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Beef Facilities and Management at U.S. Meat Animal Research Center

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The Cattle Operations Unit functions as a support service to the research scientists and maintains the animal populations necessary for our livestock research. Indirectly, this also involves responsible land management and herd health procedures. All the facilities and procedures employed in maintaining the extensive cattle herd are determined by research needs. Consequently, while providing a function sometimes indirectly related to research, the operations unit is necessary to provide adequate feedstuffs and healthy animals for research studies.

**Facilities**

**Cow-Calf Polesheds.** There are nine polesheds at MARC used for maintenance of the 7,250-cow breeding herd. Each barn functions as a working area, with general-purpose facilities designed for calving, artificial insemination, pregnancy checking, data collection, and routine processing of the cattle herd. These facilities generally include a scale, manual chute, calf-pulling stall, and individual pens (ranging from 10 to 25, depending upon use in cow or heifer calving areas). Individual pens are used primarily in the spring during the main calving season and are used either after assistance to the cow or heifer during calving or to provide assistance to the calf in cases of severe chilling, poor mothering, or sickness. Corrals are used to hold or sort cattle. Each area is equipped with a "hot house," which is a heated office and supply area.

**Bull Barn.** This area is used for routine processing, semen collection, and special research studies. Pens are available for holding and sorting bulls. A heavily constructed squeeze alley and chute are used for processing and semen collection. A special area is designed for libido evaluation. The hot house includes an office and lab for semen evaluation.

**Feedlot.** Five thousand five hundred calves and assorted other cattle are fed in the feedlot, primarily in the winter. This number includes animals which will be used in the breeding herd, animals fed for slaughter, cows for reproduction studies, and breeding bulls. Performance and puberty studies are routinely conducted on many of the young calves as part of genetics studies. Approximately 80% of the calves are born in the spring (3,900) and come to the feedlot in the fall at an average age of 6 months. Twenty percent (800) of the calves from (3,900) and come to the feedlot in the fall at an average age of 6 months. Twenty percent (800) of the calves from this fall calving herd enter the feedlot at approximately 5 months of age.

**Multi-Purpose Building.** The main processing facility is a pre-engineered metal building, fully lighted and heated, with concrete flooring. The working facility includes a circular squeeze, working alley, scale, and chute. Fifteen pens are used for sorting and holding. There is also an office and lab area. A reproductive physiology lab is a separate, thermally controlled area specifically designed for embryo transfer and other cattle physiology research.

**Scalehouse.** This is a metal building which functions as the main doctoring area and as office headquarters for the feed-truck drivers. A working alley, scale, and chute are included in this area, as well as sorting pens and sick pens.

**Poleshed.** This barn functions as a sale and physiology facility. It includes a working alley and chute. There is a heated office and sale ring. Holding pens are used predominantly for embryo transfer donor cows.

**Cattle Confinement Area.** There are 11 pre-engineered metal buildings with a total animal capacity of 1,500 head. They are used mainly for intensive nutrition, reproduction, or environmental research.

The cattle surgery facility includes a prep room, surgery room, recovery stalls, lab, and office. Four barns are equipped with individual headgates for intensive feeding studies. Two of these accommodate cows with calves and have been used predominantly for cow efficiency studies. The other two are used for postweaning experiments requiring individual feed consumption data.

A specially designed barn includes 12 metabolism crates, used to study animal utilization of nutrients. In addition, 36 stalls equipped with headgates are primarily used for studies requiring frequent collection of blood samples for hormonal determinations. Three hood calorimeters are used for fasting heat production studies. A nursery has been developed for artificial rearing of calves for specific research studies. The barn also contains a lab.

Two self-cleaning buildings are equipped with flushing gutters and are used for total confinement research. Working facilities include an office, lab, crowding area, working alley, scale, chute, and sorting pens.

**Laboratory Complex.** Of the four buildings in the main office and laboratory complex, one is used frequently for beef cattle studies. The meats complex contains an abattoir and a sensory evaluation (taste panel) area which are used extensively for carcass evaluation studies.

