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Co-Product STORE: An Economic Budget for Determining Co-Product Storage Costs

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Market Report	Yr Ago	4 Wks Ago	7/18/08
Livestock and Products, Weekly Average			
Nebraska Slaughter Steers, 35-65% Choice, Live Weight.	$89.00	$94.59	$97.22
Nebraska Feeder Steers, Med. & Large Frame, 550-600 lb..	129.50	123.09	112.84
Nebraska Feeder Steers, Med. & Large Frame 750-800 lb.	119.08	112.25	108.15
Choice Boxed Beef, 600-750 lb. Carcass.	142.83	158.20	170.77
Western Corn Belt Base Hog Price Carcass, Negotiated.	67.82	74.86	77.47
Feeder Pigs, National Direct 50 lbs, FOB.	48.52	34.30	24.77
Pork Carcass Cutout, 185 lb. Carcass, 51-52% Lean.	75.31	79.24	82.28
Slaughter Lambs, Ch. & Pr., Heavy, Wooled, South Dakota, Direct.	105.00	117.00	111.62
National Carcass Lamb Cutout, FOB.	253.59	272.32	278.32
Crops, Daily Spot Prices			
Wheat, No. 1, H.W. Imperial, bu..	5.33	8.29	7.40
Corn, No. 2, Yellow Omaha, bu.	3.03	6.75	5.60
Soybeans, No. 1, Yellow Omaha, bu.	7.53	14.18	14.28
Grain Sorghum, No. 2, Yellow Dorchester, cwt..	4.96	11.39	9.23
Oats, No. 2, Heavy Minneapolis, MN , bu.	2.54	4.09	*
Feed			
Alfalfa, Large Square Bales, Good to Premium, RFV 160-185 Northeast Nebraska, ton.	135.00	195.00	190.00
Alfalfa, Large Rounds, Good Platte Valley, ton..	72.50	77.50	77.50
Grass Hay, Large Rounds, Premium Nebraska, ton.	*	*	*
Dried Distillers Grains, 10% Moisture, Nebraska Average	*	179.00	179.00
Wet Distillers Grains, 65-70% Moisture, Nebraska Average	43.00	70.30	65.25
***No Market**			

In the last few years the decrease in co-product price, particularly that of wet distillers grains plus solubles (WDGS) during the late summer months, has provided incentive for producers to purchase co-products during this period. This provided producers the opportunity to store the co-product and feed it at a later date. Although current co-product prices are not mirroring the "typical" ethanol co-product seasonal price trend (Waterbury and Mark, 2008) that has been evident in the past (Figure 1 on next page), storage opportunities still exist for cattle feeders and cow/calf operations. From an economic perspective, ethanol co-products continue to be a viable substitute for corn, as WDGS and modified wet distillers grains plus solubles (MWDGS) prices have averaged 69.6 percent and 68.1 percent, respectively, of the corn price on a dry matter basis since the beginning of June this year. Because ethanol co-products are currently cheaper than corn, it may be beneficial for producers to consider ethanol co-product storage, as the corn market continues to show signs of high market price volatility. Furthermore, the storage of ethanol co-products allows small operations to utilize appropriate quantities of the feedstuff relative to the size of the operation, and also acts as a natural procurement and price hedge for any type of operation because it becomes an owned commodity.

Storage of co-products involves several costs that vary depending on the storage method used. Managers must evaluate which of the storage methods best fits their operation, while at the same time ensure that the benefits of storing the co-product exceed the costs of storage. Co-Product STORE — Storage To Optimize Ration Expenses — is a tool designed to quantify the costs of co-product storage. It allows producers to analyze and evaluate specific storage scenarios in response to changing market conditions using different storage

methods. Two storage examples (bunker and silo bag) are evaluated to illustrate how the spreadsheet estimates storage costs. Co-Product STORE is available at http://beef.unl.edu under the "By-product Feeds" tab.

Co-Product STORE is organized into four steps (Parameters, Feed Costs, Equipment and Structure Costs, and Other Costs) and includes a results summary which displays costs and tonnage values for the total storage mixture and co-product alone. Users need to provide several inputs in Step One (Parameters), including interest rate on feed and supplies, shrink, tons of co-product per loaded truck, the date the co-product is placed in storage and the dates that an operation starts and finishes feeding the stored co-product. Ethanol co-product and forage percent dry matter, percent crude protein (CP; dry matter basis), percent total digestible nutrients (TDN; dry matter basis), quantities used as-is and as-is prices are required inputs for Step Two (Feed Costs). If producers do not want to calculate mixture costs per pound of CP and/or per pound of TDN, the percent CP and/or percent TDN can be excluded as inputs in step two. Step Three (Equipment and Structure Costs) inputs include rented equipment and/or structure price and quantity, ownership costs on owned equipment and/or structures (proportion of time/space used, interest rate, useful life, salvage value, repairs, taxes and insurance), and the price and quantity of other supplies (e.g., tires, plastic, fuel). Input values required for Step Four (Other Costs) include the quantity and price of transportation and labor.

