

Packing House Operations with an Emphasis on the ATSF

Compiled by Steve Sandifer and Donald Lake

Packing House Operations on Model Railroads

with an emphasis on the ATSF

May 5, 2003

Compiled by Steve Sandifer (webmaster) and Donald Lake (Corporate Plant Operations Manager, Darling International, and an O scale modeler, Omaha, NE)

The first use of a refrigerator car to handle beef was in 1873. The car was a Texas and Atlantic car taking meat from Denison, Texas, to New York. The refrigerator car meat business nearly died 100 years later.

The operation of a meat packing plant is a very involved and time sensitive matter. For a model railroad, a packer can keep a switch crew busy all day long. It is not a matter of the local dropping off a few stock cars and picking up a few reefers. This is an attempt to understand how a meat packer would have operated in the age of stock cars and ice reefers.

Since I am modeling the ATSF in Kansas in 1950-53, my primary focus is the meat packing industry at that time. In Emporia, Armour had a large packing plant in the middle of the Anderson Cattle Company stockyards. Unfortunately, I have learned that Armour did not open their Emporia plant until 1963, but I will backdate it as only modelers can.

Most packers (the larger ones i.e. Swift, Armour, etc.) had multiple facilities, meat preparation and cold storage around the country, east coast and west coast. Meat from Swift in Marshalltown would go to Swift in Chicago or New York or wherever Swift had a distribution facility. Here it might be further processed, beef quarters cut down to pieces of meat, or it was distributed to local meat markets and butchers, etc. Remember, this was the day before convenience frozen foods and local butchers were still in control of meat distribution.

Most of the stock arriving in Emporia went to Anderson Cattle Company or Peak & Hatcher sales barns that were adjacent to Armour. Armour stock came through these companies as well as their own chutes. Since supply and processing often did not match, stock would be fed at the adjacent yards until needed. Grain, hay, and other maintenance supplies were necessary at these yards.

Pages to follow include:

- Processing
- Cars needed
- Hide Cars
- Darling International
- Model Operations
- Resources

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Beef Packinghouse - May 23, 2003

Beef are not the only stock to be processed, but we will treat various types of stock one at a time. Much of what would apply to beef would apply to other stock. Beef cattle made up about 60% of the stockcar loads.

The typical live weight of a fat steer and heifer would have been around 1200 pounds. They would arrive at the packinghouse stockyard in single deck stock cars that held 40-50 head each.

Upon arrival, the animals would be weighed, checked for any injuries or illness, and placed in holding pens. Animals would arrive in various quantities, but would be processed in a steady line, sometimes only one or two shifts a day. Therefore, the stockyards would insure a steady supply of animals for the butchers. Stockyards would require feed for the animals. If the pens had concrete floors, bedding would also be required. Periodically the bedding and excrement would be removed and shipped away as fertilizer for area farms.

The 1200-pound steer would produce:

- 800 pounds of hanging meat
- 30 pounds of other meat products
- 26 pounds of blood
- 50 pounds of paunch
- 70 pounds of hide
- 200 pounds of drop

We will look at each of these items separately.

Hanging Meat

The slaughtered animal was quartered into approximately 4 equal parts. Each quarter would be frozen and shipped out in meat reefers that were equipped with ceiling rails and hooks from which quarters were hung. In the early 50s most meat reefers were 36' in length, were owned by the meat packers, and could hold 400-500 quarters, or the processed hanging meat of 100-125 cows.

In the 30s, most meat packers had their own reefers and tank cars, and some had a few stock cars. By the 50s, they owned or leased reefers and few had other types of cars on their rosters. Most plants were set up for 36' reefers.

Reefers and tank cars were steam cleaned before use at the plant. Stock and box cars, unless company owned, were usually cleaned by their home railroad back at their yard.

Trains Magazine in 1958 had an article highlighting IC's meat traffic across IA and IL at that time. The article mentioned that the vast majority of meat and meat products produced in the Midwest moved via the various gateways to eastern markets. IC was by far the largest hauler of meat and livestock at that time, since they served most of the big packing houses/livestock markets -- Omaha, Sioux City, Sioux Falls, Waterloo, Dubuque, etc. According to the article,

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IC's Iowa Division alone handled nearly 50,000 loads of meat and packing house products per year. That would be around 135 loads/day.

