/10/20

Appendix 11: Heating, Ventilation and Air Conditioning (HVAC) System Summary

Room No.	Specific Use	Temperature Set-Point (define units)	Electronic / Emergency Monitoring of Temperatures (Y/N)	Alert/Alarm Temperature Ranges (if applicable; define units)	Humidity Control (Y/N)	Relative Pressure	Air Exchange Rate (per hour)	Date Verified / Measured
		(settings to be verified)					(values to be measured)	
(b) (6)		67	Y	62/72	Y	-	11.6	2/10/20
		66	Y	61/71	Y	-	19.5	2/10/20
		73	Y	68/78	Y	-	11.3	2/10/20
		71	Y	66/76	Y	-	12.6	2/10/20
		68	Y	63/73	Y	-	25.9	2/10/20
		68	Y	63/73	Y	-	16.8	2/10/20
		73	Y	68/78	Y	-	9.7	2/10/20
		71	Y	66/76	Y	-	25.9	2/10/20
		69	Y	64/74	Y	-	16.5	2/10/20
		71	Y	66/76	Y	-	9.8	2/10/20
		68	Y	63/73	Y	-	25.9	2/10/20
		69	Y	62/72	Y	-	17.3	2/10/20
		73	Y	68/78	Y	-	10.2	2/10/20

Appendix 11: Heating, Ventilation and Air Conditioning (HVAC) System Summary

Room No.	Specific Use	Temperature Set-Point (define units)	Electronic / Emergency Monitoring of Temperatures (Y/N)	Alert/Alarm Temperature Ranges (if applicable; define units)	Humidity Control (Y/N)	Relative Pressure	Air Exchange Rate (per hour)	Date Verified / Measured
		(settings to be verified)					(values to be measured)	
(b) (6)		73	Y	68/78	Y	-	40.6	2/10/20
		73	Y	68/78	Y	-	16.0	2/10/20
		73	Y	68/78	Y	-	10.2	2/10/20
		73	Y	68/78	Y	-	37.8	2/10/20
		73	Y	68/78	Y	-	19.6	2/10/20
		68	Y	63/73	Y	+	9.5	2/10/20
		68	Y	63/73	Y	+	11.4	2/10/20
		73	Y	68/78	Y	+	8.2	2/10/20
		73	Y	68/78	Y	-	8.9	2/10/20
		71	Y	66/76	Y	-	8.6	2/10/20
		71	Y	66/76	Y	-	13.1	2/10/20
		73	Y	68/78	Y	-	8.8	2/10/20

Appendix 11: Heating, Ventilation and Air Conditioning (HVAC) System Summary

Room No.	Specific Use	Temperature Set-Point (define units)	Electronic / Emergency Monitoring of Temperatures (Y/N)	Alert/Alarm Temperature Ranges (if applicable; define units)	Humidity Control (Y/N)	Relative Pressure	Air Exchange Rate (per hour)	Date Verified / Measured
		(settings to be verified)					(values to be measured)	
(b) (6)		73	Y	68/78	Y	+	12.7	2/10/20
		73	Y	68/78	Y	-	11.6	2/10/20
		73	Y	68/78	Y	-	11.1	2/10/20
		74	Y	69/79	Y	-	14.4	2/10/20
		73	Y	68/78	Y	-	14.5	2/10/20
		73	Y	68/78	Y	+	11.3	2/10/20
		70	Y	65/75	Y	-	14.2	2/10/20
		70	Y	65/75	Y	-	10.8	2/10/20
		70	Y	65/75	Y	-	13.9	2/10/20
		70	Y	65/75	Y	-	10.4	2/10/20
		70	Y	65/75	Y	-	10.1	2/10/20
		68	Y	63/73	Y	+	9.9	2/10/20
		73	Y	68/78	Y	-	10.2	2/10/20

