

Meeting 9

Date	Tuesday, 09 March 2021
Attendees	Dr Ali Yetisen (AY), Marie Jones (MJ), Mathusan Kandiah (MK), Zong Lee (ZL), Yuxin Liu (YL), Mustafa Naser (MN), Helen Ogbobi (HO), Wei Ooi (WO), Andreas Richardson (AR), Stephen Tan (SN), Sathurthini Thuraiatnam (ST), Mingchuan Zheng (MZ)
Apologies	
Chair	Helen Ogbobi
Secretary	Mathusan Kandiah

Minutes

Item	Discussion
General	<p>Progress (HO) Safety: LOPA analysis Control: Update P&ID Synthesis: Finished report Reactor: made progress with modelling</p> <p>Team allocation MJ on controls and YL on business but available to help with reactor Andreas checking aspen</p>
Synthesis	MJ: Finished report but needs proofreading, YL to export stream table, Currently finalising PFD
Reactor	<p>AR: Finally function reactor model in COMSOL. Temperature plot shows big hotspot from reaction. Speaking with Jason about a cooling pipe in centre of reactor to get rid of hotspot. Need to adjust parameters of geometry Adjust constants values for sensitivity analysis. WO to implement design into Solids works</p> <p>AF: Just one tube? AR: Multiple tubes but only modelling one, currently 7 tubes. Currently trying to put cooling tube down reactor AF: Catalyst is packed around? AR: Yes, Zeolite and silica carbide mixture</p> <p>AY: Cost implication from propanol to methanol MJ: Made the choice because methanol is easier to recycle so don't need fresh solvent, and methanol is cheaper than propanol</p>
Separations	<p>MZ: Crystalliser and wash column are finalised and British standards for mechanical design, especially wash column. Two components to design; wash column to separate solid from liquid.</p> <p>AY: What standards are used in China? MZ: Klaus told us to use British standards, and we are familiar with them AY: In reality, what standards are we supposed to follow? MZ: Not sure</p>

	<p>AR: Usually the British standards are just the ISO standards</p> <p>AF: National standards will be more stringent</p> <p>HO: Chris said that he prefers all team to use British standards also in terms of laws and regulations, but will take into considerations</p>
Safety	<p>HO: Finished HAZOP (need to tidy up table), LOPA- one major consequence and 3 initiating causes</p> <p>Waste treatment – Tried to treat all liquid waste streams, can reduce COD below 250 micrograms/L 1) wet air oxidation 2) coagulation 3) anaerobic digestions,</p> <p>Chris advised to just to incinerate the gas streams</p> <p>Approximate emissions for CO₂ and NO_x using balanced equations</p> <p>Look at embodied energy and get finished</p> <p>ST: Done F&EI, hope to get it done this week</p> <p>AA: Do you have a physical site in mind?</p> <p>AR: Required to specify on the city level</p> <p>MN: Economics expert said city level is enough, but we specified further due to china laws, can confirm at next expert meeting</p> <p>AA: Costing of that site can be incorporated</p> <p>MN: Price of land is considered</p>
Control	<p>MJ: Selected implementing recommendations e.g. new alarms, new control loops and adding actuators. Have been working on Gantt charts for start-up/shut down</p> <p>SN: Want to finalise alarms and interlocks systems but need to sort out some final details. Also want to explore more advanced controls i.e. multivariate control, model predictive control.</p>
Business	<p>MN: Created financial spreadsheet</p> <p>YL: Income statement and cash flow being worked on. Spreadsheet nearly finished except for CAPEX. Worrying that CAPEX is low due to small flowrates, therefore small pressure vessels leading to short payback period (1-2 years). Expert said its okay but consider why other companies haven't done this; maybe because we are continuous whereas others are batch.</p> <p>MN: Listed main 3 customers for Nitroma products. Need to finish off CAPEX, scenario analysis and report write up.</p> <p>AA: Payback period too short; maybe something wasn't accounted for?</p> <p>MN: All things were considered and were taken into account</p> <p>MN: Price contract agreed</p> <p>AF: Regarding CAPEX, is catalyst price accounted for?</p> <p>MN: Need to look at lifetime of catalyst and adjust to OPEX or CAPEX and will change payback period</p> <p>AF: Do you have providers of the catalyst? Has done it for design project</p> <p>AA: Did you use discounted cash flow method?</p> <p>YL: Not sure but will check</p> <p>AY: Graphs for cash flow?</p> <p>YL: Will get them by next week</p>
Admin	Project Timeline

	<p>Reactor AR : Bit behind. Reactor modelling to get sorted asap, might be done by today. Mech Design will take rest of the week. Maybe continue into report writing time next week. WO: Mechanical Design in parallel with design so can be implemented quickly</p> <p>Separations On track except writeup for report</p> <p>Safety Expected to finish waste treatment last week but progress with CO2 AND NOX emission is good. Graphs for fumigation plume diagram is an issue. Need carbon emissions from economics teams. LOPA and HAZOP will not take as long as expected</p> <p>Control On track, start up and shutdown, finalise P&ID. Qualitatively explore advanced control later.</p> <p>Business On track, CAPEX should be done by tomorrow, income and balance statements should be done by end of this week. Sensitivity and scenario analysis now. HO: Monday and Tuesday for the executive summary aswell as finishing other sections Report to be completed two days before deadlines Presentation prep over weekend</p>
AOB	<p>Mentimeter</p> <p>What's going well? Pressures with deadlines Games night is definitely helping</p> <p>What can be improved? Report write up needs to speed up – some people may not have time to write up while working</p> <p>SN: Better access to experts because only once a week so big decisions need to be made throughout the week. MJ: More tutorials with experts like the HAZOP at the beginning. MN: Official break during FYD to allow everyone to reset AR: Like SN, teaching assistants to help solve problems</p> <p>AR: Last meeting before presentation, can use for practice AY: Can have a test run if you like</p>

Actions

Description	Assignee	Due
Graphs for cash flow	Business	Next meeting
Complete parameter sensitivity analysis	Reactor	Next meeting
Consider international standards	All	Next meeting

Approval

Ali K. Yetisen
Ali K. Yetisen (Mar 9, 2021 15:20 GMT)

Dr Ali Yetisen
Facilitator

Helen Ogbobi
Helen Ogbobi (Mar 9, 2021 16:14 GMT)

Helen Ogbobi
Chair

Mathusan Kandiah

Mathusan Kandiah
Secretary









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Final Audit Report

2021-03-09

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