

Meeting Minutes

Date: 14 September 2017

Location: S.Beyerlein's Office

Members Present: Patrick, Sam, Will, Adam, Steve

Meeting began with brief update on events since the formative meeting.

Call with Diedrich Roasters began at 3:15 PM. Danny and Leonard addressed the questions list we had sent line-by-line:

1. What are the required/maximum dimensions for the final product?
 - > 4x4x6'; must be able to fit on a pallet
 - Excludes roaster and connection equipment
2. What is the maximum allowable weight of the final product?
 - No weight requirements, should be less than 1000 lbs
3. What is the maximum allowed manufacturing budget?
 - Diedrich's cost basis is 1/3 material, 1/3 labor, and 1/3 profit margins. So, less than \$3300.
4. What is the maximum allowed material cost?
 - Refer to question 3.
5. What is our development budget? If possible, can we request a general received budget breakdown?
 - Less than \$7000 on prototyping/travel, ~\$3000 on manufacturing
6. What are the specific design requirements with regards to back pressure and particulate output?
 - Pressure: -0.15 - 0.25 inH₂O
 - Quantification of Pm is difficult; aim for 95% reduction and removal of visible smoke
7. Are there any CAD drawings of the exhaust port that our design must mate to?
 - Yes, they will be provided in a dropbox.
8. How removable should the product be?
 - The product should be free-standing; for mounting, the component should be able to act in a standalone fashion.
9. What are the desired operation lifespan and maintenance intervals?
 - Operational lifespan: indefinite (Diedrich roasters are known for lasting a long time)
 - 40 hour minimum maintenance interval
 - 6 year minimum filter interval
10. Is there any existing data on current emissions, output flow rate, and exhaust temperature.
 - Yes, it will be included in the Dropbox send.
11. What is the existing documentation format we must adhere to?
 - Will send us internal procedures
 - D&D process format
 - ISO-9001 certification
 - Purchases must include a data sheet
 - Metal parts should have associated CAD drawings
 - UL508A panel shop, ANZ Z83

12. What in-house manufacturing capabilities does Diedrich have that pertain to this system?
- Full fabrication facilities (machine shop and welding)
 - No power coat or heat treatment
 - Want to give us machining opportunities
 - Emphasis on sheet metal
13. How often will we be able to perform on-system testing?
- 1 or 2 alternative test trips, schedule permitting
 - Cannot bring a roaster down here
14. Is there a possibility of adapting/retrofitting the current exhaust system to fit current needs?
- Yes, great idea
 - Can use/modify cyclone system
15. Will the end product be outsourced or produced in-house?
- Dependent on final design - focus should be on in-house
16. If produced in-house, what facilities does Diedrich have for production?
- Refer to answer 12

A weekend visit was not recommended. A tentative plan for next Thursday or Friday was given, contingent on test rescheduling. It was asked that we use Danny as primary contact, and CC Leonard on all communication. Email was suggested as primary form. Call ended approximately 3:45 PM.

Melissa suggested we work with Bill Magnie on machine shop access and welding training, and to get a hold of the standards. They may have a cost associated with them. She also suggested we adapt to their sheet format and size, and to take advantage of the sheet metal work.

Meeting concluded at 3:50 PM.

Meeting Minutes for Coffee Mates

Date: 18 September 2017

Location: UI Library

Members Present: Sam, Patrick, Adam, Will

First agenda item was planning for company visit. Team agreed on a visit date of Friday, September 22nd. Samantha stated she may leave night before, and agreed to contact Diedrich/Steve with the proposed date.

The Dropbox contents were opened and explored. The Dropbox contained an outlet air report, an IR-series operation manual, marketing specifications, and the IR-12 parts.

Adam and Will presented their current research:

- Filtration: forums exist where individual roasters have discussed their own filtration systems
 - Cyclone-chaff collection with a course mesh screen
 - w-shaped high-temperature cloth filters
 - Activated carbon treatment
 - 20 kg carbon filter is large
 - Based on a wet-hull roaster design (less smoke output)
- Ionization system was examined
- Electrostatic Precipitation:
 - Effective but heavy smoke reduces operational lifespan
- Combination is probably best
- Giermer recommends ESP for <25-kg capacity roasters
- Abernathy uses a trapping field (possibly a catalyst)

Patrick presented research on standards

- ISO-9001 is \$130; checking to see if an educational discount is possible
 - Essentially a certificate of calibration standards

Action Items:

- Check with Danny for Friday itinerary
- Begin project portfolio
- Formalize current research

Coffee Mates Meeting Minutes

Date: 21 September 2017

Location: S.Beyerlein's Office

Members present: Patrick, Adam, Will, Sam, Steve

Scott Smith (managing the Power Plant) is a good resource for emissions and particulate/soot cleaning.