Appendix 11: Heating, Ventilation and Air Conditioning (HVAC) System Summary

Room No.	Specific Use	Temperature Set-Point (define units)	Electronic / Emergency Monitoring of Temperatures (Y/N)	Alert/Alarm Temperature Ranges (if applicable; define units)	Humidity Control (Y/N)	Relative Pressure	Air Exchange Rate (per hour)	Date Verified / Measured
		(settings to be verified)					(values to be measured)	
(b) (6)		73	Y	68/78	Y	-	9.9	2/10/20
		70	Y	65/75	Y	-	10.0	2/10/20
		65	Y	60/70	Y	-	22.0	2/10/20
		73	Y	68/78	Y	+	13.1	2/10/20
		73	Y	68/78	Y	-	15.6	2/10/20
		68	Y	63/73	Y	-	12.8	2/10/20
		72	Y	67/77	Y	-	17.3	2/10/20
		72	Y	67/77	Y	-	11.3	2/10/20
		75	Y	70/80	Y	-	12.0	2/10/20
		72	Y	67/77	Y	+	14.5	2/10/20
		73	Y	68/78	Y	-	15.6	2/10/20
		66	Y	61/71	Y	-	13.6	2/10/20
		64	Y	59/69	Y	-	13.0	2/10/20

Appendix 11: Heating, Ventilation and Air Conditioning (HVAC) System Summary

Room No.	Specific Use	Temperature Set-Point (define units)	Electronic / Emergency Monitoring of Temperatures (Y/N)	Alert/Alarm Temperature Ranges (if applicable; define units)	Humidity Control (Y/N)	Relative Pressure	Air Exchange Rate (per hour)	Date Verified / Measured
		(settings to be verified)					(values to be measured)	
(b) (6)								
		72	Y	67/77	Y	-	14.2	2/10/20
		72	Y	67/77	Y	+	12.9	2/10/20
		73	Y	68/78	Y	-	12.0	2/10/20
		73	Y	68/78	Y	-	12.5	2/10/20
		72	Y	67/77	Y	-	16.7	2/10/20
		73	Y	68/78	Y	-	9.5	2/10/20
		72	Y	67/77	Y	-	12.8	2/10/20
		71	Y	66/76	Y	-	12.7	2/10/20
		72	Y	67/77	Y	-	12.8	2/10/20
		Thermostat in space	Y	48	Y	+	21.8	3/11/20

Appendix 11: Heating, Ventilation and Air Conditioning (HVAC) System Summary

Room No.	Specific Use	Temperature Set-Point (define units)	Electronic / Emergency Monitoring of Temperatures (Y/N)	Alert/Alarm Temperature Ranges (if applicable; define units)	Humidity Control (Y/N)	Relative Pressure	Air Exchange Rate (per hour)	Date Verified / Measured
		(settings to be verified)					(values to be measured)	
[redacted]		Thermostat in space	Y	48	Y	+	18.5	3/11/20
		Thermostat in space	Y	48	Y	+	15.4	3/11/20
		Thermostat in space	Y	48	Y	+	14.3	3/11/20
		Thermostat in space	Y	48	Y	+	13.8	3/11/20
		Thermostat in space	Y	48	Y	+	4.5	3/11/20
		Thermostat in space	Y	48	Y	+	4.3	3/11/20
		Thermostat in space	Y	48	Y	+	4.8	3/11/20
		Thermostat in space	Y	48	Y	+	4.5	3/11/20
		Thermostat in space	Y	48	Y	+	4.6	3/11/20

