MADDIE MCGEES MOUNTAIN MUNCHIES

EMPLOYER: CHRIS MCGEE
INTERN: LILY MACFARLANE
P2 ADVISOR: ALISTAIR STEWART

About Myself

I am studying Conservation Biology and Ecology at MSU and am interested in nonprofit conservation work in the future.

I applied for this internship because I believe pollution prevention is a key part of land and wildlife conservation.

MONTANA
STATE UNIVERSITY

About Maddie McGee’s

Maddie McGees Mountain Munchies is a pet treat manufacturing company that repurposes beef organs and fish skins to make their pet treats.

All products are made from other companies food waste, and don’t contribute any food waste of their own.

P2 Interest

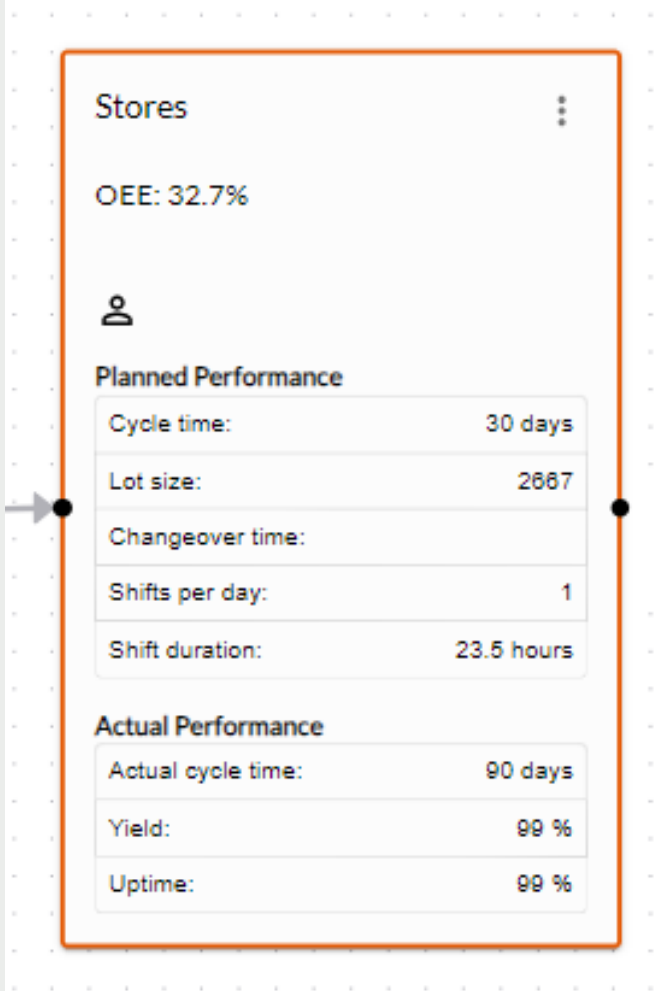
Chris McGee created Maddie McGee’s and has been running the business for about a year.

His current market is in whole food pet treats and his business is relatively new, so our first P2 interest was his manufacturing process as a one-man operation.

Our second interest was energy usage from Chris’ freezers and freeze dryers.


