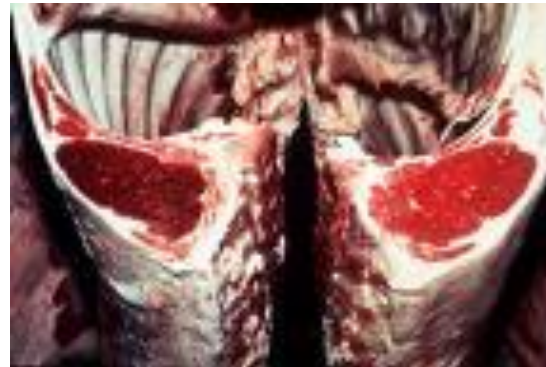


Beef Harvest

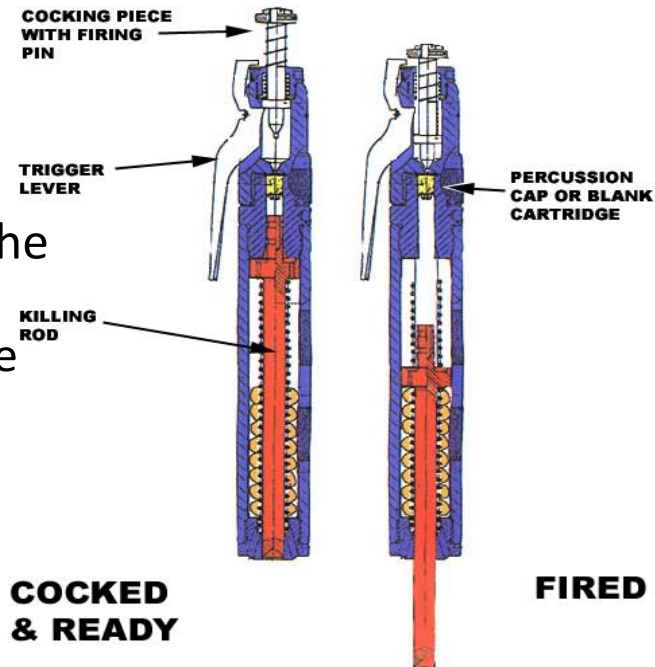
Preharvest Handling

- Minimize short-term excitement, over heating and rough handling
 - Fiery fat – increased blood flow to capillaries of subcutaneous fat without drainage before harvest
- Hold animals additional 24 h if cattle are run or worked hard
- Minimize long term stress
 - Dark cutting – similar to DFD in pork
- Hold off feed 12-24 h
 - Ease evisceration
 - Minimize microbial contamination
- Free access to water
 - Enhance bleeding
 - Brighter lean
- Antemortem inspection
 - U.S. Pass, Suspect, or Condemned



Harvest Steps

- Stunning/Immobilization
 - Humane Methods of Slaughter Act of 1978
 - All animals slaughtered under inspection must be stunned before bleeding
 - Most cattle mechanically stunned
 - Concussion (compression)
 - Penetrating (captive bolt)
 - Sharp blow midway between eyes and halfway up forehead toward the poll
 - Brain is closest to outside surface of skull



Harvest Steps

- Exsanguination (Bleeding)
 - Knife inserted below brisket
 - Cut 10-15 in. from brisket to throatlatch
 - Sever carotid artery & jugular vein
 - Minimize stun/stick interval to prevent blood splash
 - Cattle yield 3-3.5% of live weight in liquid blood



Harvest Steps

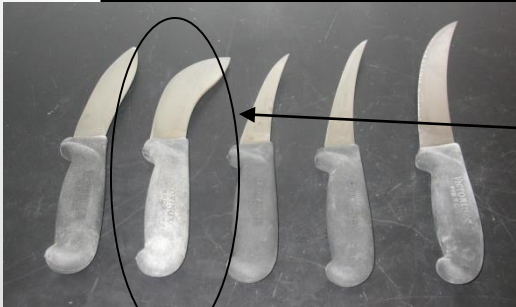
- 1. Dressing
 - Removal of hide, head, fore and hind feet, and oxtail
 - Remove head between atlas vertebra & occipital condyles (must weasand first)
 - Systems
 - Cradle
 - **On-the-rail**
 - Used in FAPC and most commercial beef harvest facilities

2. Hide Leg Transfer (HLT)



3. Hide Removal

Air Knife



Beef Skinning Knife

3. Hide Removal



4. Evisceration

- Removal of viscera (from abdominal cavity) and pluck (from thoracic cavity)
 - Loosen bung, bag, and tie off (done during HLT)
 - Weasand – loosen esophagus from trachea & tie off
 - Steers – free pizzle
 - Remove stomachs, intestines, spleen
 - Cut around skirt, through diaphragm, and down backbone to remove pluck
 - Kidneys & KPH remains
 - Expose kidneys for inspection
- Extreme caution to prevent cutting/tearing GI tract

