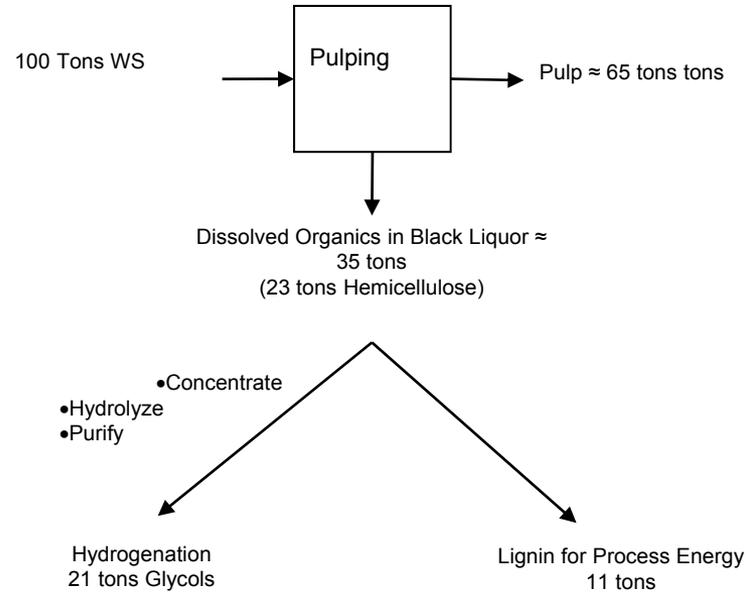


# Straw Utilization for Fiber and Chemicals

Mark Lewis UW

March 30, 2010

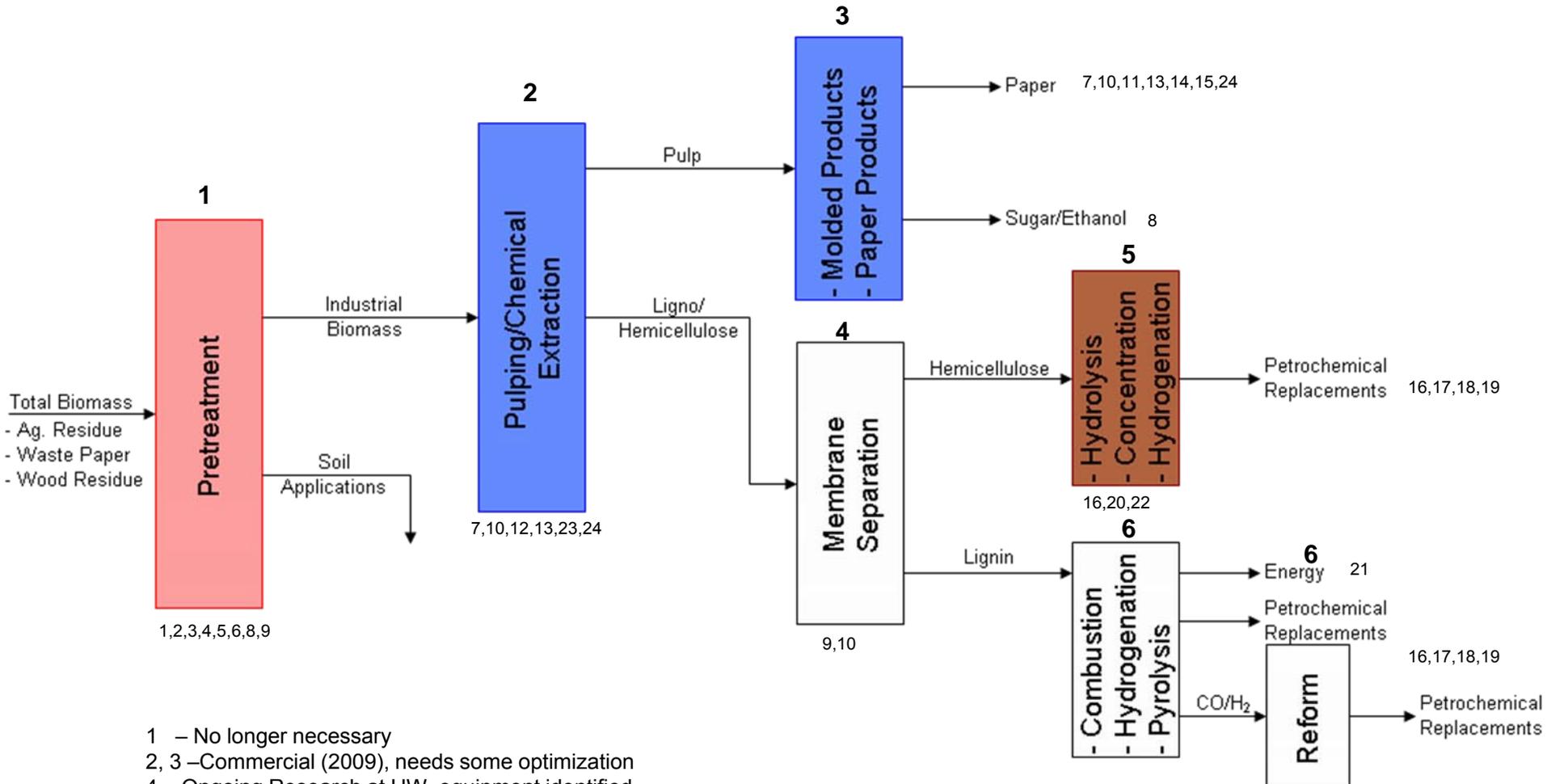
Potential Biorefinery Operations



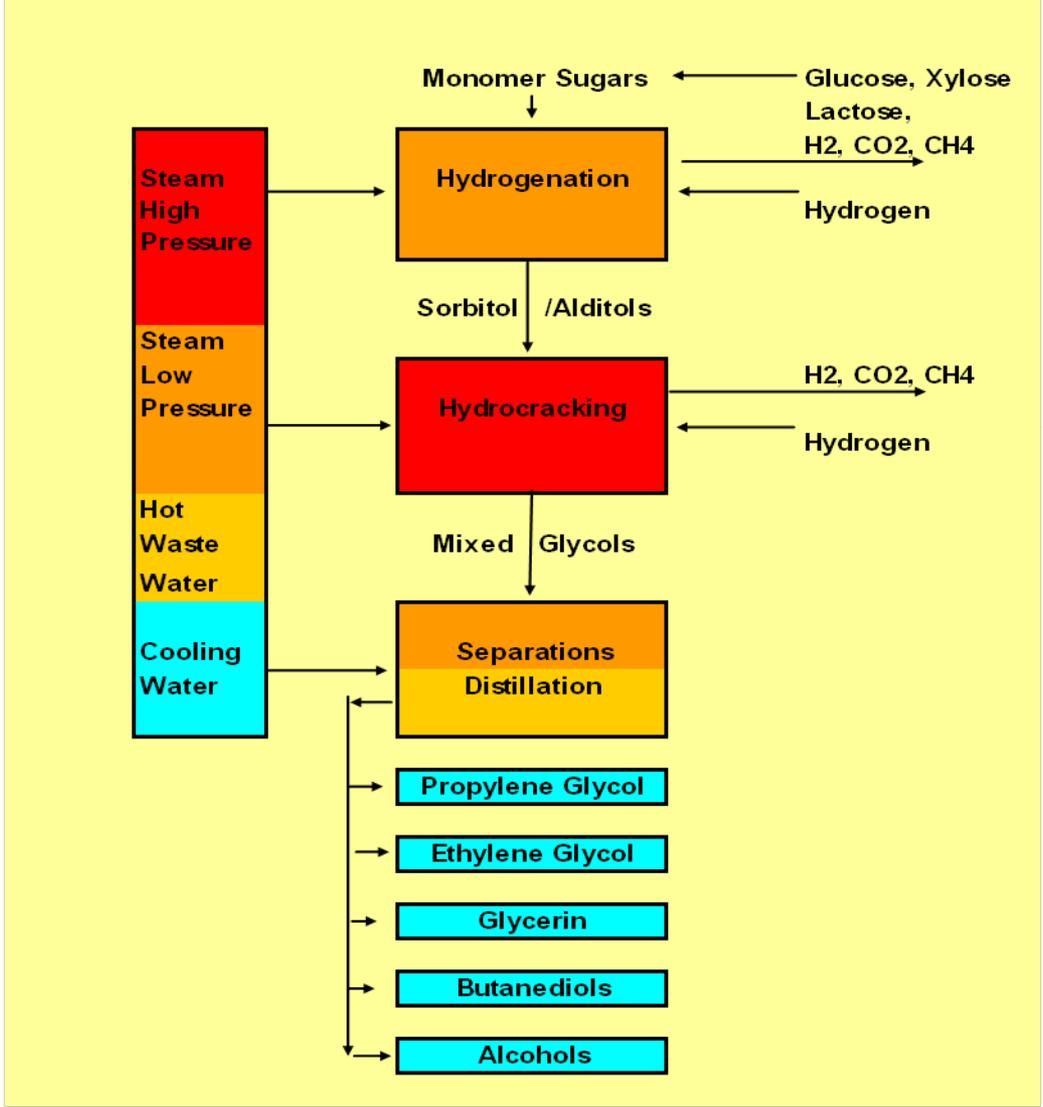
# Dayton Feasibility

- Reviewed various sites for Straw Mill
- Met with various farmers to discuss logistics and straw availability
- Evaluated pulp users
- Commitment from buyers for lignin and sugars