recieves
OEE: 98.0%
Planned Performance
Cycle time: 10 minutes
Lot size: 667
Changeover time:
Shifts per day: 1
Shift duration:
Actual Performance
Actual cycle time: 10 minutes
Yield: 99 %
Uptime: 99 %
Stores
OEE: 32.7%
Planned Performance
Cycle time: 30 days
Lot size: 2667
Changeover time:
Shifts per day: 1
Shift duration: 23.5 hours
Actual Performance
Actual cycle time: 90 days
Yield: 99 %
Uptime: 99 %
FIFO
201
withdraw and defrost
OEE: 98.0%
Planned Performance
Cycle time: 3 hours
Lot size: 201
Changeover time:
Shifts per day: 1
Shift duration: 3 hours
Actual Performance
Actual cycle time: 3 hours
Yield: 98 %
Uptime: 100 %
meat prep
OEE: 96.0%
Planned Performance
Cycle time: 13 minutes
Lot size: 34
Changeover time: 2 minutes
Shifts per day: 1
Shift duration: 30 minutes
Actual Performance
Actual cycle time: 13 minutes
Yield: 98 %
Uptime: 98 %
FIFO
34
chop
OEE: 98.0%
Planned Performance
Cycle time: 11 minutes
Lot size: 34
Changeover time:
Shifts per day: 1
Shift duration: 30 minutes
Actual Performance
Actual cycle time: 11 minutes
Yield: 100 %
Uptime: 98 %
FIFO
34
load trays
OEE: 98.0%
Planned Performance
Cycle time: 5 minutes
Lot size: 34
Changeover time:
Shifts per day: 1
Shift duration: 30 minutes
Actual Performance
Actual cycle time: 5 minutes
Yield: 99 %
Uptime: 99 %
drying
OEE: 94.5%
Planned Performance
Cycle time: 1.5 days
Lot size: 201
Changeover time: 3 hours
Shifts per day: 1
Shift duration: 23.5 hours
Actual Performance
Actual cycle time: 1.5 days
Yield: 98 %
Uptime: 96.4 %
FIFO
201
Stickering Packages
OEE: 99.0%
Planned Performance
Cycle time: 47 seconds
Lot size: 1
Changeover time: 30 seconds
Shifts per day: 1
Shift duration: 3.5 hours
Actual Performance
Actual cycle time: 47 seconds
Yield: 99 %
Uptime: 100 %
FIFO
500
Filling Packages
OEE: 89.1%
Planned Performance
Cycle time: 18 minutes
Lot size: 24
Changeover time: 5 minutes
Shifts per day: 1
Shift duration: 1.5 hours
Actual Performance
Actual cycle time: 18 minutes
Yield: 99 %
Uptime: 90 %
FIFO
68
Sealing and Boxing
OEE: 96.1%
Planned Performance
Cycle time: 1.7 minutes
Lot size: 24
Changeover time: 5 minutes
Shifts per day: 1
Shift duration: 30 minutes
Actual Performance
Actual cycle time: 1.7 minutes
Yield: 99 %
Uptime: 99 %
FIFO
24
Put Away
OEE: 100.0%
Planned Performance
Cycle time: 30 seconds
Lot size: 24
Changeover time:
Shifts per day: 1
Shift duration:
Actual Performance
Actual cycle time: 30 seconds
Yield: 100 %
Uptime: 100 %
48
withdraw and ship
OEE: 100.0%
Planned Performance
Cycle time: 2 hours
Lot size: 96
Changeover time:
Shifts per day: 1
Shift duration: 2.5 hours
Actual Performance
Actual cycle time: 2 hours
Yield: 100 %
Uptime: 100 %

P2 Focus



Meat Storage

Primary Constraint on VSM

About 1500 lbs. of beef was delivered each month, but only about 205 lbs. were processed and sold. Extra beef was stored in freezers for at least 90 days.

Solution: Stop buying beef and deplete stocks until only one month of beef is stored at a time and beef is bought based off need.

Freeze Dryers

Secondary Constraint

One full cycle of meat in the freeze dryers takes 24-36 hours when the shop is cool (below 70 degrees), and 36-48 hours when the shop is warm (above 70 degrees). The machines also produce a lot of heat when they’re drying which warms up the shop.

Solution: Close off an area of the shop and put air conditioning in that area to keep the room cold and reduce freeze drying time in the summers.