Evisceration



Weasand Rod



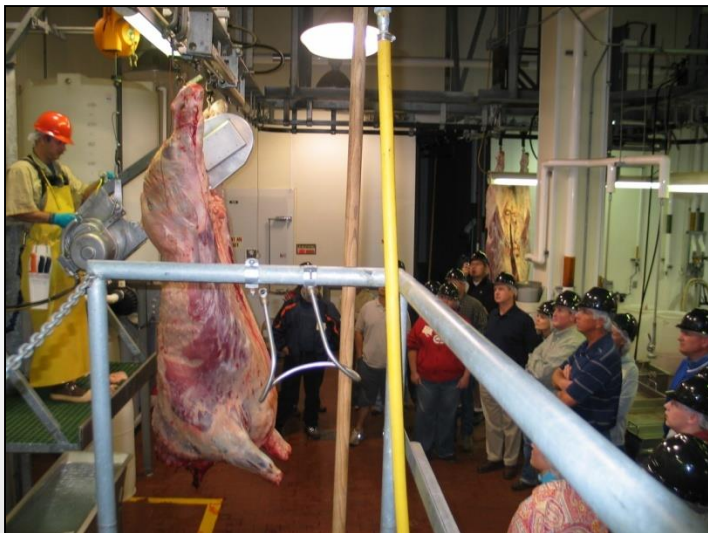
Harvest Steps

- 5. Inspection – head, viscera, pluck, carcass
- 6. Split
 - Remove spinal cord
- 7. Trim & Wash
 - Trim hide, bruises, foreign material (hair, fecal matter, dirt) **BEFORE WASHING**
 - Wash with warm water
- 8. Steam Pasteurization
 - Microbial intervention
- 9. Weigh
- 10. Chill

Harvest Steps



Inspection



Splitting



Steam Pasteurization

Specified Risk Materials (SRMs)

- SRMs are the items from bovine animals that may contain the BSE agent if an animal had BSE
- Because SRMs are different for cattle that are 30 months of age or older, establishments must identify the age of the cattle being slaughtered

SRMs

- For cattle 30 months or older:
 - Brain, skull, eyes, trigeminal ganglia, spinal cord, dorsal root ganglia (DRG), and vertebral column (excluding vertebrae of the tail, the transverse processes of the thoracic and lumbar vertebrae, and the wings of the sacrum)
- For all cattle:
 - Tonsils and distal ileum of the small intestine

Dentition for Cattle that are under 30 months of age

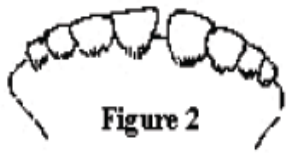


Figure 2

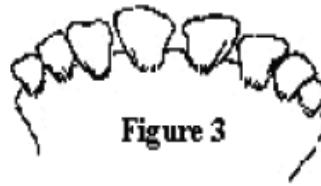


Figure 3



Figure 4



Figure 5

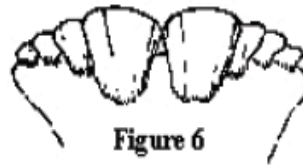


Figure 6

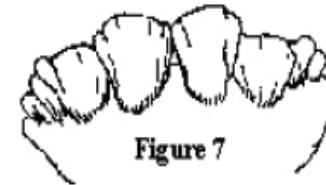
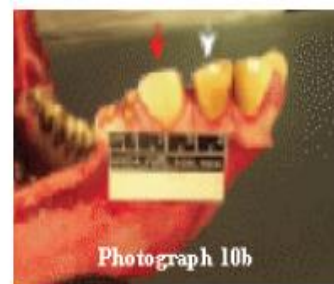
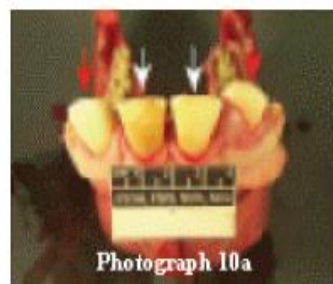
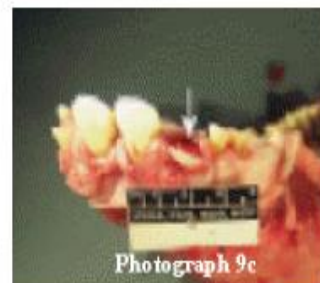


