



Title: Ruminant Nutrition Center

SOP Number: 076

Purpose: This document outlines the standard operating procedures for the Ruminant Nutrition Center, which includes building 812 and surrounding fenced area located at the New Deal Research and Education Center (NDREC). The area is primarily used, but not limited to, the conduction of studies involving the use of ruminally-cannulated animals (bovine or ovine). Any experimental protocol that deviates from the procedures described below, will be listed in the approved AUF.

ADVANCE NOTIFICATION OF ACTIVITY

Principal investigators must get authorization to schedule experimental protocols in the Ruminant Nutrition Center at least one week in advance. The center manager will be responsible to ensure the center is in proper condition for all experimental protocols.

RECORDS

- A. Records Maintained at the Ruminant Nutrition Center office area.
 1. Daily Log of Events. A daily log of events will be maintained for each experiment. Events recorded might include cattle observations, medical, or feed delivery, heater/exhaust elements function, pen cleaning activity, water-trough check, and any other that may affect animals. During the presence of animals in the facility, the following checklist will be completed daily. **The Daily Observation log will be initialed daily by any authorized personnel officially included in the approved AUF.**
 - Daily check items:
 - a. All cattle are allocated within proper assigned stall number
 - b. All cattle are fed properly (time and quantity)
 - c. All individual stalls were properly cleaned (washed minimum once a day)
 - d. All water troughs are clean (emptied and flushed) and flow-valves are working properly
 - e. Morning and afternoon all individual cattle check is completed
 - f. Morning and afternoon all individual water troughs check is completed
 - g. Individual diet intake file is completed (amount offered and refusals)
 2. Pen Identification. A complete listing of the identification number (ear tag number) of cattle in each pen for each experiment should be maintained on the front of the pen. The ID card must include: Animal ID, treatment, appropriate project number and period length for treatment currently in progress, date animals entered the stalls, and predicted date animals will exit the stalls. (*OBS.: full length of project must **not** be included in front of the pen sign aiming to avoid confusion regarding collection periods. Complete information regarding the project will be present in the AUF inside the office).*)

3. Base diet. Copies of the base-diet formulations for each experiment should be maintained in a notebook or in computer within the Ruminant Nutrition Center, or with Principal Investigator.
4. Feed records. Daily records of individual feed delivered to each pen and amount left from the day before (refusals) for each pen should be manually noted within daily intake records and must be visible to everyone involved in the project. Both feed offered and refusals must be weighed, and dry matter content determined by composite analyses, at least once a week. More intensive dietary and refusal dry matter content assessment will be in place during collection-days, and such schedule should be determined by the Principal Investigator, which will determine the research objectives conducted in the center. Experimental drugs in premixes should be adequately labeled according to regulatory directions for use.
5. Health records. Animal Care/Daily Observation log will be located inside the office and must contain records of any medical treatments an individual animal receives. Records shall include the date, a brief diagnosis, medical treatments administered (including the lot number and expiration date), outcomes of treatment and be completed by the person administering the treatment.
6. Animal removed from pens. A record of cattle removed from pens because of other reasons than the predicted management described in AUF will be maintained in the notebook for each experiment located in the Ruminant Nutrition Center. Generally, decisions to remove cattle from pens should be made by the Principal Investigator or Ruminant Nutrition Center Coordinator in conjunction with the veterinary staff for the project.

B. Records

1. Experimental Protocol and Project Correspondence. Paper copies of the AUF and all correspondence related to each study (amendments, approvals, informative material submitted by IACUC, personnel sign list, etc.) must be maintained on file inside the office at the Ruminant Nutrition Center.
2. Approved Animal Care and Use Form. The Principal Investigator is responsible for filing an Animal Care and Use Form to the University IACUC for review and approval before any cattle can be included in an experiment. If animals are placed inside the Ruminant Nutrition Center at a "maintenance status" because they are not yet included in an experimental AUF, they still must be part of an approved AUF, and such AUF must state and follow procedures of current Ruminant Nutrition Center SOP.
3. Necropsy Results. Results of any post-mortem examinations that are conducted for any cattle that die during an experiment will be maintained in the files of the Principal Investigator. Veterinary post-mortem examinations are typically conducted when specified in the experimental protocol for a research study, although all unexpected deaths will be reported immediately to Texas Tech University veterinary staff.