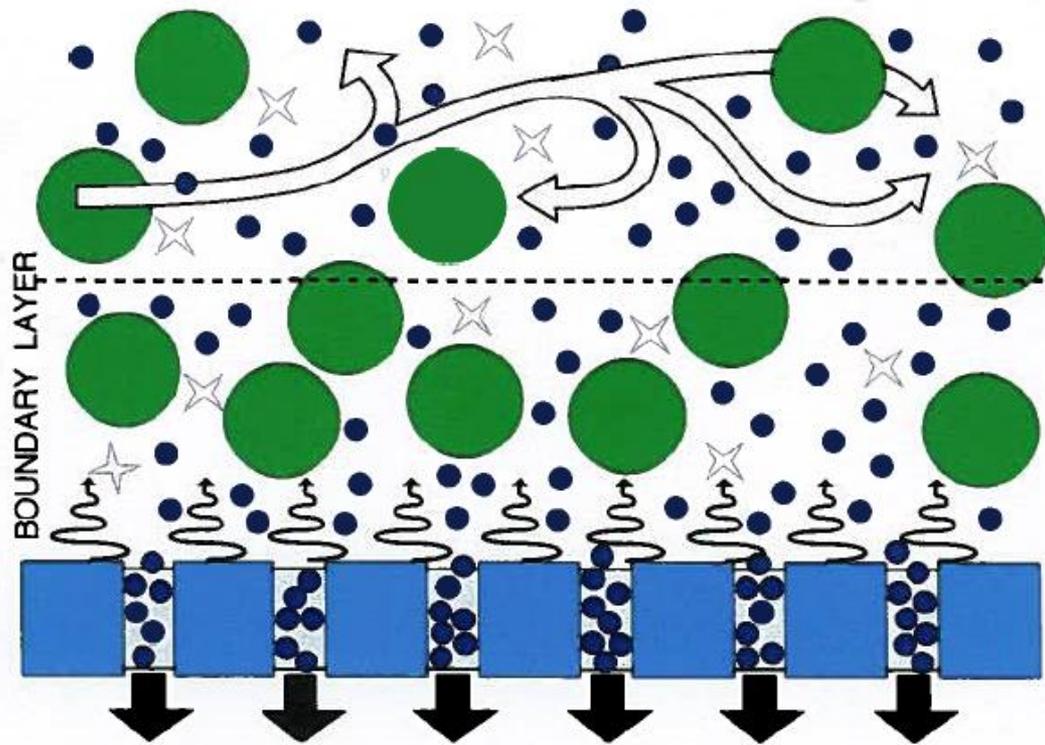
# Potential Washington Agro-Industry Manufacturing Configuration



- 1 – No longer necessary
- 2, 3 – Commercial (2009), needs some optimization
- 4 – Ongoing Research at UW, equipment identified
- 5 – Process presently commercial/needs R/D for bio-sugar and glycerin feeds
- 6 – Working with Lignin buyer to optimize