Figure 7

Source: USDA, FSIS—Using Dentition to Age Cattle



Dentition for Cattle that are 30 months of age or older

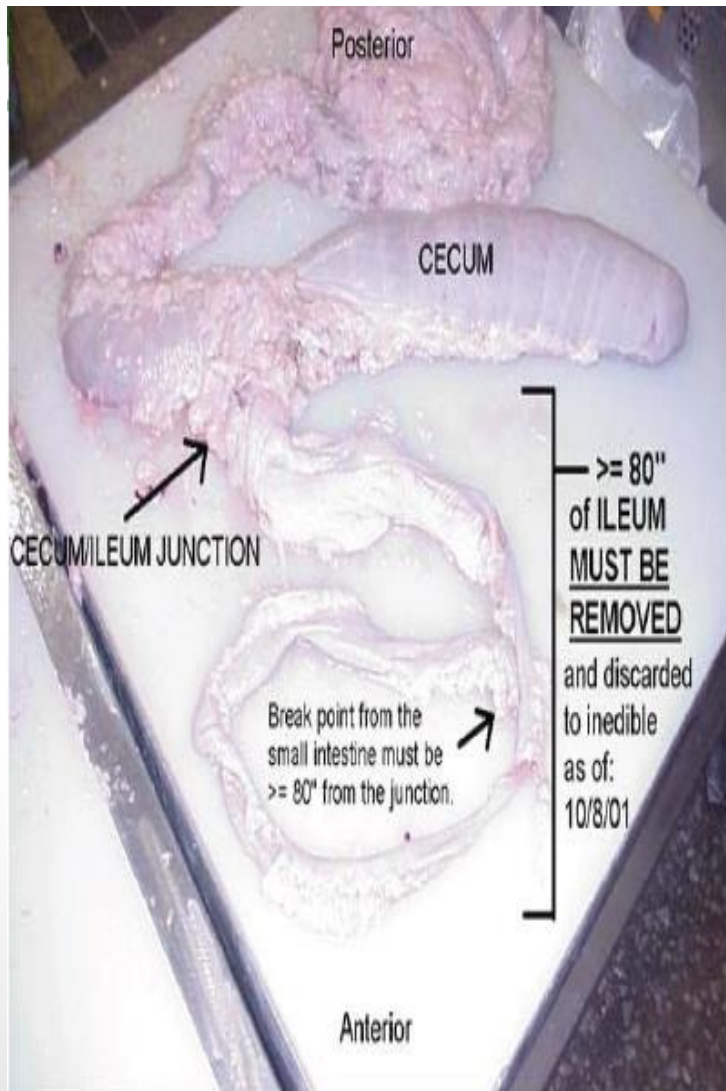


Source: USDA, FSIS—Using Dentition to Age Cattle

SRMs from the head

- Skull
- Eyes
- Brain
- Trigeminal ganglia
- Tonsils

Distal Ileum Removal



Spinal Cord Removal



Spinal cord is completely removed on the slaughter floor.

Bettcher vac cuts and vacuums material away from carcass, reducing the potential for cross-contamination.



Hand tool used to remove spinal cord missed by saw or vac.



Jarvis saw has a blade that runs down through the spinal channel.



Segregation of Carcasses (in commercial beef plants)

> 30 Month Carcass Identification

Forequarter

(Circle 3 stamp)

Hindquarter



30+ Carcasses (in commercial beef plants)



Ribbon applied to foreshank



Marking spinal column with
purple ink

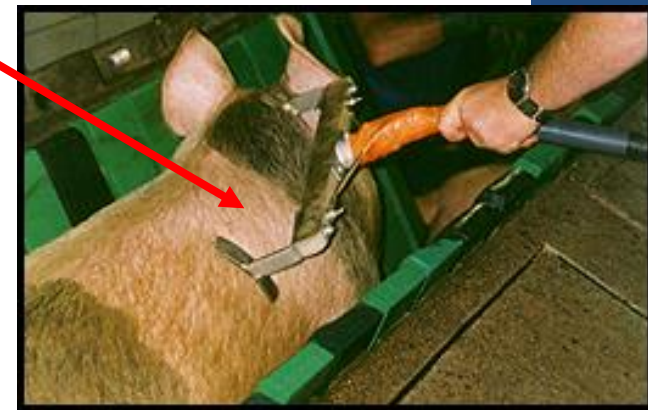
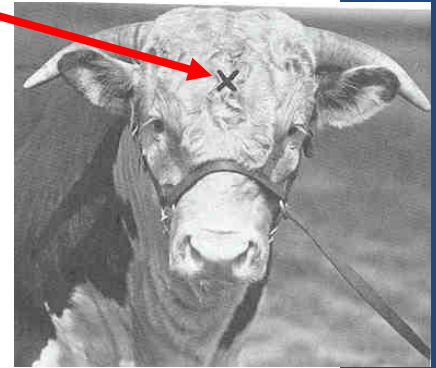
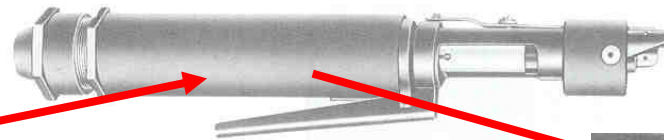
Pork Harvest