EXPECTED SAVINGS

Freeze Dryers:

(1500 watts x 96 hrs.)/1000 = 144 kwh/month
144 kwh x .86 lbs. CO_2/kwh = 124 lbs. CO_2 per large freeze dryer per month

(1000 watts x 96 hrs.)/1000 = 96 kwh/month
96 kwh x .86 lbs. CO_2/kwh = 83 lbs. CO_2 per small freeze dryer per month

144 kwh x $0.117/kwh = $16.85 per large freeze dryer per month
96 kwh x $0.117/kwh = $11.23 per small freeze dryer per month

Total (2 large and 1 small freeze dryer): $45 and 331 lbs CO_2 per month

Freezers:

(1150 watts x 730 hrs.)/1000 = 839.5 kwh/month
839.5 kwh x .86 lbs. CO_2/kwh = 722 lbs. CO_2 per freezer per month

839.5 kwh x $0.117/kwh = $98 per freezer per month
Additional $80/month to rent both freezers

Total for 2 Freezers: $276 and 1,444 lbs. CO_2 per month

P2 Focus

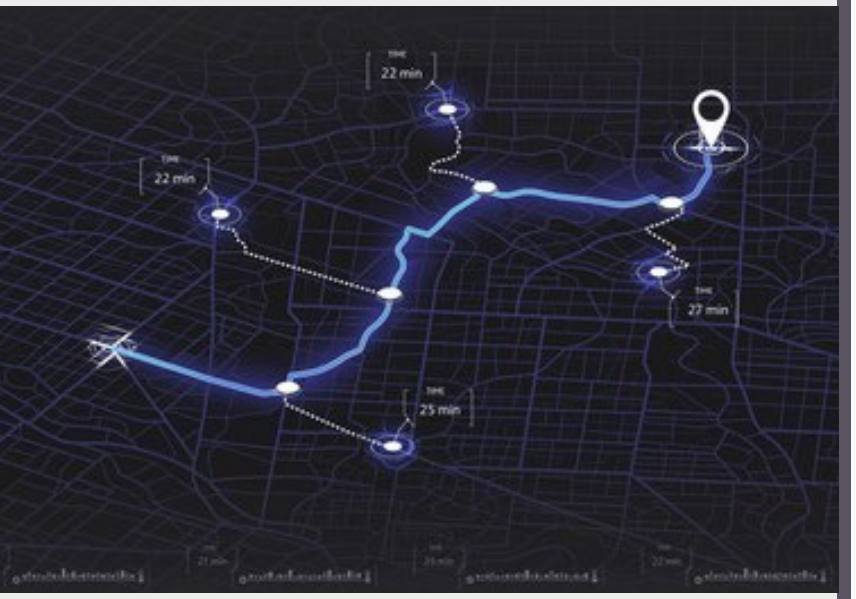
5S Audits and Standard Operating Procedures

Since Chris works alone, he doesn't have many standard methods recorded for organization or use of his workshop.

We created a 90-day plan for organization of the shop based on a 5s audit of each room. We also started on some standard operating procedures for manufacturing process.

This will make work more manageable for a possible new employee.

P2 Focus



Deliveries

One part of the process that was standardized is deliveries.

We created a schedule for delivering products or mailing products only once a week and found an app that can be used to plan a delivery route depending on locations.

This saves time and transportation costs for the business.

Recommended P2 Actions	If Implemented:	If not Implemented:

$	Annual Reductions:	

Action	One time Cost	Annual Savings	Hazardous material input (lbs)	Hazardous Waste (lbs)	Air emissions (lbs)	Water pollution (lbs)	MTCO2e emissions (Tons)	Water use (gal)	Barrier to implement	Plans to implement within 5 yrs
Freezer Removal	$0	$3312			17,328				Inventory level	Yes
Close off freeze dryers	$500	$540			3,972				Time	Yes

MTP2 MONTANA POLLUTION PREVENTION PROGRAM

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

Reflection:

- Stay on task, remember the program goal.
- Ask questions and use your advisors as often as you can.

THANK YOU

Thank you to the EPA for funding this research.

I acknowledge that the work I've done in this area is located on the homeland of many indigenous nations and recognize that it is essential to understand the history of this place and its people as I grow and learn upon the land.