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ANIMAL MANAGEMENT

General: Care will be taken to avoid loud noises and other stressful events while cattle are being handled. Prior to entrance to the facility, animals will have: individual identification, electronic ear tag that monitors eating behavior (optional and can be obtained from Ruminant Nutrition Center Coordinator), vaccines, internal and external parasiticide treatment, body weight measurement, and IACUC will be notified regarding animal transportation. All procedures will follow SOP023 guidelines.

A. Daily management at indoor facility

1. Indoor facility:
 - a) Contains two ceiling-mounted heaters strategically located in each extremity of the facility to provide winter heating, and 6 roof-mounted exhaust fans to provide summer cooling. Regardless of year season, exhaust fans must be kept active while animals are inside the facility (odor elimination).
 - b) There are 10 concrete stalls ($12 \times 12 = 144 \text{ ft}^2$) with a central drain and 10-inch curb surround which retains animal waste and moisture within each pen location. Each pen contains a 20×20 -inch window, which allows sunlight access to the stalls.
 - c) A 40-gallon plastic feed-bunk, an automatic water trough, a collection stall, and a rubber mat ($10 \times 3 \text{ ft}$) are also present inside each pen.
 - d) The drainage system contains an automatic flush of commercial bacterial solution that flushes through the animal waste line to prevent drain build-up of content and potential clogging.
2. Animals are individually housed. Front pen visual contact among animals must be allowed (stall gate must allow animals to see each other). Ad libitum feed intake is provided (allowing approximately 5% daily refusals, DM –basis), unless specific management of feed restriction is needed to accomplish research objectives, which will be clearly stated in the AUF. Animals will be fed consistently at the same time once daily. Time of such feeding is to be defined for each study conducted. When required by protocol specifications (diets with low bulk-density), animals will be fed twice daily.
3. Pen cleaning (animal solid waste) will be scooped twice a day and placed outside the facility (removed from site twice a week and placed on composting pile). Water will be applied, along with brushing, to wash/scrub the pens and alley in front of the pens, of remaining feces and urine at least once a day (morning period) into drain located inside each stall.
4. When collection is to be performed, a halter will be placed (cattle) to control the animals head, and animal will be gently tied in the collection stall located within each pen. Animal individual behavior will be observed, learned and respected, and if safety is not compromised, collection might be performed without placing animals inside collection stall.

5. Unless otherwise specified in the AUF, a 21-day feeding/collection period will be standard within the indoor facility. At the end of each period, animals will be allowed to exercise in the outside pens for at least 48 hours. Within this period, animals (cattle) may be transported (trailer, SOP030) to the Beef Center facility for body weight measurements, according to SOP022.
6. Outside open pens. While outside, animals will be group-housed within each dietary treatment (if different diets). Water troughs (100-gallon plastic tank) will be checked twice daily.

B. Flooding contingency plan

1. Indoor facility is located at the highest place of the research center. Indoor facility is also equipped with individual stall drainage.
2. Outside pens are approximately 6 feet below the level of the indoor facility. In case of flooding emergency occurring within the 48 hours in which animals would be outside, they will be immediately moved into the inside stalls.
3. If flooding persists for multiple days, animals can also have access to inside arena area located within indoor facility (2,800 ft²). Arena area is not used for animal permanent housing, but it may provide temporary help to alleviate flooding inconvenience allowing animals to have access to a dry group-housed environment.

CATTLE HEALTH EVALUATION AND TREATMENT

General: All animals housed at the Ruminant Nutrition Center will be observed twice daily for signs of illness or injury. Animals that require attention are handled within working stall located inside each pen, or if necessary, brought to the cattle working facility located at the Beef Center for further observation. Treatment will be directed by the Texas Tech University Veterinarian Staff.

- A. At the discretion of the Principal Investigator and the University Veterinarian, cattle that die suddenly or of unknown causes may be necropsied. This examination can be performed by the Texas Tech University or a local veterinarian.