Seven basic steps for slaughter

- Stunning/Immobilization
- Exsanguination (stick)
- Hair/Hide removal
- Head removal
- Evisceration
- Carcass splitting
- Weigh and wash

Stunning/Immobilization

- Methods:
 - Mechanical
 - Electrical
 - Chemical



Chemical Stunning – CO2

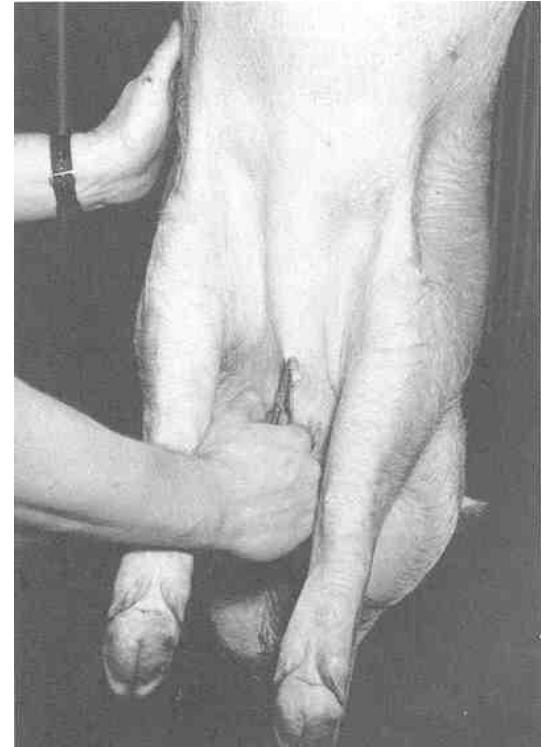


Chemical Stunning – CO₂



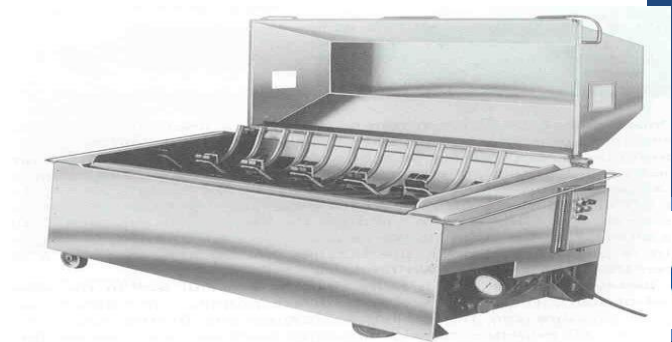
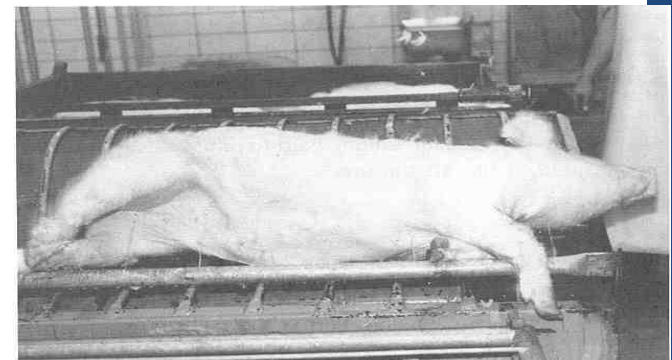
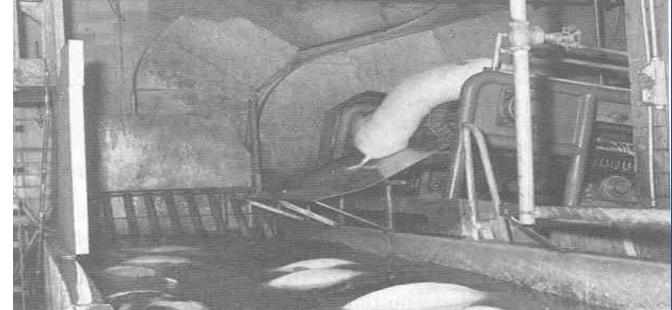
Exsanguination (Stick)