Appendix 11: Heating, Ventilation and Air Conditioning (HVAC) System Summary

Room No.	Specific Use	Temperature Set-Point (define units)	Electronic / Emergency Monitoring of Temperatures (Y/N)	Alert/Alarm Temperature Ranges (if applicable; define units)	Humidity Control (Y/N)	Relative Pressure	Air Exchange Rate (per hour)	Date Verified / Measured
		(settings to be verified)					(values to be measured)	
(b) (6)		Thermostat in space	Y	48	Y	+	3.8	3/11/20
		Thermostat in space	Y	48	Y	+	4.3	3/11/20
		Thermostat in space	Y	48	Y	+	4.5	3/11/20
		Thermostat in space	Y	48	Y	+	13.1	3/11/20
		Thermostat in space	Y	48	Y	+	14.5	3/11/20
		Thermostat in space	Y	48	Y	+	11.9	3/11/20
		Thermostat in space	Y	45/90	Y	+	5.6	3/11/20
		Thermostat in space	Y	45/90	Y	+	6.1	3/11/20
		Thermostat in space	Y	45/90	Y	+	5.8	3/11/20
		Thermostat in	Y	45/90	Y	+	5.8	3/11/20

Appendix 11: Heating, Ventilation and Air Conditioning (HVAC) System Summary

Room No.	Specific Use	Temperature Set-Point (define units)	Electronic / Emergency Monitoring of Temperatures (Y/N)	Alert/Alarm Temperature Ranges (if applicable; define units)	Humidity Control (Y/N)	Relative Pressure	Air Exchange Rate (per hour)	Date Verified / Measured
		(settings to be verified)					(values to be measured)	
(b) (6)		space						
		Thermostat in space	Y	45/90	Y	+	5.9	3/11/20
		Thermostat in space	Y	45/90	Y	+	6.1	3/11/20
		Thermostat in space	Y	45/90	Y	+	2.2	3/11/20
		NA	NA	NA	Y	+	13.2	3/25/20
		NA	NA	NA	Y	+	8.6	3/25/20

[Create additional rows by pressing TAB in the bottom-right box.]

Copy and repeat the Description and Table for each location, including all satellite housing locations.

Appendix 12: Aquatic Systems Summary – Part I

Please summarize water management and monitoring information programs for each animal facility, including all satellite facilities, rooms, cephalopod housing systems, and enclosures. The following key will assist you in completing the form:

(1) List location of aquaria, including outdoor enclosures (ponds or outdoor tanks). If indoors, list building and room number. Note that all species housed at the same location and maintained via the same design and monitoring may be listed in the same row.
(2) Please indicate if embryonic (E), larval (L), juvenile (J) or Adult (A)
(3) Group tanks (ponds, outdoor tanks, multiple aquaria) are arranged as arrays with shared water supply; individual aquaria have exclusive water handling systems.
(4) Indicate water type, e.g., fresh, brackish, or marine.
(5) Indicate water pre-treatment, e.g., dechlorination, rough filters.
(6) Indicate water circulation, e.g., static, re-circulated, constant flow, or some combination of these. If applicable, indicate water exchange frequency and amount (percentage).
(7) Provide a key word for filtration employed, e.g., biological, chemical, mechanical, and type (e.g., mechanical-bead filter). A diagram may be provided showing the flow of water, filtration, source of "make-up" water and amount replaced daily.

Part I

Location (1)	Species (2)	System Design					
		Group / Individual (3)	Water Type (4)	Pre-treatment (5)	Circulation (6)	Filtration (7)	Disinfection (e.g., UV, ozone)
(b) (6) [redacted]	Fin fish (all stages)	Group	Fresh/marine	Adjusted city tap water	Constant flow/RAS	Biological (packed media)	
	Fin fish (all stages)	Group	Fresh/marine	Adjusted city tap water	Constant flow	NA	
	Fin fish (all stages)	Group	Fresh/marine	Adjusted city tap water	Constant flow	NA	
	Fin fish (all stages)	Group	Fresh/marine	Adjusted city tap water	Constant flow/RAS	Biological (packed media)	
	Fin fish (all stages)	Group	Fresh	Adjusted city tap water	Constant flow/RAS	Biological (packed media)	
	Fin fish (all stages)	Group	Fresh/marine	Adjusted city tap water	Constant flow/RAS	Biological (packed media)	
	Fin fish (all stages)	Group	Fresh/marine	Adjusted city tap water	Constant flow/RAS	Biological (packed media)	

Note: Records of equipment maintenance (filter changes, UV bulb changes, probe changes, calibrations, *etc.*) should be available for review.