Prepping for 09/22 company visit: plan to leave 6:30 AM from Steam Lot. Be sure to take notes and be ready to draft a write up.

Smoke simulation: a wood burn may be a good simulation of coffee roasting. Check with Bill and Ankit for feasibility. May be able to use the Engine Bay.

The University has an opacity meter for detecting light transmission through a medium. Check with Ankit then Dan for this instrument.

Coffee Mates Meeting Minutes

Date: 25 September 2017

Location: UI Library

Members Present: Adam, Patrick, Sam, Will

Old Business

Patrick met with Ankit about the opacity meter. Ankit did not know anything about it. Patrick will check with Dr. Cordon tonight.

Dropbox items were explored, and the Solidworks files were unpacked.

New Business

Brainstormed the requested project problem statement and deliverables. A draft of these items was created.

The Solidworks assembly was noticeably slow on the campus hardware. As Will and Adam have higher-performance computers, obtaining licensing for their computers was discussed.

Plans for work for the week were discussed. Patrick agreed to type up draft for problem statement, Sam agreed to check on a potential license for Will and Adam. Will and Adam agreed to check with Melissa on conducting shop tours/training, possibly on Thursday during the usual meeting time.

Action Items

- Type up problem statement (Patrick)
- Check for Solidworks license (Sam)
- Check with Melissa on shop tours (Will and Adam)

Coffee Mates Meeting Minutes

Date: 2 October 2017

Location: UI Library

Members Present: Adam, Patrick, Sam, Will

Old/Current Business

- Filtration research
 - Water scrubbers discussed by Will and Adam
 - Exhaust gases flow through tube with water injector
 - Vapor absorbs exhaust particulate and cools gas
 - Can be paired with electrostatic filter
 - Requires lots of water (possibly a hookup)
 - Could include Venture tube collector
- Snapshot preparation
 - Tuesday, October 10
 - Tasks assigned for members to prepare portfolio
 - Plan to have finished by Wednesday evening
- Shop tour
 - Melissa is available Wednesday or Friday after 2:30

Action Items

- Patrick
 - Project schedule
 - Meeting Minutes
- Adam
 - Client visit meeting minutes
 - Project learning
- Will
 - CAD renderings, other drawings
 - Project learning
- Sam
 - Problem statement/deliverables
 - Problem specifications
- Team
 - Meet at 2:45 on Thursday to compile results

Coffee Mates Meeting Minutes

Date: 9 October 2017

Location: UI Library

Members Present: Adam, Patrick, Sam, Will

Old Business

Scrubber

- Micro-mister purchased (similar to use in garden)
- Will need a reservoir for water – both proof-of-concept and prototype
- May need recirculation pump for prototype but not for proof-of-concept
- Sam has a hose we can use for testing purposes

Location

- Kamal's lab space has chilled water but no ventilation
- The SmERF has ventilation but no chilled water (line still available)

Smoker

- Design finalized, available in logbook
- Beginning purchase order

New Business

Snapshot day

- Will tack pictures up (full poster expensive)
- Team name
- Problem statement
- CAD images
- Documentation of Project learning
- Table of specifications (Sam will handle)
- Schedule (Patrick will handle)

Action Items

Sam

- Table of specifications
- Compile slides for Snapshot

Will

- Update and formalize slides

Adam

- Status update

Patrick

- Schedule

Coffee Mates Meeting Minutes

Date: 12 October 2017

Location: Steve's Office

Members Present: Adam, Patrick, Sam, Will, Steve

Old Business

Fans discussed

- 100 CFM Hi-temp fan (possibly w/ inline controller – run by Ankit) ~\$20

- 200 CFM variable flow hi-humidity ~\$60

- Fan will pull air rather than push to reduce heat exposure

- Run to 4” outlet

General design

- Steve has hesitations of a stacked design

- Show proof that stacked works in portfolio

Opacity meter is nowhere

New Business

Need to figure out SmERF space

Proof-of-concept for smoker must be completed soon

Ready to start putting together system diagrams

Ready to start creating test procedures

Must be able to defend design choices by design review

Should put together articles supporting design choices

Action Items

Sam

- Price out opacity meter

Patrick

- Find shop space

- Get smoker parts ordered

Will

- Create system diagrams

Adam

- Start compiling articles

Coffee Mates Meeting Minutes

Date: 16 October 2017

Location: UI Library

Members Present: Adam, Patrick, Sam, Will

Old Business

Scrubber Progress

- Have cyclonic section hole
- Need epoxy to seal (purchasing)
- Currently waiting on a conical reducer and fan from Amazon
- Spray nozzle testing next step