Using these inputs, the budget generates a results summary that includes total mixture cost, mixture cost per ton with and without shrink, shrink cost per ton, co-product cost per ton with and without shrink and tons of mixture and co-product before and after shrink. The results summary also includes mixture cost per pound of CP with and without shrink and mixture cost per pound of TDN with and without shrink. All output values generated in the results summary are represented on both an as-is basis and a dry matter basis.

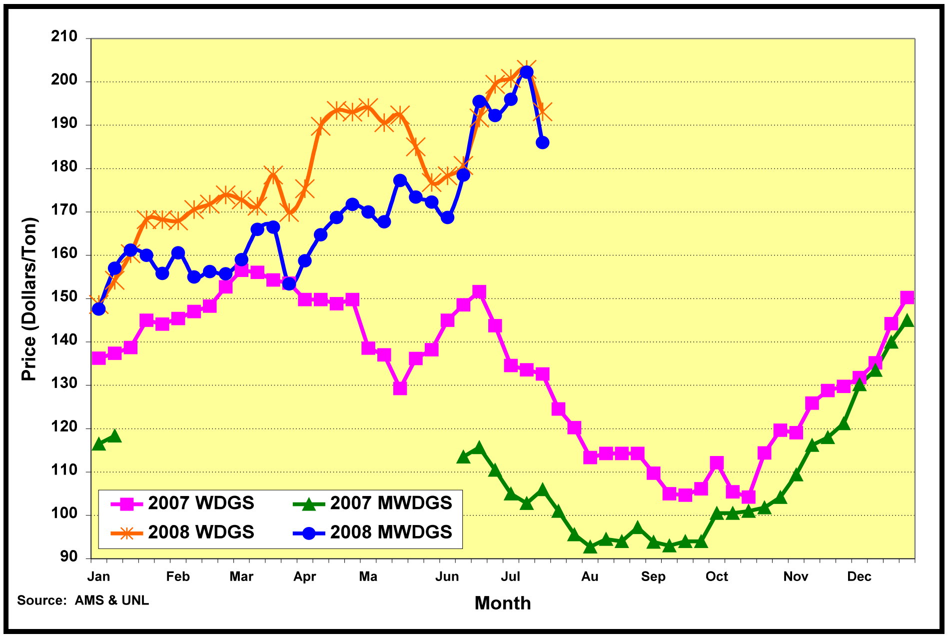

Figure 1. Weekly WDGS and MWDGS Prices, Dry Matter Basis, Nebraska, 2007-2008.

Although individuals using Co-Product STORE should define costs and include parameters that are representative of their own operation, general assumptions were utilized in this evaluation of two storage methods (bunker and silo bag), based on prices and conditions that existed in early Summer 2008. Both examples assumed that 250 tons (as-is) of wet distillers grain plus solubles (WDGS) would be mixed and stored with grass hay at the appropriate inclusion levels (34.24 and 15.27 percent inclusion on a dry matter basis for bunker and bag storage, respectively; Erickson et al., 2008). For the bunker method of storage, the mixture is assumed to be stored on the ground using large round bales for bunker walls. Because the large round bales will be useable after storage, they are not included as a cost. All other assumptions are outlined in Table 1 (on page 4).

Table 2 (on page 4) presents the mixture and co-product costs (estimated using Co-Product STORE) for the bunker and silo bag storage examples previously described. As the table shows, it is important to analyze the costs on a dry matter basis. Although the as-is mixture cost per ton with shrink is less for bag storage than bunker storage in this example, the dry matter mixture cost per ton with shrink is actually greater for the silo bag storage method compared to the bunker method. This is due to the lower total tonnage associated with bagging (lower forage inclusion level), and the resulting relative percent dry matter differences associated with the mixtures (bunker mixture was 44.1 percent dry matter and bag mixture was 38.5 percent dry matter).

Assuming that both storage methods are equal regarding physical feasibility, either method of storage could be cheapest depending upon an operation's individual costs. Whether the total mixture cost per ton, co-product cost per ton, or mixture cost per pound of CP or TDN is most appropriate for comparison to other

prices depends on an operation's needs. For example, if a cow/calf producer is analyzing co-product and forage storage during the summer versus purchasing co-product later in the year to feed as a supplement by itself, it would be more appropriate to compare the mixture cost per ton with shrink to the cost of the co-product purchased at a later date. Additionally, if cow/calf producers are considering ethanol co-products as an alternative source for protein supplementation, it may be most beneficial to analyze the mixture cost per pound of CP. On the other hand, it may be appropriate for feedlots (or any operation storing only co-product with no other feedstuff) to evaluate the co-product cost per ton with shrink, as most of the co-product purchased by feedlots will be included in a ration regardless of whether it is stored alone, mixed with another feedstuff and stored or purchased later in the year. It is important to remember that all costs and tonnage values will change from operation to operation, and the numbers in Table 2 simply represent the costs and parameters assumed for these two particular scenarios.