[Create additional rows by pressing TAB in the bottom-right box.]

Appendix 12: Aquatic Systems Summary – Part II

The following key will assist you in completing this form:

(1) In these columns, please indicate monitoring frequency, e.g. daily, weekly, monthly or other point sampling frequency; continuous/real time, or none, if applicable. Also indicate method of control (heaters versus room HVAC, hand versus auto dosing, etc.).

(2) Indicate other parameters and their monitoring frequency, e.g., alkalinity, total hardness, conductivity, chlorine/chloramine.

Part II

Monitoring *Indicate in the boxes below the frequency of monitoring and method of control for the following parameters. (1)*									
Location (from Part I)	**Temperature**	**Salinity**	**pH**	**NH_4**	**NO_2**	**NO_3**	**Dissolved O_2**	**Total Dissolved Gases**	**Other. Please List (2):**
(b) (6) [redacted]	Real time	NA	Real time	Quarterly	Quarterly	Quarterly	As needed	NA	
	Real time	NA	Real time	Quarterly	Quarterly	Quarterly	As needed	NA	
	Real time	NA	Real time	Quarterly	Quarterly	Quarterly	As needed	NA	
	Real time	NA	Real time	Quarterly	Quarterly	Quarterly	As needed	NA	
	Real time	NA	Real time	Quarterly	Quarterly	Quarterly	As needed	NA	
	Real time	NA	Real time	Quarterly	Quarterly	Quarterly	As needed	NA	
	Real time	NA	Real time	Quarterly	Quarterly	Quarterly	As needed	NA	

Note: This information may be provided in another format, provided that all requested data is included.

[Create additional rows by pressing TAB in the bottom-right box.]

Appendix 13: Primary Enclosures and Animal Space Provisions

Please complete the Table below considering performance criteria and guiding documents (e.g., *Guide*, Ag *Guide*, ETS 123 and/or other applicable standards) used by the IACUC/OB to establish adequacy of space provided for all research animals including traditional laboratory species, agricultural animals, aquatic species, and wildlife when reviewing biomedical, field, and agricultural research studies. Refer to AAALAC International's Position Statement "Cage or Pen Space" for additional guidance.

Species	**Dimensions of Enclosure** (cage, pen, tank*, corral, paddock, etc.)	**Maximum Number Animals / Enclosure**	**Guiding Document Used to determine the Institution's Space Standards** (*Guide*, Ag *Guide*, ETS 123, Other)	**Enclosure Composition & Description****
(b) (6)	12'x 12' pens (8 pens per room in 2 rooms)	12	Ag Guide	Concrete flooring with rubber mat pad (4'x6') and painted metal fencing panels
	1. 2 pens at 8'x 11.5' 2. 1 pen at 12'x 11.5' 1 pen at 29'x16.5'	1. 7 2. 11 39	Ag Guide	Concrete flooring with Sanichip bedding. Smaller pens are set up with metal fencing panels and
	75'x 60' with a 12'x 24'hoop shelter and add'l 25'x 65' pen	135	Ag Guide	
	7 pens of 10'x10'		Ag Guide	Plastic poultry slat flooring; painted metal fence panels
	1. 1 pen 4'x 10' 2. 2 pens12'x10' 3. 1 pen 15'x10'		Ag Guide	Plastic poultry slat flooring; painted metal fence panels