- Sever the carotid artery and jugular vein
- About 50% of the blood is removed
- Blood can be used for numerous by-products
- 1st by-product collected on harvest floor



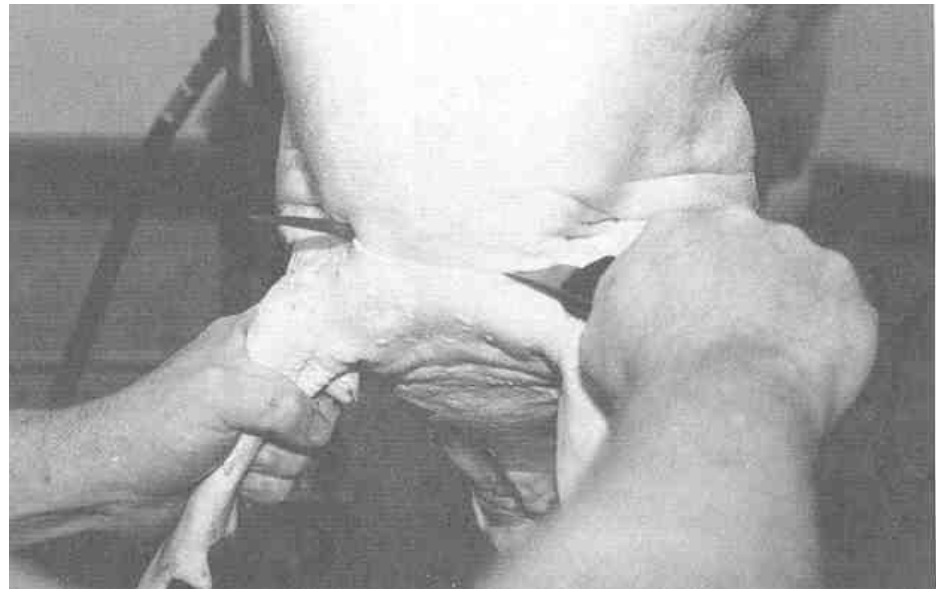
Hide/hair removal

- Hogs
 - Hair is removed
 - Carcass is soaked in water (140-145°F)
 - “Hard Scald” (lye) is added
 - Dehairer paddles loosened hair from carcass
 - Remaining hair is scraped and singed



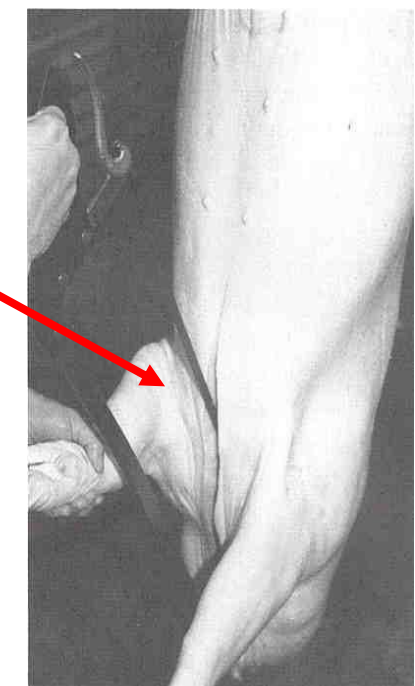
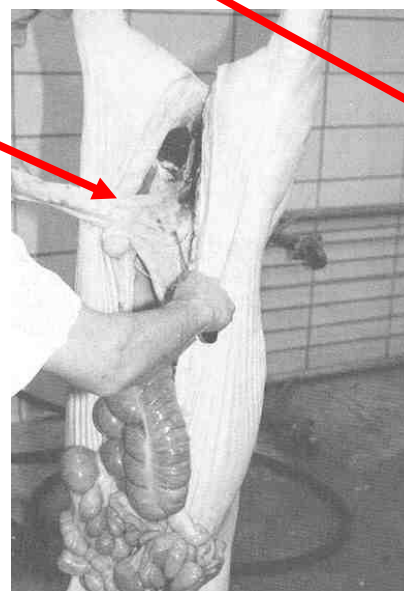
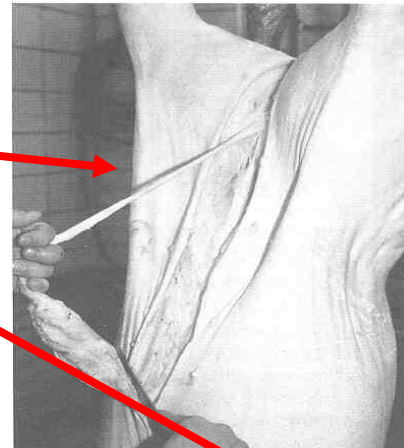
Head removal