Although ethanol co-product prices are not currently tracking the seasonal price trend that has been present in previous years, ethanol co-product contracting and storage opportunities may still exist for some cattle feeders and cow/calf operations. Producers must recognize and define the type of storage method that is optimal for their own operation, while ensuring that the benefits of actually storing the co-product exceeds the cost to do so. One way to accomplish this is by contacting the ethanol plant(s) for a contracted co-product price for delivery later in the year. WDGS can currently be contracted at approximately $214 per ton (dry matter basis) for December delivery. Based on the storage costs calculated by Co-Product STORE (Table 2), this contracted price is nearly $32 per ton and $51 per ton (dry matter basis) less than bag and bunker co-product costs per ton with shrink, respectively. Although co-product storage does not appear to be the optimal choice in this scenario, it is important for each producer to use their own unique parameters and inputs, as costs will vary from operation to operation. Furthermore, contracted co-product prices will differ among plants and among co-products, so depending upon an operation's individual costs, it may be more advantageous to implement co-product storage. Co-Product STORE helps producers analyze and address these issues by quantifying the costs of co-product storage.

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Table 1. Assumptions for Bunker and Silo Bag Storage Examples.

	Bunker	Bag
Parameters		
Interest rate on feed and supplies	8.5%	8.5%
Shrink[1]	15%	6%
Tons of co-product per loaded truck	25	25
Date co-product placed in storage	8/1/2008	8/1/2008
Date start feeding stored co-product	12/1/2008	12/1/2008
Date finish feeding stored co-product	4/23/2009	4/23/2009
Feed		
WDGS	250 tons, 35% DM, 30% CP[2], 112% TDN[2,3], $65/ton	250 tons, 35% DM, 30% CP[2], 112% TDN[2,3], $65/ton
Grass Hay	52 tons, 87.6% DM, 14.4% CP[2], 56% TDN[2,3], $85/ton	18 tons, 87.6% DM, 14.4% CP[2], 56% TDN[2,3],$85ton
Rented Equipment		
Mixer	10 hrs, $15/hr	5 hrs, $15/hr
Hay Grinder	6 hrs, $20/hr	3 hrs, $20/hr
Bagger		268 tons, $8/ton
Owned Equipment		
Tractor	$813.75 ownership cost	$203.44 ownership cost
Other Supplies and Costs		
Bunker Plastic	600 sq ft, $0.13/sq ft	
Fuel	120 gal, $3.50/gal	30 gal, $3.50/gal
Transportation	30 miles, $3.50/loaded mile	30 miles, $3.50/loaded mile
Labor	21 hrs, $10/hr	6 hrs, $10/hr

[1]Percentage difference of quantity of material bunkered or bagged compared to quantity of material weighed out and fed. Shrink ranges from 8% to 15% for bunker storage and 3% to 6% for bagging.
[2]Percentages are averages based on UNL feeding performance data and are expressed on a dry matter basis.
[3]TDN value changes depending on co-product inclusion level; percentages are calculated assuming corn is 90% TDN (dry matter basis).

Table 2. Bunker and Silo Bag Storage Costs Estimated Using Co-Product STORE.

	Bunker (As-is Basis)	Bunker (DM Basis)	Bag (As-is Basis)	Bag (DM Basis)
Total Mixture Cost	$24,465.61	$24,465.61	$22,283.37	$22,283.37
Mixture Cost per Ton Without Shrink	$81.01	$183.88	$83.15	$215.78
Mixture Cost per Ton With Shrink	$95.31	$216.33	$88.45	$229.56
Shrink Cost per Ton	$14.30	$32.45	$5.31	$13.77
Co-Product Cost per Ton Without Shrink	$88.84	$225.33	$86.55	$230.80
Co-Product Cost per Ton With Shrink	$104.52	$265.10	$92.07	$245.53
Mixture Cost per Pound of CP Without Shrink	$0.373	$0.373	$0.391	$0.391
Mixture Cost per Pound of CP With Shrink	$0.439	$0.439	$0.416	$0.416
Mixture Cost per Pound of TDN Without Shrink	$0.099	$0.099	$0.104	$0.104
Mixture Cost per Pound of TDN With Shrink	$0.117	$0.117	$0.111	$0.111