Chapter 16 – Cost allocation – Joint Products and Byproducts

I. Joint Cost Allocation and The Production of Ethanol Fire

a. Allocating the production of ethanol from corn feed to other products.

II. Learning Objectives:

a. Identify the splitoff point in a joint-cost situation and distinguish joint products, products with high sales values, from byproducts, products with low sales values
b. Explain why joint costs are allocated to individual products
c. Allocate joint costs using four methods
d. Explain when the sales value at the splitoff method is preferred when allocating joint costs
e. Explain why joint costs are irrelevant in a self or process further decision
f. Account for byproducts using two methods.

III. Joint cost Basics

a. **The splitoff point** is the juncture in a joint production process when two or more products become separately identifiable
    i. **Output with a positive value and output with 0 sales value**
    ii. **Product has a positive total sales value or does not have a inhibitory effect.**
    iii. **Low total sales volume or no sales volume equates to byproducts vs those with high sales volume, which are main products or joint products.**
b. **Separable costs are all costs** – manufacturing, marketing, distribution and so on-incurred beyond the splitoff point, decisions relating to the sale or further processing of each identifiable product can be made independently of decisions about other products.

IV. Allocating Joint Costs

a. Explain why joint costs are allocated to individual products. To calculate cost of cost of goods sold and inventory, and for reimbursements under cost-plus contracts and other claims.
b. Computation of inventoriable costs and costs of goods sold
c. Computation of inventoriable costs and costs of goods sold for internal reporting purposes
d. Cost reimbursement for companies have a few of their products or services reimbursed under cost-plus contracts with say a government agency.
e. Rate or price regulation for one or more of the jointly produced products
f. Insurance based computations for damage claims made on the basis of cost information of jointly produced products.
g. Commercial litigation where joint processes or services are a key input for allocation.

V. Approaches to Allocating Joint Costs

a. Learning objective – allocate joint costs using four methods, sales value at splitoff, physical measure, net realizable(NRV), and constant gross margin percentage nrv.
b. Approach one: allocate based off a market-based approach – applies benefits received methods
    i. Sales value at splitoff method
    ii. Net realizable method
    iii. Constant gross margin percentage NRV method

c. Approach two: allocate costs using physical measures, such as weight, quantity and volume.

d. No cause and effect structure because the results are joint

e. Sales value at split and Physical Measure Method

f. NRV constant gross margin NRV %

	Joint costs	
Joint costs(costs of 110,000 gallons raw milk and processing of splitoff joint)	**400,000**	
	Cream	**Liquid Skim**
Beginning Inventory	**0**	**0**
Production(gallons)	**25,000**	**75,000**
Sales(gallons)	**20,000**	**30,000**
Ending inventory	**5,000**	**45,000**
Selling price per gallon	**8**	**4**

VI. Sales Value at Splitoff Method

a. Sales value at splitoff method

i. Allocates joint costs to joint products produced during the accounting period on the basis of relative total sales value at the split off point.

Panel A: Allocation of joint costs using sales at splitoff method	**Cream**	**Liquid Skim**	**Total**
Sales value of total production at splitoff point(25,000 gallons x $8 per gallon, 75,000 x $4 per gallon)	200,000	300,000	500,000
Weighting (200,000/500,000; 300,000/500,000	.40	.6	
Joint costs allocated (.40 x 400,000, .6 x 400,000)	160,000	240,000	400,000
Joint Production cost per gallon(160,000/25,000; 240,000/75000)	6.40	3.2	
Panel B: Product-line income income statement using sales value at splitoff method)	Cream	Liquid Skim	Total

Revenues(20,000 gallons x $8 per gallon; 30 gallons x $4 per gallon)	160,000	120,000	280,000
Cost of goods sold(joint costs)			
Production costs	160,000	240,000	400,000
Deduct ending inventory(5,000x6.40;45 gallons x 3.20 per gallon)	32,000	144,000	176,000
Costs of goods sold	128,000	96,000	224,000
Gross margin	32,000	24,000	56,000
Gross margin %(32,000/160,000);Gross margin %(32,000/160,000);24,000/120,000 56,000/280,000	20%	20%	20%

