

Patrick COSTELLO

PERSONAL DETAILS

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PERSONAL PROFILE

Originally from England, I am currently working for FarmChem Engineering Management Ltd. in Trinidad and Tobago. I am one of the lead engineers in FarmChem's sustainable development team, and their Carbon Capture Storage and Utilisation (CCUS) lead. In addition to this, between 2021-2023, I have been contracted to NiQuan's Gas to Liquids plant in Point-a-Pierre, Trinidad, in various roles such as: process engineer, process engineering consultant, commissioning engineer and turnaround support. I have also oversaw the design, construction and later upgrading of a blending system on behalf of GreenSol Ltd and Schlumberger, as well as conducting feasibility studies on a range of engineering projects.

EXPERIENCE

NOV 2021
-PRESENT

PROCESS/RENEWABLES ENGINEER AND CCUS LEAD

FarmChem Engineering Management Ltd, Trinidad & Tobago

- Produced many detailed reports pertaining to proposals in solar power, feasibility studies and CCUS.
- Producing an ongoing internal report, detailing both new and established carbon capture and utilisation technologies.
- Providing regular presentations on CCUS to FarmChem employees and directors.
- Attended the Carbon Capture Technology Expo in Houston Texas, in June 2022, and the European equivalent in Germany in October 2022.
- Building connections with relevant individuals and companies to advance FarmChem's drive into CCUS.

JULY 2023
-AUG 2023

PROCESS ENGINEERING CONSULTANT

**FarmChem Engineering Management Ltd, contracted at:
NiQuan Gas to Liquids Plant, Trinidad & Tobago**

- Assessed the feasibility of recommissioning an old hydrogen line to rework diesel and/or naphtha from the bulk storage tanks through the fractionation system.
- Calculated the conditions downstream of this line, in order to determine the suitability of a particular control valve, which was to be installed. For the same control valve, the CV was considered, to find the normal and maximum valve openings required.
- Investigated an overpressure scenario on the naphtha overhead drum, found existing measures to be inadequate, and pursued an MOC to correct this by opening an XV and thus utilising an existing line to flare.
- In doing this, calculated maximum flow and pressure in the flare line, and confirmed that line size would be adequate as to not cause choked flow and a back pressure.
- Delved into the existing MOC and temporary MOC systems, and pushed the closing-off of completed MOCs and the status of expired temporary MOCs, in order to facilitate the re-issuing of all P& IDs to as-built.
- Oversaw upgrades to the DMDS system, the reinstallation of the upgraded system, and relevant updates to the P& IDs.
- Oversaw the installation of a new MEA system and design of a new P& ID to show this.
- Worked with vendors to determine an efficient unloading procedure of activated carbon in the dual media filters.
- Considered tank schematics and the volume of carbon removed, determined the quantity of carbon lost, and hence required for procurement.
- Consulted the vendor with regards to the required properties of the carbon to be, and the suitability of available anthracite as a replacement.

MAY 2023
-JUN 2023

ENGINEERING DESIGN AND MANAGEMENT: BLENDING SYSTEM

**FarmChem Engineering Management, on behalf of:
GreenSol Ltd. and Schlumberger, Trinidad and Tobago**

- Managed the upgrade works of the blending system, which involved the addition of a new hopper and upgraded pumps, as well as required changes to piping size, specifications and layout, as a result.
- Assessed the requirements of a new hopper for the blending system.
- Analysed the new requirements of the blending pumps, and the suitability of the existing pumps to meet this.
- Sourced new blending pumps to meet the required specifications.
- Sourced the required piping, valves and fitting for the new layout.
- Designed the new piping layout, and oversaw construction of the upgraded system.
- Conducted the upgraded system's first blending operation, in partnership with Schlumberger representatives.

MAR 2023

PRE- FEASIBILITY STUDY: SOLAR ENERGY FOR GAS REDUCTION
FarmChem Engineering Management Ltd, on behalf of:
Proman, Trinidad & Tobago

- Assessed the feasibility of using an on-grid solar power system to offset some natural gas usage, reducing the impact of gas curtailments by NGC and hence improving production consistency.
- Investigated potential options, with regards to carbon credits in Trinidad & Tobago.
- Sourced key equipment, such as solar panels and inverters.
- Calculated key values such as: solar power to natural gas equivalence, and avoided natural gas cost.
- Produced a cost analysis on the project, including payback time.
- Analysed the scale-up potential of the project.