- Separate at the occipital condyle or atlas/axis joint



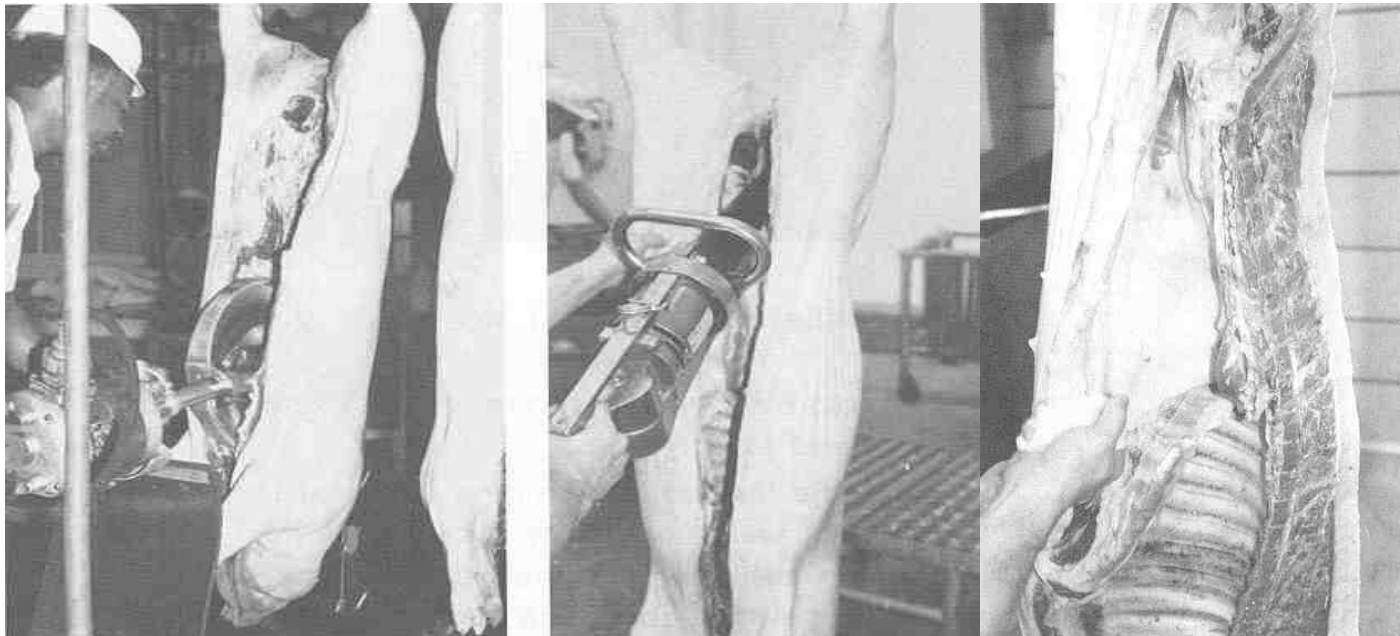
Evisceration

- Pizzle removal (male)
- Split the sternum
- Open the abdominal cavity
- Remove:
 - Viscera
 - Pluck