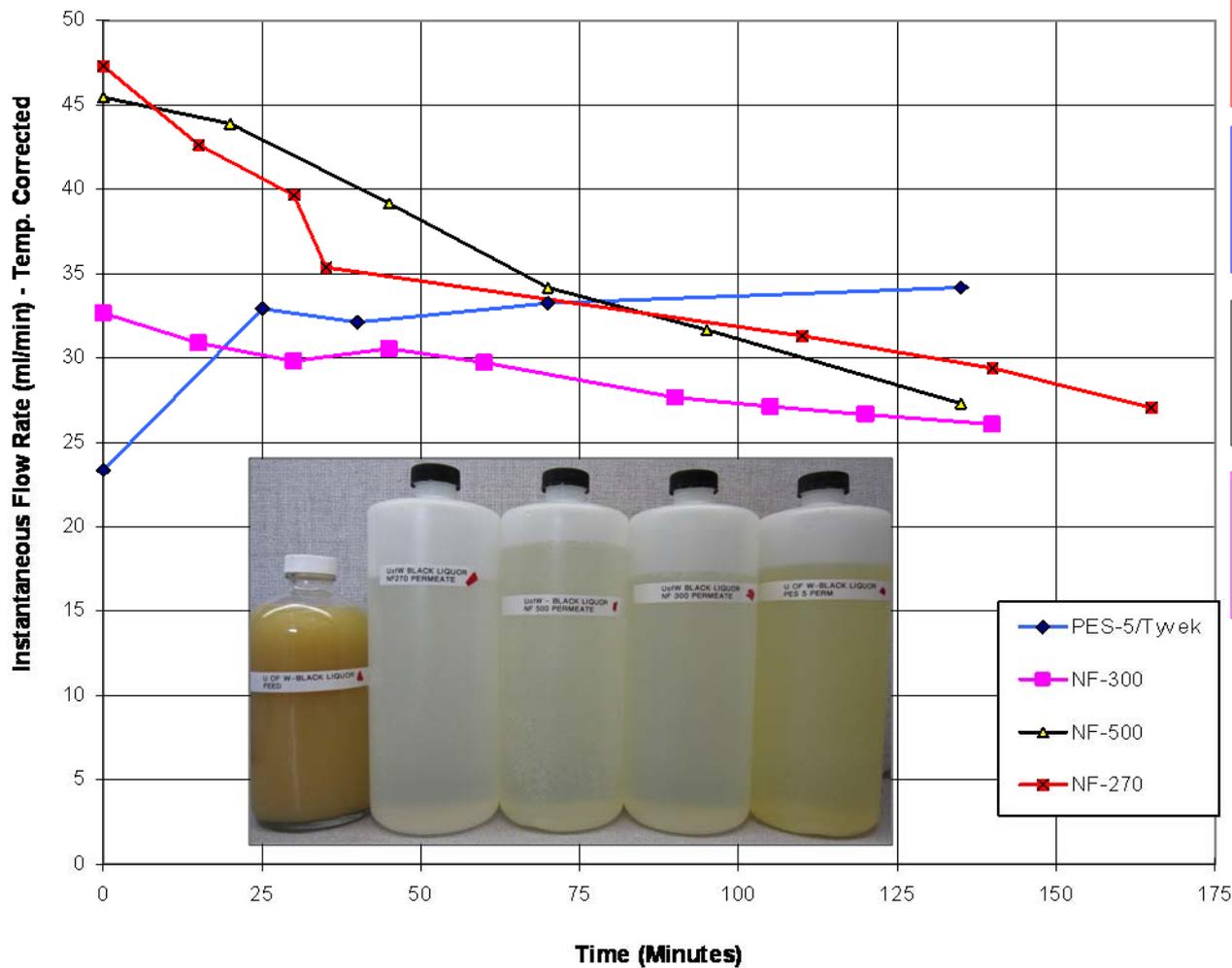


	Arabino se	Galactos e	Gluco se	Xylose	Manno se	AIL	ASL	Total
<b>Cooked What Straw (PWS)</b>	2.99%	0.58%	47.36%	27.81%	0.00%	21.33%	2.01%	<b>102.09%</b>
<b>SD</b>	0.04%	0.01%	0.41%	0.32%	0.00%	0.44%	0.05%	
<b>Original Wheat Straw</b>	2.96%	0.59%	42.80%	24.90%	0.00%	20.27%	2.40%	<b>93.91%</b>
<b>SD</b>	0.09%	0.01%	1.36%	0.94%	0.00%	0.26%	0.05%	
<b>Wheat Straw Pulp</b>	3.04%	0.40%	60.22%	27.68%	0.00%	11.53%	1.48%	<b>104.37%</b>
<b>SD</b>	0.04%	0.02%	0.74%	0.98%	0.00%	0.45%	0.05%	



## NORMAL VSEP FILTRATION

Normal filtration occurs as the membrane prevents solids from passing and clear filtrate is able to exit the system through the drainage cloth. Membrane trays are independent modules and are installed stacked on top of each other. Up to several hundred tray layers are included in the filter pack



**NF-270**  
 pH: 7.19  
 Conductivity: 3.63mS  
 %Solids: 0.25%

**PES-5Tyvek**  
 pH: 7.27  
 Conductivity: 9.83mS  
 %Solids: 1.18%

**NF-500**  
 pH: 7.52  
 Conductivity: 6.44mS  
 %Solids: 0.53%

**NF-300**  
 pH: 7.52  
 Conductivity: 6.00mS  
 %Solids: 0.46%

**Process Conditions**  
 Temp: 25°C  
 pH: 6.76  
 % Solids: 2.61%

# Grass Straw Pulping

Pulp	NaOH	KOH	NH4OH	Time	Ratio	Temp
1	5	5		30	12	90
2		10		30	12	90
3		5	5	30	12	90
4		5	5	60	12	90
5			10	60	12	90

# Ongoing Activities

- Currently manufacturing glycols from sugars at UW lab
- Meetings with for bleached wheat straw pulp from this project

# Additional Info

- Currently working with another mill in Washington who is looking to switch to straw pulping at their facilities
- Major trial to occur in June
- Meeting with mill personnel and consulting engineering firm mid April