The train highlighted in the article, eastbound CC-6, grew from 16 cars leaving Omaha, to over 80 cars leaving Waterloo. That day another section of the train operated as well, handling mostly cars from Sioux City/Sioux Falls through to Chicago. Those trains together delivered roughly 50 cars to the IHB at Broadview (just west of Chicago) for their local Chicago customers as well as eastern connections. The rest of the cars continued into Chicago: about 10 were delivered to local customers on IC's lines, about 15 continued south on the IC (to the SE US towards Miami, Birmingham, Memphis, etc.) and the remainder of the cars were delivered to various eastern connections in Chicago.

Other Meat Products

Other meat products would include tongue, liver, heart, cheek, brains and such meats. These would be cleaned, sorted, and frozen in cardboard boxes for shipping. The boxed products would be shipped in different ice reefers than the hanging meat. Over 3000 animals would be processed to fill one reefer with these products.

Blood

Even though an animal would have 46 pounds of blood, blood is 83% water. It would normally be cooked down to produce a blood meal of about 8 pounds per head. The blood powder would then be bagged or shipped bulk in box cars. It would take the blood of 12,500 cows to fill one boxcar.

Reports indicate that some plants did not process the blood but shipped it out in liquid form for someone else to process. 46 pounds of blood would be approximately 6 gallons, so a standard 1950s 8,000-gallon tank could hold the blood of 1300 animals.

Blood is commonly used as an animal feed additive and an agricultural fertilizer. Today homeowners in rural areas use blood powder to fertilize landscape flowers because it repels deer while aiding the plant.

Paunch

Cows have 3 stomachs. They eat grass then regurgitate it for further processing. We call it "chewing their cud." As a result, the stomach contents of an average cow at processing weighs 50 pounds. This material is washed and sent to farmers for use as fertilizer. Most paunch would be moved from the plant by highway trucks for local use.

Hide

A cowhide weighed approximately 70 pounds. However, before it could be shipped, the hide must be preserved by the replacement of the water content with salt. Hides were packed in approximately 40 pounds of rock salt and cured for 30-40 days. At the end of that time,

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approximately 20 pounds of salt could be recovered for reuse while 20 pounds displaced the water in the hide. The hides were then bundled and shipped via boxcar to tanneries. The oldest wood sheathed cars were used for this purpose, and once a car was used for hides it was always used for hides as the stench was unmistakable. These cars were usually labeled "for hide loading only." One car would hold about 1400 hides. On some roads including GN and RI these boxcars had hatches on the roof so that hides could be dropped in from a conveyor. I have no evidence of this being done on the Santa Fe.

Drop

Drop includes head, feet, intestines, fat trim and a small amount of hide trimmings. Condemned and dead stock carcasses would also be included. This mixture contained approximately 47% water, 35% fat and 18% tankage. After grinding, cooking, and separating, the drop would amount to 70 pounds of tallow (fat) and 38 pounds of tankage per animal.

There are two types of tallow: edible and inedible. Edible tallow would be used in various oleo products, confectioneries, chewing gum, leather working products, animal and poultry feeds and fertilizer. Inedible tallow was used for candles, textiles, lubricants, glycerin, soaps, cosmetics, animal and poultry feeds and fertilizer. An interesting graphic on the Darling International web site illustrates the uses of byproducts.

Both varieties of tallows would ship out in tank cars which could be heated for loading and unloading. The recommended temperature for loading and unloading was 160-170 degrees F. A full 8000-gallon tank car would hold 59000 pounds of fat or the product of 845 animals. Drums could also be used for shipping.

The tankage was dried and ground to a dirt-like consistency. It was originally sold as fertilizer. In the early 20th Century it was discovered to be high in valuable nutrients, so it was finely ground and added to poultry feeds. When combined with dried blood it was called digester tankage and was a feed ingredient for hogs. This dry tankage was shipped in 50-100 pound bags in bulk truck and carload quantities. At some plants it was pressed into large cookies or smaller pellets for shipment in boxcars. Again, due to the stench, once a car was used for tankage, it was dedicated to that purpose. Today, 20% of most dry dog and cat food is meat and bone meal - a modern description for tankage. (Emporia, KS, hosts the IBP meat packing plant and a Safeway pet food plant just a mile away.) Around 2600 head must be processed to supply enough tankage to fill one boxcar.

Today edible cow bones are very desirable by the Japanese market.

Kurt Stoebe wrote, "Rath Packing in Waterloo, Iowa was often described as the largest pork packing plant in the country. Apparently, part of the by-products from the plant had no market and gondolas of offal were moved 100 miles west to the junction of Tara, Iowa, where the Council Bluffs and Sioux City lines diverged. There was a yard there... not much of a town. The railroad section unloaded the gons with a clamshell on the west end of the yard and buried it."