Appendix 13: Primary Enclosures and Animal Space Provisions

Species	Dimensions of Enclosure (cage, pen, tank*, corral, paddock, etc.)	Maximum Number Animals / Enclosure	Guiding Document Used to determine the Institution's Space Standards (*Guide*, Ag *Guide*, ETS 123, Other)	Enclosure Composition & Description**
Poultry in 520	1. 2 pens at 8'x4' 2. 2 pens at 9'x5' 3. 2 pens at 10'x10'		Ag Guide	Tenderfoot; painted metal fence panels Brooder = solid plastic panels
Mouse/Rat/Hamster	• 10.5"x 19.5"x 8"	13 mice >25g, 2 rats>500g, 10	*ILAR Guide for the Care and Use of*	Polycarbonate suspended static cages with water grommet (Lab Products)
Mouse/Rat/Hamster	• 14.75"x 13"x 7"	12 mice >25 g, 2 rats>500g, 10 hamsters>	*ILAR Guide for the Care and Use of*	Polysulfone IVCS (Tecniplast)
Mouse/Rat/Hamster	• 13"x 9"x 7.5"	7 mice > 25 g, 1 rat > 500g, 6 hamsters >	*ILAR Guide for the Care and Use of*	OneCage ™ (single water grommet) IVCS (LabProducts)
Mouse/Rat/hamster/guinea pig	• 19"x 13.75"x 7.75"	14 Mice > 25 grams each, 3 Rats> 500	*ILAR Guide for the Care and Use of*	OneCage ™ (double water grommet) IVCS (LabProducts)
Mouse	• 16.6"x 13.25"x 5.7r"	12 adult mice over 25 grams	*ILAR Guide for the Care and Use of*	SuperMouse1800™ IVCS (LabProducts)
Mouse/Rat/Hamster	• 14"x 12"x 7"	11 mice >25 g, 2 rats > 500g, 8 hamsters	*ILAR Guide for the Care and Use of*	AnCare ™ IVCS

Appendix 13: Primary Enclosures and Animal Space Provisions

Species	Dimensions of Enclosure (cage, pen, tank*, corral, paddock, etc.)	Maximum Number Animals / Enclosure	Guiding Document Used to determine the Institution's Space Standards (*Guide*, Ag *Guide*, ETS 123, Other)	Enclosure Composition & Description**
Guinea Pig	• 29:x 21"x 10"	6 adult guinea pigs>350g	*ILAR Guide for the Care and Use of*	Plastic drawer solid floor, static cages with water grommet (Allentown)
Rabbit (in cages)	With divider: 22"x 28.5"x 16" • Without divider	1 rabbit (up to 5.4kg) with divider and 2	*ILAR Guide for the Care and Use of*	Stainless steel, slotted floor, static
Rabbit (on floor)	139"x123"x36.5"	23 rabbits >5.4kg	*ILAR Guide for the Care and Use of*	Epoxy flooring covered with woodchip bedding and a stainless steel gate.
Mink/Ferret	16"x 19"x 13"	1 mink per cage		Stainless steel, slotted floor, static
Poultry	36"x 36"x 36"	9 chickens/turkey up to 1.5 kg	*ILAR Guide for the Care and Use of*	Thermoplastic caging with HEPA supply and exhaust. Grated flooring.
Poultry	30"x 30"x 30"	6 chickens/turkey up to 1.5kg	*ILAR Guide for the Care and Use of*	Thermoplastic caging with HEPA supply and exhaust. Grated flooring.
Fish	2.5 gallon	Depends on species housed, flow	Guidelines for the Use of Fishes in	Acrylic

Appendix 13: Primary Enclosures and Animal Space Provisions

Species	Dimensions of Enclosure (cage, pen, tank*, corral, paddock, etc.)	Maximum Number Animals / Enclosure	Guiding Document Used to determine the Institution's Space Standards (*Guide*, Ag *Guide*, ETS 123, Other)	Enclosure Composition & Description**
Fish	30 gallon	Depends on species housed, flow	Guidelines for the Use of Fishes in	Acrylic
Fish	50 gallon	Depends on species housed, flow	Guidelines for the Use of Fishes in	Acrylic
Fish	120 gallon	Depends on species housed, flow	Guidelines for the Use of Fishes in	Polyethylene

*For aquatic species, provide tank volume.
**Include descriptors such as open-topped, static microisolator, individually-ventilated cage systems (IVCS).