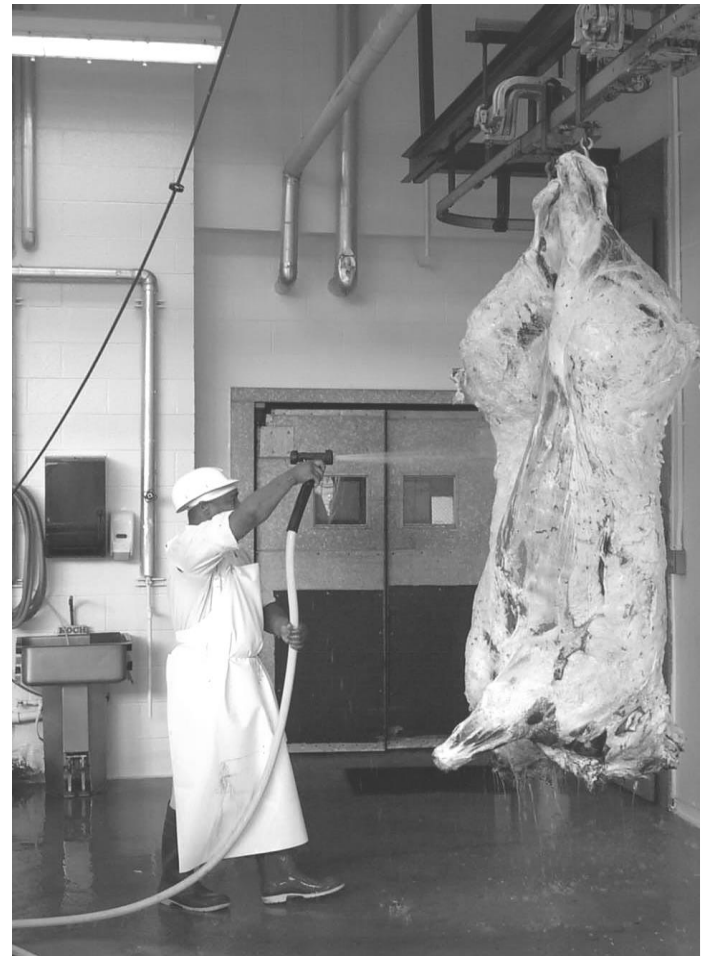
Carcass Splitting

- The carcass is split along midline of the vertebral column
- Leaf fat is removed



Weigh and Wash

- Carcass is trimmed of any visible contamination and blood clots
- Carcass is washed from the top down with water
- Carcass is Inspected
- Organic acid is applied
- Carcass is weighed and ID tag w/weight is attached before entering cooler



Lamb Harvest

Basic Steps of Lamb Slaughter

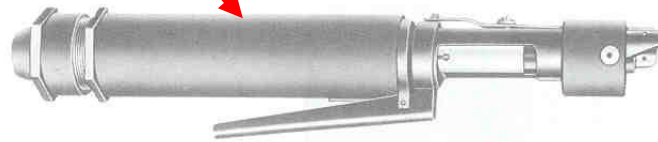
- Stun/Immobilization
- Exsanguination (stick)
- Hide removal
- Head removal
- Evisceration
- Weigh and wash



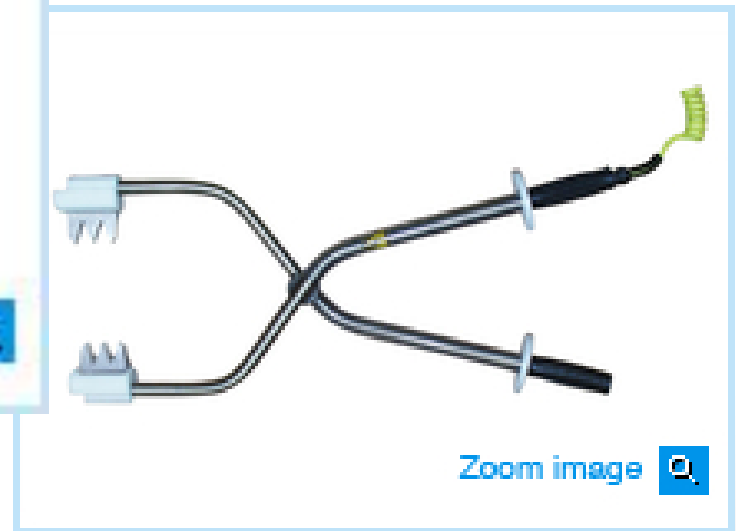
Stunning

- Methods:

- Mechanical
- Electrical
- Chemical



Stunning Methods – Heart Stunning



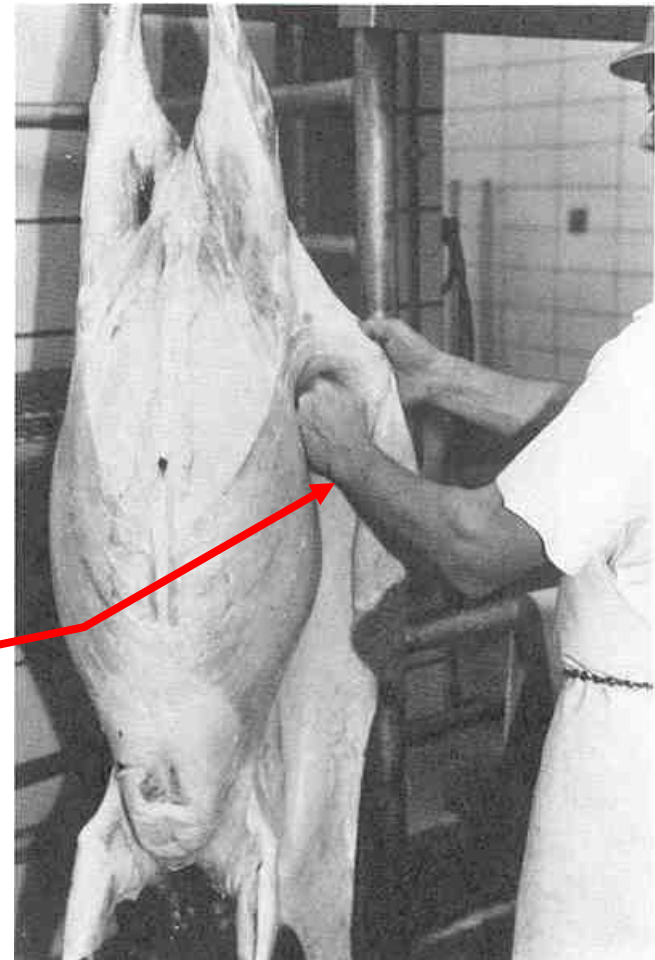
Exsanguination (Stick)