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George Walls obtained a list of commodities received and shipped from Cudahy Packing in Bedford, IA, circa 1955. Items received by rail included: sugar, salt, coal, sawdust, ammonia, fiberboard, cans, and soda ash. Items shipped in addition to the meat were: canned meats, hides, tallow, tankage, lard, bone meal, and grease.

Sheep & Hogs

Hogs made up about 24% of the stock car shipments, sheep made up 14%.

I suppose sheep would be shorn either at their point of origin or at the auction house before delivery to the packinghouse.

A double deck car would hold 250-300 sheep, 150 hogs.

The meat was shipped out in cardboard boxes since the carcass was so much smaller than that of a cow.

The major by-produce change is the use of fats for cosmetics with sheep, and several other things with hogs.

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Car Needs Ratios – 7-27-05

A typical national brand meat packer would process 2000 head a day. How many cars are needed to handle that operation?

- Stock cars: 40-50
- Hanging meat reefer: 16-20
- Other meat reefer: 0.6
- Blood tank (if unprocessed): 1.4
- Blood box (if processed): 0.2
- Paunch gondola (if by rail): 0.4
- Hide box: 1.4
- Tallow tank: 2.4
- Tankage box: 0.75
- Salt box: 0.4 (for hides)

Additional freight car services might include:

- Gondolas: bedding for the stockyard
- Box: feed for the stockyard
- Box: cardboard boxes for other meat products
- Box: cleaning supplies, consumables
- Box: Salt for ice plant if on premises
- Loads of coal or oil for power plant and boiler house.

Because loaded stock cars and loaded meat reefers are high priority perishable loads, packinghouses received multiple switch jobs a day.

Much of this material was provided by Don Lake of Darling, International. Darling has been rendering animal by products for 100 years.

Donboy on the Ops-Ind web group used to work in a packing plant. He reported:

"Coming in you have:

- Salt (lots of salt if you are processing pork) – 2 cars a month
- Boxes – 4 cars a month
- Cans – 4 cars a month
- Barrels - 1 car a month
- Livestock – 30 to 40 cars a day balance came in on trucks
- Feed for the livestock – 2 cars a month
- Bedding for the livestock – 4 cars a month
- Plant equipment – 1 car a month
- Saw dust for smoking meat – 1 car a month
- Fuel for plant boilers – 3 cars a month
- Chemicals for cleaning – 1 car a month
- Chemicals for brine mixing – 3 cars a month

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- Fresh or frozen meat bought on open market for curing (normally frozen hams for Easter and Christmas the +25 cars below had to come from somewhere)."

"Outbound you have:

- Hanging beef – 10 cars a day
- Fresh, cured, frozen and canned pork – 40 cars a day
- Seasonal rush on bacon for camping seasonal + 2 cars a day in May, June and July
- Big seasonal rush on ham for Easter and Christmas + 25 cars a day the week three weeks before holiday (big event you noticed it!)
- Dried blood – 2 cars a month
- Pet Food – 1 car a day
- Hides – 2 cars a week"

"A lot of activity moving cars in the plant tracks. Most inbound and all outbound cars had to be weighed. Empty cars had to be iced before loading. Loaded cars needed to be pulled and empty cars spotted so loading could continue (loading spots for 15 cars loaded a day 50 cars). Livestock needed to be unloaded as soon as possible so they could be fed and watered. Outbound cars would need to be blocked for their outbound trains."

"A full-time plant switcher plus the local railroad crew switching the plant at least 3 times day. Just guessing I expect that in HO scale the plant footprint would be about 10 foot by 10 foot if done in full scale."

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Hide Cars

January 12, 2003

The Santa Fe Society's book, *Santa Fe Boxcars 1869-1953* has several references to hide cars.

(p. 85), "In 1953, 25 BX-3 class cars (wood sheathed) were assigned to hide loading service and given numbers in the 40450-40474 series. The only modifications that they would likely have received were geared hand brakes and A-B brake systems, if they weren't already installed. Santa Fe instructions from 1953 indicate that the home point for these cars was Bell Yard, Texas. The last of these cars was retired from this service in 1961." Westerfield makes a kit for this car.

(P. 161) continues, "In 1950 through 1953, 65 of the BX-39 class (wood sheathed, 50') were assigned to hide service and renumbered into the 40180-40224 series. The only modification made to the cars was a coat of Cemtex protective paint on the interior surfaces, and appropriate routing instructions on the side of the car." Sunshine makes kit 29.20 for this car.

