



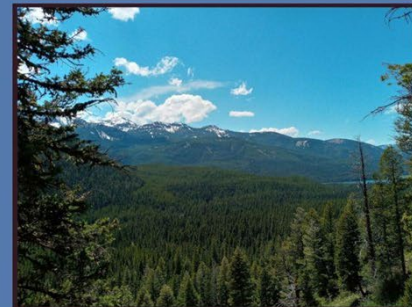
PHILIPSBURG BREWING CO. M O N T A N A

MTP2



MONTANA POLLUTION PREVENTION PROGRAM

EMPOWERING BUSINESSES TO BE PART OF THE SOLUTION, NOT THE POLLUTION.



Employer: Nolan & Cathy Smith

Intern: Jess Rahn

MMEC advisor: Brian Sullivan

Program Directors: Jenny & Barb

Self Intro



->Senior at Montana State University studying Environmental Engineering

-> Environmental remediation of contaminated sites

-> Identify prevention before remediation is necessary

About Philipsburg Brewing Company



Production:

Craft Beer & Spring Water

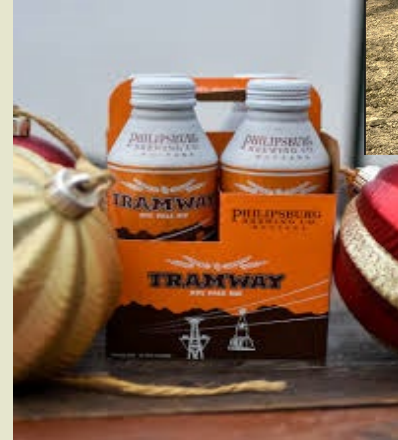
Expressed P2:

Evaluation of the Wastewater & Pilot the Sustainable Brewery Certification

“OUR GOAL IS TO BE A SELF-SUSTAINING BREWING COMPANY THAT ENRICHES THE LIVES OF THE COMMUNITY WE SERVE AND THE PEOPLE WE EMPLOY. WE WANT TO BE A BUSINESS STAFF AND CUSTOMERS ARE PROUD TO SUPPORT.”

Highlights of P'burg Brewing Sustainability

- Spent grain goes to the a local livestock for feed
- Regionally sourced hops (Oregon) are Salmon-Safe Certified
- Grain bin to store grains to replace thousands of polypropylene bags
- Redesigned cardboard cases to reduce the amount of cardboard used
- Designed the bottling line to optimize ventilation



Brewing Industry Impacts

- ❖ **Industry:** Food & Beverage Manufacturing
- ❖ **Environmental Impacts**
 - Extensive Water Usage
 - High-Strength Wastewater
 - CO2 Usage
- ❖ **Economic Impacts**
 - Tourism
 - Community Development
 - Supporting Ranchers



VSM



Sustainability Certification Figures ^{Rezu}

Batch Size (BBL)	Batch Yield (BBL)	Batch Yield (gal)	Total Water Usage (gal)	Total Waste Water Usage (gal)	Waste water:Water (gal:gal)	Water: Beer (gal:gal)	Wastewater:Beer (gal:gal)	co2 lbs./bbl.
50	50	1550	9,608.2	6,808.2	0.71	6.20	4.39	7.65



P2 Energy

- Centrifugal Pump & Motor
 - 30 years old with a leak
 - Motor Eff=35.5% Pump= 30%
 - 3276.87 kW-hrs → 1540 kW-hrs
 - Saved ~1736 kW-hr = 1.2 metric tons CO2 avoided
 - 738 gals/year

Payback Period: 4.82 years (\$234/yr)

- Lighting Change
 - Motion Sensored LED



Bottle Catching System

Initial Cost:

\$12 (sewing kit & velcro)

Annual Waste:

70,000 bottles/year

3,700 lbs of aluminium

Estimated cost saved from
implementation:

\$35,000

*would need more data to give an more
accurate cost saved analysis



Carbon Recapture

- Enhances beer quality
- Reduce supply chain volatility
- Biogenic carbon
- Potential revenue through resale of recapture

Cost of Implementation: \$126,630

Typical ROI: 4-5 years

*Possible future implementation



CiCi[®]Oak Carbon Capture Technology

Plug-and-play CO₂ capture and recovery solution for craft brewers

<p>Real-time gas purity sensor technology Ensures purity targets are met and reduces total energy consumption</p>	<p>Modular, small size system Fits into tight, wet, brewery spaces and meets modern safety and equipment standards</p>
<p>CO₂ capture software Enables real-time analytics and cloud-based mobile dashboard</p>	<p>Regenerative dryers Remove moisture</p>
<p>Sorbent bed Scrubs voics, acid gases and aromas to achieve purity</p>	<p>Compact and unique chiller design Converts CO₂ gas to liquid in minutes</p>
<p>Installs in one week</p>	<p>Produces super premium beverage-grade CO₂</p>



CiCi Solution Components

 <p>Foam Trap & Smart Foam Trap Capture CO₂ from fermentation vessel and maintain pressure</p>	 <p>CO₂ Storage Hold recovered CO₂ liquid and can be used to capture and carbonate at the same time</p>	 <p>Vaporizer Re-vaporize to boost CO₂ flow to meet carbonation needs</p>	 <p>CO₂ Monitoring Software Both within CiCi and via mobile, track real-time performance data and alerts while producing CO₂ volume data</p>
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Wastewater

Waste Management

- High BOD & TSS
- Wastewater Plant construction

Proposed Solution

- Side Stream to IBC totes
- ~30 lbs of yeast per brew
- Companies that purchase brewery yeast
 - Biofuels, Nutritional Supplements, Fertilizer, & Bakeries
 - Land application



P2 outcomes in a table

Recommended P2 Actions	If Implemented:								If Not Implemented:	
	\$		Annual Reductions							
	One-time Cost to Implement (\$)	Annual Savings from P2 Action (\$)	Hazardous Material input (lbs)	Hazardous waste (lbs)	Air emissions (lbs)	Water pollution (lbs)	MTCO _{2e} emissions (tons)	Water use (gal.)	Barrier to Implement	Plans to Implement within 5 years? (pick Y/N)
New Centrifugal Pump & Motor	\$1,131.20	\$234.51	-	-	-	-	1.2	738	-	Y
Carbon Recapture System	\$126,630	TBD	-	-	-	-	TBD	TBD	Cost & it's a newer company	Y


Reflections/Recommendations

- Personal learning
 - Understanding of Brewing Process
 - Enhanced professional skills
 - Recommendations for future P2 interns
 - Don't be afraid to ask too many questions
 - Explore possible grants
 - Brewery Specific- Ask for tours of other facilities
 - Recommendations for P2 advisors for future P2 activities
 - Brewery Specific- MBA articles & article accesses
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Special Thank You

Thank you to the staff at
Philipsburg Brewing Company
and all the Philipsburg Residents





•Land acknowledgement

We acknowledge that Philipsburg, Montana, is located on the traditional territories of the Salish, Kootenai, Pend d'Oreille, and other indigenous nations who have stewarded this land for generations. These tribes have a proud heritage, a vibrant present, and a bright future. We recognize and honor their deep connection to the land, cultural contributions, and ongoing presence. We are committed to learning from and partnering with these communities as we work together toward a future of mutual respect and understanding.

•Funding acknowledgment

This internship was funded by the Environmental Protection Agency Pollution Prevention (EPA P2) grant. The publication of this content is solely the author's responsibility and does not necessarily represent the official views of EPA Pollution Prevention programs.



Any Questions?