Appendix 14: Cleaning and Disinfection of the Micro- and Macro-Environment

Please describe the cleaning and disinfection methods in the Table below. Note the washing/sanitizing frequency and method for each of the following:

Area	**Washing/Sanitizing Method** (mechanical washer, hand washing, high-pressure sprayers, etc.)	**Washing/ Sanitizing Frequency**	**Chemical(s) Used***	**Other Comments** (e.g., autoclaved)
Micro-environment				
Solid-bottom cages (static)	Handwashing before going through Steris Rack washer	Once weekly	Bru-Clean TbC™, Cage-Klenz® 100, and Cage-Klenz®220	Bedding is changed once at cleaning and again midway through the week.
Solid-bottom cages (IVC)	Handwashing before going through Steris Rack washer	Once weekly	Virkon™/Bru-Clean TbC™ and Cage-Klenz® 100 (Cage-Klenz®220 for hamsters)	IVCs are autoclaved if used in an ABSL3 environment Poultry Isolators are sanitized with a Foamer at the End of Study. Every 6 months the isolators are gas decontaminated with Chlorine Dioxide.
Suspended wire-bottom or slotted floor cages	Handwashing before going through Steris Rack washer	Every two weeks with the rack	Bru-Clean TbC™, Cage-Klenz® 100 and Cage-Klenz®220	Pads are changed twice weekly
Cage lids	Handwashing before going through Steris Rack washer	Once weekly	Virkon™/Bru-Clean TbC™ and Cage-Klenz® 100	IVCs are autoclaved if used in an ABSL3 environment
Filter tops	Handwashing before going through Steris Rack washer	Once weekly	Virkon™/Bru-Clean TbC™ and Cage-Klenz® 100	IVCs are autoclaved if used in an ABSL3 environment
Cage racks and shelves	Handwashing before going through Steris Rack washer	Static racks are every other week; IVC racks are once every 6	Virkon™/Bru-Clean TbC™ and Cage-Klenz® 100	IVC racks are autoclaved if used in an ABSL3 environment

Appendix 14: Cleaning and Disinfection of the Micro- and Macro-Environment

Area	Washing/Sanitizing Method (mechanical washer, hand washing, high-pressure sprayers, etc.)	Washing/ Sanitizing Frequency	Chemical(s) Used*	Other Comments (e.g., autoclaved)
		months or at the End of Study		
Cage pans under suspended cages	Handwashing before going through Steris Rack washer	See Other	Virkon™/Bru-Clean TbC™, Cage-Klenz® 100, and Cage-Klenz®220	Handwashing twice weekly; Rack wash every other week
Play pens, floor pens, stalls, etc.	Handwashing	Once weekly	Bru-Clean TbC™	Corners are cleaned daily for rabbits. For Sheep, the stalls are hosed daily and Wex-cide 128 is used.
Corrals for primates or outdoor paddocks for livestock	NA	NA	NA	NA
Aquatic, amphibian, and reptile tanks and enclosures	Handwashing before going through Steris Rack washer	At the End of Study	Virkon® Aquatic/Bru-Clean TbC™	NA
Feeders	Handwashing before going through Steris Rack washer	Once weekly	Virkon™/Bru-Clean TbC™ and Cage-Klenz® 100	For Poultry, this is done at the End of Study.
Watering devices	Handwashing before going through Steris Rack washer	Once weekly	Virkon™/Bru-Clean TbC™ and Cage-Klenz® 100	For Poultry, this is done at the End of Study.
Exercise devices and manipulanda used in environmental enrichment programs, etc.	Handwashing before going through Steris Rack washer	Once weekly	Virkon™/Bru-Clean TbC™ and Cage-Klenz® 100	For Poultry, this is done at the End of Study.
Transport cages	Handwash after each use	After each use	Virkon™/Bru-Clean TbC™	NA