**Necropsy Building.** This building is equipped with a dissection room, holding cooler, lab, and office area. It is used by MARC veterinary staff for lab analyses and autopsy. Autopsies are conducted routinely to monitor herd health.

**Land Management**

The land is managed so that 27,000 acres of warm and cool-season grasses are used as pastures. Twenty-five thousand acres are used for the cattle herd. Cows are maintained on pastures year-round and supplemented with hay in the winter. Heifers are supplemented with a haylage-corn silage diet through their first calving. Bulls are on pastures during the summer and are primarily maintained in the feedlot during the winter.

Six thousand acres of land are irrigated for crops and hay production. The two main feedstuffs produced at MARC are alfalfa and corn. The first cutting of alfalfa is chopped for haylage and subsequent cuttings harvested for hay. Corn acreage produces an annual 35-40,000 tons of silage and 200,000 bushels of corn. (All feedstuffs are used for both the sheep flock and the beef herd. Corn is also a major component of the swine diet.) Additional acreage includes irrigated pasture and small grains used for forage and feed.

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'McAlhany is the information officer; Hays is the cattle operations manager; and Ross is the herd health veterinarian, MARC.'
General Management Practices

The cow herd is managed so that 80% of the cows and heifers (4,200 head) will calve during the spring calving season (March through May). Another 1,000 head will calve during the fall season (August through early October). Calf survival each year averages from 92 to 93%.

First-calf heifers are managed to start calving two weeks ahead of cows, so their breeding season begins the end of May. Most of the heifers are bred to yearling bulls during a 45-day mating season. The breeding season for cows starts with 30 days of artificial insemination and ends with a 30-day natural mating period. Average conception rate, combining heifers and cows, is 88%.

A very young cow herd is maintained to meet research objectives. Approximately 40% of the breeding herd is composed of yearlings and 2-yr-old cows. Many prime-aged (3- to 6-yr-old) cows are sold each year in a bred cow sale. Excess breeding bulls are also sold in this manner.

Herd Health Procedures

The following are the vaccination and routine processing procedures for heifers, cows, calves, and bulls.

Heifers. Prior to their first breeding season, yearling heifers are injected with killed BVD-IBR-PI3 (bovine respiratory disease-infectious bovine rhinotracheitis-parainfluenza), 5-way leptospirosis, vibriosis in oil, 7-way blackleg, and Haemophilus vaccines. Approximately 70 days after the end of breeding season, heifers are palpated for pregnancy, injected with ivermectin for parasite control, and vaccinated against E. Coli bacteria. Prior to calving, brands are clipped, and heifers are given E. Coli, 7-way blackleg, and vitamins A and D.

Cows. After calving and before breeding, cows are given the same injections as heifers. At 70 days postbreeding, they are pregnancy checked and treated for external and internal parasites. Prior to calving, they receive the same treatment as heifers. They become excess for research needs after pregnancy detection if they fail to conceive or are no longer needed for their projects.

Calves from Birth to Maturity. At birth, all calves are identified, weighed, dehorned (paste), and vaccinated against viral scours, and the navel is treated with iodine. Depending upon research projects, some calves may be castrated. Prior to the cow breeding season, the calves are vaccinated with 4-way blackleg, and 5-way leptospirosis, and Haemophilus. At weaning, they are vaccinated a second time with killed BVD-IBR-PI3 and Haemophilus. One month postweaning, brucellosis vaccine is given to heifers. At one year of age, some of the bulls are sold as breeding stock, and the rest of the heifers, bulls, and steers are either used for research studies or are fattened for slaughter.

Bulls. At the end of the growing period (1 yr), bulls are vaccinated with killed BVD-IBR-PI3, 4-way blackleg, and 5-way leptospirosis. Subsequently, they are treated for parasites and vaccinated with 5-way leptospirosis prior to each breeding season.