Meeting 8

Date	Tuesday, 02 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 Thurairatnam (ST), Mingchuan Zheng (MZ)
Apologies	
Chair	Mathusan Kandiah (MK)
Secretary	Zong Lee (ZL)

Minutes

Item	Discussion
General	**Address actions from last week (Separations and Business)** Separations(MZ): Not realistic to do 3D modelling on COMSOL, so will not pursue it. COMSOL will be used as a bonus feature software instead of the main modelling software. Only for specific detailed design. Business (MN): We can operate as a foreign-owned business in China because China is more open to foreign businesses in recent years. Risks include hostile attitude towards foreign companies, but we plan to hire local labour force to tackle this issue. **Menti improvement** AR: Daily check-in for our overall mood and any comments to be made. Been making decent progress with it. **Team Reallocation to EHS and Business** MK: Sathu is reallocated to the EHS team, while Bryan is reallocated to Business team.
Synthesis	YL: Change of solvent from propanol because it is difficult to separate it, and combustion of propanol will be needed to generate more heat for heat exchange network. But Our USP is CO2 free and green company, so we decided to switch to methanol. Easier to separate and reused. Optimising energy recovery. Currently energy requirement is reduced from 2.6MW to 2M. Andreas will check on ASPEN.
Reactor	AR: Using COMSOL and gPROMS at the same time. Already have modelling equations in place, ready to be implemented. We want to translate from '0D' to '3D'. Trying to tie COMSOL to ASPEN to get more accurate thermodynamic properties. We plan to do mechanical design next week (9/3). Jason's last meeting is this week. AY: Can you extract valuable information from COMSOL? AR: Not sure our flow regime. Current challenge is including reaction with the flow regime. COMSOL can do the CFD and is a shiny way to integrate mass and heat transfer easily.
Separation	MZ: Crystalliser has been finalised (dimension and output). Used better numerical correlation instead of empirical correlation. Tasks remaining are CAD for crystalliser and wash column. Will use British Standards

	for design of the vessel. Decided to use SolidWorks for pressure vessel design. MK: Learning CAD for mech design. Any resources available for us to learn SolidWorks? AY: All on youtube. Doesn't matter if it's from department or not. MZ: Any experts in the department we can consult? AY: Marsya (3rd mech design lecturer) Antonia: Ask your mechanical engineering friends! AR: Linkedin Learning has some resources as well. Can be accessed through Imperial. AY: It's a basic skill to learn how to model these. Make sure we learn it properly or we will struggle when we enter the workforce. Manual CAD drawing was taught in 1980 – 1990s. Solidworks is the go-to software for design nowadays.
Safety	HO: Wastestreams have high organic content without water. Will be sent straight to incineration (recommended by Chris and literature papers). Those that have a little bit of water will be treated. COD limit is 250 g/L but ours 10^6 g/L. Will need to process using 2 wastewater plants. Coagulation method reduces waste by 60-75%, second one will be decided based on cost and efficiency. Gaseous waste stream will go through incineration. Work out how much CO2 emitted and decide whether to use carbon capture system. Water waste stream will be completed today (2/3) and gas flume plots and embodied energy to be done by the end of the week. Remaining tasks are plant layout to be done by ST. HAZOP to be done this Friday as a group. Aiming to finish everything by next week, so the last week will just be used to proof read. Antonia: Have you considered condensing and recovering gaseous waste stream? HO: Looked at absorption but is not feasible. Will consider Antonia's suggestions. Antonia: Water streams seem difficult to use abatement.
Control	SN: 13 Automated control loops. Have feedback system to manage disturbances. Additional alarms to Producing P&ID containing all the alarms and control loop. Workshop on Friday will refer to the P&ID. Design safety interlocks which are procedures to take when alarm rings. AY: Control is one of the key components. Looks good, in the right direction. MJ: Meeting with Antonia today afternoon, will discuss about interlocks. AY: Use AI in control loops – future of controls! Antonia: Control is your USP to prevent future incidents.
Business	MN: Price agreement with David Edwards. Proposal sent for raw materials, catalyst, utilities and products. Our pricing strategy is penetrative pricing (price below market price). We can do this because our customers are sensitive to price. Plan to price at 12.5% below market price. EP1 is > $20 million/yr. CAPEX template has been created and works are being done to tabulate it. Aim to complete by end of this week. Remaining tasks next week are KPI, capital structure, scenario analysis. Bryan has joined the team so things will move much faster. AY: Who are your top 3 customers? MN: Still deciding, but need to research more before deciding.

	Antonia: Conglomerate buys through intermediary but hard to find sources because they don't usually reveal it. MN: Bryan finds Chinese sources through Baidu, so it should be relatively easier to get the necessary information.
Admin	**Project Timeline** Synthesis/Flowsheet: Slightly behind schedule. Report writing is delayed because we are waiting information from other teams. Reactor: Aim to complete modelling by this week. Will start mech design by next week. Separations: On track. EHS: On track but waste treatment is taking longer than expected. Aim to finish it by this week. Antonia thinks it's quite a lot of work to be done in EHS, so other members should help when they are done. Control: On track. P&ID to be done this week. Write-ups and SOP are scheduled to later this week and next week. Business: Slightly behind schedule (1 or 2 days) **Report** AY: Progress is good, look at report progress in the next meeting. Antonia, Abdullah, and Ali to be added onto Overleaf. Antonia: Get the contents page up to outline the skeleton to give a better idea of what to write.
AOB	Next meeting 9/3 (Tuesday) 12 pm.

Actions

Description	Assignee	Due
Include report progress in next week meeting's slides	All	Next meeting
Add Antonia, Abdullah and Ali to Overleaf	AR	02/03
Look at condensing and recovering gaseous waste stream	HO	Next meeting
Research on top 3 customers for our business	MN	Next meeting
Start planning for a celebration party 😊	HO	19/03

Approval

Dr Ali Yetisen *Facilitator*	Mathusan Kandiah *Chair*	Zong Lee *Secretary*

2021-03-02_minutes-signed

Final Audit Report 2021-03-03

Created:	2021-03-02
By:	Lee Hao (zhl4817@ic.ac.uk)
Status:	Signed
Transaction ID:	CBJCHBCAABAAZ6aypKwkvidXULYdBC1oPJjwr-CfM-vJ

"2021-03-02_minutes-signed" History

Document created by Lee Hao (zhl4817@ic.ac.uk)
2021-03-02 - 13:39:12 GMT- IP address: 129.31.225.108

Document emailed to Ali K. Yetisen (a.yetisen@imperial.ac.uk) for signature
2021-03-02 - 13:39:57 GMT

Email viewed by Ali K. Yetisen (a.yetisen@imperial.ac.uk)
2021-03-02 - 13:59:10 GMT- IP address: 90.255.18.139

Document e-signed by Ali K. Yetisen (a.yetisen@imperial.ac.uk)
Signature Date: 2021-03-02 - 14:05:15 GMT - Time Source: server- IP address: 90.255.18.139

Document emailed to MATHUSAN KANDIAH (mathusan.kandiah17@imperial.ac.uk) for signature
2021-03-02 - 14:05:16 GMT

Email viewed by MATHUSAN KANDIAH (mathusan.kandiah17@imperial.ac.uk)
2021-03-03 - 11:31:53 GMT- IP address: 90.205.159.79

Document e-signed by MATHUSAN KANDIAH (mathusan.kandiah17@imperial.ac.uk)
Signature Date: 2021-03-03 - 11:32:35 GMT - Time Source: server- IP address: 90.205.159.79

Agreement completed.
2021-03-03 - 11:32:35 GMT