VII. Physical Measure Method

a. Allocates joint costs to joint products during the accounting period on the basis of a comparable physical measure such as the relative weight, quantity, or volume at the splitoff point

Allocation of joint costs using physical-measure method	**Cream**	**Liquid Skim**	**Total**
Physical measure of total production	25,000	75,000	100,000
Weighing(25,000/100,000;75,000/100,000)	.25	.75	
Joint costs allocated (.25*400,000,.75*400,000)	100,000	300,000	400,000
Joint product cost per gallon(100,000/25,000 gallons,300,000/75,000)	4	4	
Panel B: Product Line Income Statement Using Physical Measure Method	Cream	Liquid Skim	Total
Revenues(20,000gallons x 8 per gallon; 30,000 gallons x 4 per gallon)	160,000	120,000	280,000
Costs of goods sold(joint costs)			

Production costs(.25 x 400,000; .75 x 400,000)	100,000	300,000	400,000
Deduct ending inventory(5000 gallons x 4 per gallon; 45,000 gallons x 4 per gallon)	20,000	180,000	200,000
Cost of goods sold	80,000	120,000	200,000
Gross margin	80,000		80,000
Gross margin(80,000/160,000;0/120,000, 80,000/280,000)	50%	0%	28.6%

b. Physical measure is not as utilized because it may not be a proper predictor of revenue generating capabilities.
c. General methodology is to include only the joint product output in the weighting computation.

VIII. Net Realizable Value Method
a. Joint cost to joint product allocation based off of NRV.
b. There are constant steps generally before and after the split off point using the NRV.

IX. Constant Gross Margin Percentage NRV Method
a. Allocates joint costs to joint products in such a way that each individual product achieves an identical gross-margin percentage.
    i. Compute overall gross margin percentage – final sales value of total production
    ii. Compute total production costs for each product – overall gross-margin percentage by the product's final sale value of total production
    iii. Compute allocated joint costs – The separable costs for each product are deducted from the total production costs.

X. Choosing An Allocation Method – NRV mark up or profit margin is attributable to joint process and none of the markup is attributable to separable costs.
    i. Explain when the sales value at split off method is preferred when allocating joint costs.
b. Measurement of the value of the point of the joint products at the split-off point
    i. Sales value at split-off is the best measure of the joint measure.
c. No anticipation of subsequent management decisions
    i. No information is required after the processing steps after split-off
d. Availability of a common base to allocate joint costs to the product
    i. Sales values at split-off has a common allocation base that is used.
e. Simplicity
    i. NRV and percentage gross margin NRV(maintains the same cost to sales ra are more complex methodology.
f. **<u>Advantage of the Physical inventory method:</u>** Selling prices as a bases to set rates and selling prices to allocate costs creates circular reasoning
    i.

XI. Not Allocating and Joint Costs
a. Subtract the joint costs from revenues

b. If substantial inventories exist, value them at NRV. Normally, using NRV is not used because it is used on each product.

XII. Irrelevance of joint Costs for decision making
   a. Sell-or-process-further decisions

XIII. Joint-Cost Allocation and Performance Evaluation
   a. Production of “buttercream” also results in allocation of buttercream into fixed costs.

XIV. Pricing Decisions
   a. Use of sales value at splitoff or the net realizable value method to allocate joint costs results in reverse effects –
      i. Selling prices of joint products drive joint-cost allocations, rather than cost allocations serving as the basis for the pricing of joint products.
      ii. The use of the sales value splitoff or the net realizable value method to allocate joint costs results in a reverse effect
         1. Selling prices of joint products drive joint-cost allocations.

XV. Accounting for Byproducts
   a. Byproducts can affect the allocation of joint costs
   b. **Two product example**: by products, main products
   c. **Two methods**: production method and the sales method
   d. **Production Method**: Byproducts Recognized at the time production is complete

XVI.