- Sever the carotid artery and jugular vein
- About 50% of the blood is removed
- Blood can be used for numerous by-products
- Electrical stimulation expedites a more complete blood letting



Pelt removal

- Pelt Removal
 - Mechanical
 - Pelt is opened down the belly of the carcass
 - Mechanical side pullers and down/up pullers remove hide
 - Manual
 - Pelt is opened down the belly of the carcass
 - Pelt is “fisted”
 - Preserve the Fell membrane



Pelt Removal

- Open pelt on the free hind leg
 - Open pelt along the posterior side of the leg and continue towards the anus
 - Fist the pelt off of the leg
 - Fist down the leg and over the rump region
 - Skin out the remaining pelt to the shank and cut off the foot leaving the foot attached to the now hanging pelt
 - Place the newly de-pelted leg on rail hook and free alternate leg
 - Repeat the process with the remaining leg and place on rail hook



Pelt Removal

- Open midline of pelt by a score cut (take care not to puncture the body wall or abdominal cavity) from the crotch to the throatlatch
- Using knife and fisting technique remove the pelt from the midline back carefully not to remove the fell membrane
 - Begin at the hind legs and move towards head allowing gravity to assist in pelt removal
 - The Fell Membrane should be left intact to protect the carcass during chilling
- Make a knife cut from the shank of the foreleg to the midline cut and remove the pelt from both forelegs
- Continue removing pelt down the neck



Fell Membrane



Pelt and Head Removal – Pre-wash

- Remove the pelt from the forelegs allowing access to the foreleg shank joint
- Remove the foreleg at the break joint
- A 4-6 inch knife cut should be made longitudinally down the neck above the throatlatch to expose the trachea
- Remove the head and attached pelt by separating head between the occipital condyles and the atlas vertebra



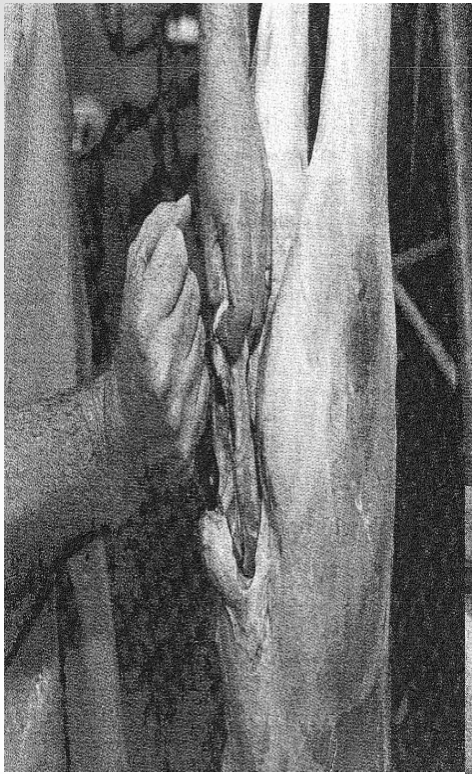






Evisceration

- Tie off bung
 - Cut around anus and loosen
 - Pull 10-12 inches of colon out and tie off
- Remove pizzle at base
- Make short deliberate incision in the upper abdominal wall near the crotch
- Grasp knife with thumb on back of blade
- Insert fist into the cavity with blade out
- Push downward cutting the belly wall to the sternum
- Viscera will naturally fall out (protect knife blade to avoid puncturing the viscera)



Evisceration

- Grasp Viscera with Opposite Hand
- Sever blood vessel near liver on right side to release the liver
- Cut around the diaphragm membrane
- Cut behind the aorta next to the backbone
- Pull outward on the pluck (heart and lungs)
- Make cuts next to first ribs to free the pluck
- Place viscera and pluck with identification in separate container for inspection
- Remove kidneys and pelvic fat

Weigh and Wash

- Carcass is trimmed of any visible contamination and blood clots
- Carcass is washed from the top down with water
- Carcass is weighed and ID tag w/weight is attached before entering cooler
- An organic is commonly applied at this point per USDA-FSIS Food Safety Guidelines