Appendix 14: Cleaning and Disinfection of the Micro- and Macro-Environment

Area	Washing/Sanitizing Method (mechanical washer, hand washing, high-pressure sprayers, etc.)	Washing/ Sanitizing Frequency	Chemical(s) Used*	Other Comments (e.g., autoclaved)
Operant conditioning & recording chambers, mechanical restraint devices (chairs, slings, etc.)	NA	NA	NA	NA
Euthanasia chambers	Handwash after every use and Steris Rack wash at End of Study	After each use	70 % Ethanol/ Cage-Klenz®100 and Cage-Klenz®220	NA
Macro-Environment				
Animal Housing Rooms:				
Floors	Hose down	Weekly	Bru-Clean TbC™	Daily Sweep in Guinea Pig rooms
Walls	Spray	End of Study	Virkon™/Bru-Clean TbC™	Wiped down as needed
Ceilings	Spray	End of Study	Virkon™/Bru-Clean TbC™	NA
Ducts/Pipes	Spray	End of Study	Virkon™/Bru-Clean TbC™	Wiped down as needed
Fixtures	Spray	End of Study	Virkon™/Bru-Clean TbC™	
Corridors:				
Floors	Floor scrubber	Weekly	Bru-Clean TbC™	
Walls	Handwashing	Railings monthly	Bru-Clean TbC™	

Appendix 14: Cleaning and Disinfection of the Micro- and Macro-Environment

Area	Washing/Sanitizing Method (mechanical washer, hand washing, high-pressure sprayers, etc.)	Washing/ Sanitizing Frequency	Chemical(s) Used*	Other Comments (e.g., autoclaved)
Ceilings	Spray	Weekly	Virkon™/Bru-Clean TbC™	ABSL3 Shared corridor weekly ONLY
Ducts/Pipes	Spray	Weekly	Virkon™/Bru-Clean TbC™	ABSL3 Shared corridor weekly ONLY
Fixtures	Spray	Weekly	Virkon™/Bru-Clean TbC™	ABSL3 Shared corridor weekly ONLY
Support Areas (e.g., surgery, procedure rooms, etc.); complete for each area:				
Floors	Handwashing	Weekly	Bru-Clean TbC™	
Walls	Handwashing	As needed	Bru-Clean TbC™	
Ceilings	Handwashing	As needed	Bru-Clean TbC™	
Ducts/Pipes	Handwashing	As needed	Bru-Clean TbC™	
Fixtures	Handwashing	As needed	Bru-Clean TbC™	
Implements (note whether or not shared):				
Mops	Washed in mechanical washer	As needed	Tide or similar detergent	NOT SHARED
Mop buckets	Handwashing	Weekly	Virkon™/Bru-Clean TbC™	NOT SHARED
Aquaria nets	Dipped in disinfectant	Weekly	Virkon® Aquatic	
Other				
Other:				
Vehicle(s)	Spray/scrub	As needed	Project specific	

Appendix 14: Cleaning and Disinfection of the Micro- and Macro-Environment

Area	**Washing/Sanitizing Method** (mechanical washer, hand washing, high-pressure sprayers, etc.)	**Washing/ Sanitizing Frequency**	**Chemical(s) Used***	**Other Comments** (e.g., autoclaved)
Other transport equipment (list) livestock trailers	sprayers	After use	Project dependant	

*Please provide chemical, not trade name.

Appendix 15: Facilities and Equipment for Sanitizing Materials

In the Tables below, summarize the facilities and equipment used to sanitize animal related equipment (tunnel washer, bottle washer, rack washer, bulk autoclave, hand washing area, bedding dispensing unit, *etc.*). Note that some descriptions may be combined if all share identical features (e.g., all rack washers).

[*Note*: Please remove the examples provided in the Table below.]