Smoker

- McMaster-Carr parts ordered, just waiting
- Getting training with Bill for cutting/welding access
- Will check for acetylene torch or plasma cutter (backup is SawZall)
- BE shop may have additional useful tools

Opacity meters – no update

New Business

None – continue progress

Action Items

Team

- Wait on parts
- Update portfolio

Sam

- Price out opacity meters
- Check with BE for cutting implements

Adam/Will

- Get epoxy

Coffee Mates Meeting Minutes

Date: 19 October 2017

Location: Steve's Office

Members Present: Adam, Patrick, Sam, Will, Steve

Old Business

Parts ordered, waiting on arrival

Training in welding to occur next week

New Business

Wiki-page – Patrick will be webmaster

Opacity Meter

- Check viability of creating homemade one with Kamal

- research visibility measurement methods

- fiber optic/IR transmitter and receiver through smoke medium

Research space – clear with Kamal about taking over space from waterbrake

Action Items

Study of Nozzle size and velocity and droplet size vs efficiency

Choose nozzle size/type

Smoke generator status update

Fan location/mounting chosen

Method of intake pressure measurement chosen

Opacity determination

Software system diagrams

Coffee Mates Meeting Minutes

Date: 23 October 2017

Location: UI Library

Members Present: Adam, Patrick, Sam, Will

Old Business

Burner equipment arrived – need to talk to Becky to locate

Wet scrubber – waiting on routing pipe

Nozzle testing not done yet

Swirl occurring with injection (good)

New Business

Lux sensors on way – determining if viable sensor for opacity measurement

Fan thoughts – use to force air from roaster (replace radiator fan in smoker)

4 weeks until design review – begin prepping

Action Items

Patrick

-Send costs list to Will

Team

-continue progress

Coffee Mates Meeting Minutes

Date: 30 October 2017

Location: UI Library

Members Present: Adam, Patrick, Sam, Will

Old Business

Smoker waiting on additional parts

Location issues – Kamal does not want our stuff by waterbrake location

Opacity meter

- Sam will handle – creating for another class

- created before end of semester

New Business

Vague and unsettling email from Leonard

- Concerns with wet scrubber

- Plan to call Thursday

- Meeting in NIATT conference room 3:00 (tentatively)

- Need to start researching alternatives again in case plan is scrapped

- scrubber development on hold for time being

Agendas – moving role to Sam to better balance team time (will update contract)

Portfolio and logbook check coming up again

Patrick wiki-master

- wiki check coming up

- send bios and pictures to Patrick for use

Action Items

Team

- Send bios to Patrick

- Research alternative filtration again

Patrick

- Update wiki page

- Get purchase order for when Steve is back

Update meeting minutes

Coffee Mates Meeting Minutes

Date: 2 November 2017

Location: UI Library

Members Present: Adam, Patrick, Sam, Will, Leonard (phone), Danny (phone)

Phone Call

Rival company VortX KleanAir has a wet scrubber solution

- Patent exists so we need to be careful

- Water line is okay

Design choice

- Need to defend why we want to do a wet scrubber

- Needs more... innovation.

- Explain why alternatives were not chosen

Design review

- Leonard is out of town 12-17th

- Plan tentatively for Friday 10th at 3:00**

- Choice defense primary topic

- Verify time/availability with Steve

Action Items

Team

- Prep for Design Review

- Prep for portfolio/logbook check

- Update schedule and problem statement to accommodate new criteria

- (If time) continue the actual building stuff part of the project

Coffee Mates Meeting Minutes

Date: 6 November 2017

Location: UI Library

Members Present: Adam, Patrick, Sam, Will

Old Business

Smoker – no development

Website – no development

Scrubber – tests tonight for nozzles

Steve

-Design Review date confirmed (10th at 3:00)

-Determine location

-Steve talking with Dev for BE shop space to not have to deal with Kamal's restrictions

New Business

Design Review

-Need powerpoint by Thursday Meeting with Steve

-Cover:

- Experimental design

- Webpage Design

- Design Validation

- Agendas

- Meeting Minutes

- Design Goals

- Summary of Progress

- Design Specs

- System Diagrams

-Meet tomorrow at Will and Adam's apartment to work on

Action Items

Patrick

-update meeting minutes

-update wiki page

Adam and Will

-Nozzle Tests

Sam

-Compile portfolio

Team

-Show up tomorrow night

Coffee Mates Meeting Minutes

Date: 18 January 2018

Location: Steve's Office

Members Present: Adam, Patrick, Sam, Will, Melissa, Steve

Old Business

Review of where the team left off last semester. Generating smoke and testing smoke abatement.