FEED PREPARATION AND STORAGE

- A. All diets needed for animals housed within the Ruminant Nutrition Center will be milled in the research center feed mill at least once a week. To avoid spoilage, milled diets will be stored under refrigeration (4-6°C) in walk-in cooler located 200 yards away from the Ruminant Nutrition Center. Diets are kept inside labeled 55-gallon plastic containers with lid. Once a week, during diet containers re-filling process, the cooler is turned-off and cleaned.
- B. If a dietary treatment requires top-dressing a small quantity of feed at the moment of feeding, such supplement will be kept inside the Ruminant Nutrition Center inside a labeled plastic container with lid.

RUMINAL CANNULA USED TO ACCESS RUMINAL COMPARTMENT

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General: If ruminally cannulated animals are used in a study, ruminal collections or incubation time intervals will be properly described in the AUF.

- A. Ruminal content collection proceeds as follows:
 - 1. All equipment and materials needed for collection or incubation must be prepared before the animal is approached;
 - 2. Personnel using gloves (OB + procedure gloves) will carefully open ruminal cannula by first releasing pressure within the cannula lid by using a screw-driver (the tool must not touch the animal); after pressure release, the cannula lid will be pushed towards the inside of the rumen, then turned 90 degrees and removed from ruminal cavity to allow for rumen content collection;
 - 3. After ruminal content collection procedures are completed, equal care should be taken in re-sealing ruminal cannula lid/plug. To close the canula, place the shorter flange of the lid/plug (shallow edge) in the opening, and in a step-wise fashion, and push on each extremity of the lid until it snaps inside the groves of the cannula. To facilitate replacement, the cannula lid/plug can also be optionally stored in a container of warm water while collection is performed (this will maintain cannula lid flexibility).
- B. For incubations (in situ bags) the same procedure described above must be followed for accessing rumen cannula, but instead of collection of ruminal contents, in situ nylon bags are introduced inside the rumen.
- C. Wireless ruminal pH probe (5 × 25 cm) accompanied with small (2 × 5 cm) cylinder weight may be introduced inside the rumen every 7 days.

FECAL COLLECTION

General. Fecal samples are usually collected twice a day, during the last 7 days of each 21-day period. Samples (approximately 50 g, as-is) from each collection (morning and afternoon) are collected directly from the rectum by slowly massaging the anal sphincter or evacuating feces by the introduction of a gloved hand into the distal rectum. Collection times and number of days might be modified aiming to address specific research interests.

AFTER STUDY IS COMPLETED

General. As soon as animals are removed from facility, pens, gates, and walls are power washed to remove organic matter (organic matter is usually present only on the floor). 24 hours later, the ceiling, walls, floor, and pen components will be disinfected with DC&R disinfectant or similar (propanediol 19.2%; ammonium chloride 3.1%; and formaldehyde 2.3%). Within the same week, an insecticide for stalls (permethrin based) is applied within the entire facility. Depending on the time between projects (if more than 60 days), cleaning procedure described above will be repeated prior to animal entry.

HEALTH CARE

Everyone with access to the animal facility is responsible for informing the Animal Care Services Veterinarian staff when an animal becomes ill or a change in behavior is noted. Seriously ill animals should be reported **IMMEDIATELY** to the veterinarian. When an investigator, technician, or animal care personnel requires veterinary assistance, they should:

A. Complete the "Animal Treatment Record" in the Notebook. Indicate the date, room number/ pen number/animal number/cage or animal ID, the problem observed, and ensure that the name (or initials) of the person making the report is recorded.

B. Contact the University Veterinarian or the ACS Facility Manager at:

Dr. Tiffanie Brooks, ACS Attending Veterinarian
806-834-8588 Office
806-239-2120 Cell

Dr. Paul Stonum, ACS Clinical Veterinarian
806-834-7373 Office
660-562-4425 Cell

Sydnee Woodman, ACS Facilities Manager
806-834-2872 Office
602-758-0670 Cell

C. Provide all the above information to the individual contacted above, who will give advice and authorization for the action(s) that should be taken.

FACILITY CONTACTS

If questions arise regarding facility scheduling, maintenance, or any other physical or management related topic the following personnel must be contacted:

A. Ruminant Nutrition Center Manager:

Dr. Jhones O. Sarturi, AFS Faculty
806-834-4926 Office
402-805-7869 Cell