Building	Room No.	Equipment Type	Safety Feature(s)	Methods of Monitoring Effectiveness
(b) (6) [redacted]	0404	Autoclave	Tools to pull carts out of the autoclave to avoid entering the unit; bar running the length of the door that can be pushed in case of an emergency; Emergency stop button	Annual Calibration; Monthly 3M Attest™ Steam Pack; temperature sensitive autoclave tape on one package of every level of racks; annual verification with NCAH Calibration Laboratory
	0404	Rack Washer	Emergency pull cord inside the unit that will stop the system; emergency push on both of the two doors; only one of the two doors can be open at any given time.	Guarantee 180-degree hot water rinse with Pharmacal TEMP-TAPE 180°F temperature-sensitive tape used every morning of an anticipated cage wash cycle

[Create additional rows by pressing TAB in the bottom-right box.]

Appendix 16: Lighting Summary

Using the Table below, summarize the lighting system(s) for the animal housing facility(ies). For each species or holding room type, list light intensity (range), construction features (e.g., water resistance), photoperiod (light:dark) and control (e.g., automatic versus manual, phasing). For systems automatically controlling photoperiod, describe override mechanisms (including alarms, if applicable).

Location:

Room Type[a]	Light Intensity Range	Lighting Fixture Construction Features[b]	Photo-period (hrs)[c]	Photoperiod and Lighting Control	Override Mechanisms (if applicable)
(b) (6) [redacted]	Not measured	Recessed or surface mounted	12:12	Automatic via building management system	Wall switches can override the BAS system
	Not measured	Surface mounted	14:10	Automatic via building management system	NA
	Not measured	Surface mounted	12:12	Automatic via building management system	Wall switches can override the BAS system
	Not measured	Moisture proof incandescent lights and some fluorescent lighting has been added for procedure areas	Light timer is used if needed	Light timer if needed	N/A
	Not measured	Fluorescent light fixtures	12:12	timers	N/A
	Not measured	Fluorescent lights for procedures and in storage rooms, natural lighting via exterior windows	Natural lighting	Natural lighting	NA
	Not measured	Moisture proof fluorescent fixtures	12:12	timers	Can turn on lights manually if needed
	Not measured	Moisture proof fluorescent fixtures	12:12	timers	Can turn on lights manually if needed
	Not measured	Moisture proof fluorescent fixtures	12:12	timers	Can turn on lights manually if needed

[a] A list of each room is not needed; group or cluster rooms by species or function
[b] Include such features as water resistance, red lighting, *etc.*
[c] Note if light cycle inverted/reversed.

Appendix 17: Satellite Housing Facilities

Note: In the Program Description Section 2. IV. (Physical Plant), item C., describe the criteria used to determine a "Satellite Animal Holding Area." In the Table below, summarize these animal housing areas. Note that the total square footage for all each of these must also be included in the Summary of Animal Housing and Support Sites **(Appendix 2)**, and applicable information regarding these areas included in the Heating, Ventilation, and Air Conditioning (HVAC) Summary (**Appendix 11**) and Lighting Systems Summary (**Appendix 16**).

Not applicable

Building	**Room(s)**	**Person Responsible**	**Species Used**	**Approximate Area** (ft^2 or m^2) **Devoted to Housing**	**Maximum Period of Stay**	**Purpose / Rationale / Justification**	**Construction Features and Finishes**

[Create additional rows by pressing TAB in the bottom-right box.]

Appendix 18: Cephalopod Oversight

Please describe below the oversight of cephalopods (for guidance, refer to AAALAC International's Frequently Asked Question, "Invertebrate animals" and AAALAC's Reference Resource, "Guidelines for the Care and Welfare of Cephalopods in Research-A consensus based on an initiative by CephRes, FELASA and the Boyd Group," (*Note AAALAC International's caveats regarding this resource*). In addition, the care and use of cephalopods may be described in the relevant sections (i.e., housing, husbandry, veterinary care, surgery and euthanasia, etc.) within the Program Description.

Not applicable