New Business

Create a testing plan to measure smoke output, temperature and water pressure.

Temperature sensors: thermocouple, check with BE department, other ideas?

Plan a phone call with Leonard regarding update and plans moving forward

Plan:

- Complete installation of nozzles
- Standardize beans
- Determine smoke output (either with smoke meter or photos and videos)
- Measure temperature
- Time smoke output

Action Items

Sam

- Email Leonard about phone call
- Email Dev regarding thermometers

Will

- Price check on various propane tanks
- Complete purchase order

Adam

- Install nozzles

Patrick

- Obtain thermocouple
- Complete smoke meter

Coffee Mates Meeting Minutes

Date: 25 January 2018

Location: Steve's Office

Members Present: Adam, Patrick, Sam, Will, Melissa, Steve

Old Business

Overview of weekend test run results

- Beans caught fire (spontaneous combustion)
- Measured temperatures with IR gun – reached 400F
- Smoke was not reduced at all from what was seen
- Did not have a smoke meter

New Business

Drew-up schematic of design in order to better understand and for Steve and Melissa to give input.

Changes to design moving forward:

- Replace PVC with stove pipe
- Push air with a high temperature fan
- Move nozzle locations

Discussed potential alternatives including an ESF

Need to obtain different temperature readers

Discussion of optional smoke generation: pellets, charcoal, etc.

Sam and Patrick to test other options for smoke generation

Action Items

Sam

- Purchase alternative smoke generation items

Will

- Install new nozzle location

Adam

- Research ESF design as alternative
- Determine competition pricing

Patrick

- Complete smoke meter

Coffee Mates Meeting Minutes

Date: 01 February 2018

Location: JML

Members Present: Adam, Patrick, Sam, Will, Melissa, Steve

Old Business

Overview of weekend test run results

- Pellets for BBQ cooking worked best
- Maximum temperature was 300F
- Smoke mimicked roaster
- Caught fire once exposed to high level of oxygen

Smoke meter

- Lux sensor is working
- May need to change mapping to determine light reduction

Awaiting response from Leonard for phone call date

New Business

Testing the smoke and scrubber combined to determine if smoke abatement occurs

Need to create a slider to control oxygen and fill cracks with tin foil

Nozzles need to be adjusted

- Try new placement
- Order new nozzles?

Team will meet over weekend to test run. Steve and Melissa will come to JML for next meeting and a preview of testing.

Action Items

Sam

- Email Leonard an update
- Purchase tin foil/insert into BBQ

Will

- Install new nozzle location

Adam

- Install new nozzle location

Patrick

- Complete smoke meter

Coffee Mates Meeting Minutes/Phone Call

Date: 08 February 2018

Location: Steve's Office

Members Present: Adam, Patrick, Sam, Will, Melissa, Steve

Old Business

Quick update regarding weekend progress

Questions and things to discuss with Leonard and Danny

Steve suggests continuing with ESF research and purchasing a small filter system

Phone Business

Update on smoke meter – progress and how it will work

Old design and testing summary

Discussion of future design – including barrel and different nozzles

ETA 2 weeks on having more testing

March 6th is snapshot – potentially Leonard will attend and have a design review

Nozzles – updated on specific Bete Nozzles. \$200/piece with a 5-week lead time

Open to ESP/wet scrubber combo (watch budget)

Document alternative ideas

Focus on wet scrubber

Another phone call before March 6th

Remember to plan for waste water

New Business

Rent a power washer as a pump for higher pressure nozzles

Research a variety of pump systems

Action Items

Sam

- Email Leonard an update
- Send info regarding snap shot

Will

- Find a way to purchase new nozzles
- Build stand for barrel

Adam

- Research pumps

Patrick

- Cut top off barrel

Coffee Mates Meeting Minutes

Date: 15 February 2018

Location: Steve's Office

Members Present: Adam, Patrick, Sam, Will, Melissa, Steve

Old Business

Barrel lid is cut

Stand is built to hold the barrel

New Business

Snapshot day: design review the same day, meet after snap shot at 5? Patrick will not be available that week

Reducing lid

- Create a cone using plexiglass and spread with a heat gun

Obtain a new fan to blow rather than pull. Ask Dietrich prior to purchase.