"Internal Santa Fe instructions of 1953 indicate that the home points were Bell Yard, TX, for sub-series 40180-40189 and Los Angeles, CA, for sub-series 40190-40224. The instructions also indicated that the cars could be sent loaded with other commodities to their home points. This was unusual, since the foul odor and residue from the hides could permeate the car and subsequently transfer the odor to many other types of loads. Normally, only the roughest types of loads (e. g. metal castings) could successfully be loaded in hide cars. Even then, the odor could be picked up by the packing materials. In later years the cars were marked with instructions that the cars should be used for hide loading only. Car number 40182 was the last car retired from this service in 1972."

Darling International

Darling operates a fleet of over 700 railcars. Tank cars are in the 20,000 to 25,000-gallon range, leased from UTLX, GATX, NATX. Covered hoppers are built by Thrall and leased from NDYX. Tank cars are used for tallow and greases, and the covered hoppers are used for the meal.

Islington Station makes Darling-Delaware decals in HO - Walthers 54' funnel flow is a great match for the UTLX cars. You can use the MDC car for the GATX and NATX cars.

Accurail makes a painted version of the Darling International covered hoppers but it being an ACF Centerflow, it is the wrong prototype for the Thrall-built cars.

If you operate a modern meat packing plant or poultry processor, a Darling tank car or two would be appropriate. Use the location list above to route your car for processing!

source: www.darlingii.com

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Model Operations

7-27-05

A packing plant model will need at least 5 tracks or logical spot for cars:

- Stock track with chute and stockyard.
- Clean-out track with access to steam cleaning supplies.
- Reefer track with doors for loading.
- Tallow track with hoses.
- General purpose track which could include unloading supplies, loading hides and tankage, and access to the power plant.

Track plans for the 1977 Iowa Beef Packers in Emporia included 9 tracks:

- 4 TOFC tracks for processed beef placed in refrigerated trailers.
- 2 tracks with a total of 7 spots for tallow loading.
- 1 track with 3 spots for hide cars.
- 1 track with 5 spots for un-stated purposes.
- 1 track for un-stated purpose.

The stock chute was on the lead into the plant with another chute at an adjacent stock dealer on the tail track. Of course, these were out of use in 1977.

Today, meat reefers have come back in mechanical form and Emporia Cold Storage has moved its plant to the IBP sight. The TOFC tracks are gone and are covered by an expanded plant.

After researching the operations of Armour in Emporia, I am proposing for my yet unbuilt railroad the following Armour switch job.

- On duty:
 - Get switcher from ready track.
 - Pick up loaded stock and empty reefers at yard
- Obtain permission to proceed across the main to Armour. (This will be necessary every time the train moves from the yard to Armour to Emporia Ice)
 - Unload the stock, leave empty cars on stock track.
 - Do a reefer swap: Pull loaded reefers and clean empty reefers, leave the empties you brought from the yard in the clean-out track.
- Take the loaded and clean empty reefers downtown to Emporia Ice.
 - Top up the loaded reefers, pull iced empty reefers, and leave clean empty reefers to be iced.
- Return to yard
 - Leave loaded reefers for the next available train to their destination.
 - Pick up any loaded stock cars that have come in.
 - Pick up any auxiliary cars needed at Armour (tankage, tallow, hides)
 - Pick up empty reefers that have come in.

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- Return to Armour
 - Unload stock if any.
 - Spot iced empty reefers on end of loading track.
 - Leave empty reefers and empty tank cars at cleanout track. Move clean tanks to the tallow track.
 - Switch other auxiliary cars.
 - Assemble all empties and loads that need to return to the yard.
- Return to yard.
 - Drop off everything but loaded reefers.
- Take loaded reefers downtown to Emporia Ice
 - Top up loaded reefers
- Return to yard
 - Leave loaded reefers for the next available train to their destination.
- Put power away.

This routine will offer two pickups of loaded reefers and two deliveries of loaded stock cars in each 8-hour shift. This operation would be repeated with an evening shift as well.

Doug Harding on his Iowa Central Railroad uses the following car card insert for meat reefers:

- ___ 1) URTC Inspection
- ___ Hold for Repair
- ___ 2) Cleaning
- ___ 3) Pre-cooling
- ___ 4) Icing
- ___ 5) Loading
- ___ 6) Top Ice
- ___ 7) to yard
- ___ 8) to scale
- ___ 9) to yard for departure
- Special Orders:

References:

Donald Lake is the primary source of materials used for this article. Other contributors were Keith Jordan, Mike Blaszak, Charles Schultz, Doug Harding, Clark Probst, Linda Sand, George Walls, and Kurt Stoebe.