Nozzles from bete, order immediately

Smoke meter works and will now just need to be tested on the system

Pump – hold off for now because the nozzles operate at household pressure

Diagram – need to create a system diagram to send to Leonard (preferably with a program)

Action Items

Sam

- Email Leonard system diagram/update/regarding an extra fan
- Purchase filter

Will

- Email budget/nozzle information to team
- Purchase nozzles

Adam

-

Patrick

- Obtain materials for conical reducer

Coffee Mates Meeting Minutes

Date: 22 February 2018

Location: JML

Members Present: Sam, Patrick

Old Business

Adam and Will did not show

New Business

Snapshot: update PowerPoint with new information. Smoke meter, new system, photos, testing. Bring iPad to display photos and videos of smoke output

Design Review: update PowerPoint with new information (still waiting on date confirmation).

Conical reducer: carbon fiber, epoxy. Mold to custom create a design.

Connect fan to the system

Portfolio:

- Need meeting minutes from Patrick
- Agendas from Adam
- Need a summary of our testing completed

Action Items

Sam

- Find out plan from other 2 members moving forward on the design
- Email Steve a weekly progress report & Leonard
- Update portfolio

Will

- Work on nozzle array

Adam

- Work on nozzle array

Patrick

- Obtain materials for conical reducer/assemble

Coffee Mates Meeting Minutes

Date: 27 February 2018

Location: JML

Members Present: Sam, Patrick, Will, Adam

Old Business

Nozzle array – spoke with Steve and decided to use pre-made threaded pipe instead of custom design and having to hand thread.

Design Review- March 6th was denied and a new date has not been set yet.

New Business

Conical reducer – the epoxy/carbon fiber is not working and need new ideas.

- BBQ lid
- Garbage can lid
- Prefabricated reducer (for HVAC)

Test runs over the weekend

Leonard wants to schedule a trip to visit Sandpoint, will need to happen after Spring Break, shortly after.

Need to build a stand for the fan (no mounting brackets and heavy)

Need to wire fan

Action Items

Sam

- Email Steve update
- Email Leonard regarding Design review
- Continue with Portfolio update
- Complete Snapshot slides
- Upload photos/videos to iPad for snapshot

Will

- Work on nozzle array
- Stand for the fan

Adam

- Work on nozzle array
- Test water

Patrick

- Complete conical reducer

Coffee Mates Meeting Minutes

Date: 01 March 2018

Location: JML

Members Present: Sam, Patrick, Will, Adam, Melissa, Steve

Old Business

Showed new design and ran the new design with water – not all nozzles are putting out water

Fan – discussed location and showed output of air

Design review update – waiting on Leonard for a date

Conical reducer design

New Business

Need to secure fan wiring – came apart during demonstration, also not variable, only has 1 speed

Melissa suggested adding a hose to the end of the nozzle array to have 2 hoses for the 9 nozzles

Along with a new hose purchasing a pressure gauge to measure the pressure output by the hoses

Goal is to have test run smoke and wet scrubber combined to determine if smoke reduction occurs prior to snap shot day

Snapshot – will not be bringing design to the review (too bulky). But will provide photos and videos of smoke produced and the nozzle output

Action Items

Sam

- Email Leonard post testing of system
- Complete all for Snapshot
- Finish Portfolio

Will

- Work on nozzle array
- Stand for the fan
- Test water

Adam

- Work on nozzle array
- Test water

Patrick

- Send photo of smoke meter
- Meeting minutes (January)

Coffee Mates Meeting Minutes

Date: 08 March 2018

Location: JML

Members Present: Sam, Will, Adam, Melissa, Steve

Old Business

Showed new design and ran the new design with water – pressure doubled with 2 hoses. Nozzles are now unclogged and a pressure gauge has been inserted in line. Potential plan to meet with Leonard – either a trip to Sandpoint or they come down

New Business

Fan mount – ideally attach a fan mount to the barrel stand or weld to BBQ

- However for now utilize a temporary stand for initial testing

Testing is to be completed either before break begins or immediately following

- Team chose to meet Monday by 10:30am

Build carts so that system can be easily moved

Action Items

Sam

- Email Leonard regarding meeting and project update
- Research field filters (purchase immediately)
- Email Steve Monday 3/19 regarding plans for the week

Will

- Designing a structure for the fan (facilities might make it)

Adam

- Design structure for the fan mount

Coffee Mates Meeting Minutes

Date: 22 March 2018

Location: JML

Members Present: Sam, Will, Adam, Patrick, Steve

Old Business

Set up and ran the system to show successful smoke abatement

New Business

Fan – not fully secured and the blades slipped causing them to hit the side, will need to secure before test running again

Next steps – complete reducer and connect smoke meter

- Begin compiling data from smoke sensor

Action Items

Sam

- Email Leonard regarding meeting and project update
- Help Patrick complete sensor casing

Will

- Obtain reducing lid

Adam

- Research reducing lid

Patrick

- Complete smoke sensor casing