JAN 2023
-MAR 2023

ENGINEERING DESIGN AND MANAGEMENT: BLENDING SYSTEM
FarmChem Engineering Management, on behalf of:
GreenSol Ltd. and Schlumberger, Trinidad and Tobago

- Managed the design and construction of a blending system for GreenSol Ltd, consisting of three blending tanks and associated water tanks, pumps and piping for the purpose of mixing mud for Schlumberger to supply to offshore drilling applications.
- Designed the piping layout of the system, and location of vessels, pumps, hopper and generator.
- Sized and sourced all components of the system, excluding the vessels and generator.
- Oversaw the mechanical and electrical testing of the pumps, generator and agitators.
- Conducted the system's first blending operation, in partnership with Schlumberger representatives.

MAY 2022
-NOV 2022

COMMISSIONING/PROCESS ENGINEER
FarmChem Engineering Management Ltd, contracted at:
NiQuan Gas to Liquids Plant, Trinidad & Tobago

- Worked closely with NiQuan's process engineering team, and provided regular DCS support.
- Produced a range of engineering reports, including calculations, for the client including: syngas compressor polytropic efficiency, syngas to FT loop reduction and the requirements of an additional process condensate stripper column.
- Authored several procedures for the client, including compressor overspeed tests and chemical cleaning of heat exchangers.
- Designed an additional tray for the process condensate stripper, in order to improve its efficiency.
- Calculated a steam to condensate ratio for the same stripper, to improve its efficiency further.
- Sized multiple orifice plates for different systems within the facility.
- Confirmed the suitability of key mechanical equipment through calculation, such as heat exchangers and pumps.

MAR 2022

FEASIBILITY STUDY: BLENDING AND STORAGE FACILITY
FarmChem Engineering Management Ltd.

- Analysed market data on the worldwide and local consumption of chemical products, such as: methanol, xylene, caustic soda and sulphuric acid.
- Investigated the specific market opportunity in Trinidad, Guyana and Suriname for such products.
- Evaluated the capacity of the facility, storage tanks and equipment.
- Assessed the condition of such existing tanks and equipment, the repair work required and sourced quotes to show these associated costs.
- Provided a project timeline, accounting for such repair works, to take the facility from its current state to fully operational.
- Presented the potential risks and benefits of the facility through the projected OPEX and CAPEX, as well as projected sales data, via a 5-year forecast to give measurable outputs such as: net-present-value, and internal rate of return.

DEC 2021
-FEB 2022

TURNAROUND PROCESS ENGINEERING SUPPORT
**FarmChem Engineering Management Ltd, contracted at:
NiQuan Gas to Liquids Plant, Trinidad & Tobago**

- Provided updates to P& IDs during turnaround.
- Supported the cause and effect analysis of the plant.
- Assisted with process engineering support for the HAZOP of the facility.

MAR 2021
-NOV 2021

DATA ANALYST AND CONTINUOUS IMPROVEMENT TEAM LEAD
Beelivery, United Kingdom

- Responsible for setting goals and daily plans for the team.
- Selected suitable training courses for the team.
- Provided 1-1 training with team members on topics including Lean Six Sigma and FastStats.
- Conducted employee appraisals .
- Implemented a late-night surcharge between 9pm-5am, to improve the number of drivers working at night, and improve cancellation rates.
- Completed feasibility studies on suggested improvement projects.
- Analysed driver and customer behaviours on a geographical level.
- Analysed company income and profits to a very high level of granularity as part of sourcing potential investments into the company.

JUNE 2021
-NOV 2021

MECHANICAL DESIGN ENGINEER
Beelivery, United Kingdom

- Designed a prototype E-Foil on CAD software Fusion 360.
- Sourced the relevant E-Foil components from around the UK, including custom-built 3-D parts such as the propeller housing, as designed.
- Built and tested the E-Foil prototype, with success.
- Conducted research interviews with sailing enthusiasts, as to ascertain the viability and demand of an attachable electric foil for a laser sail boat.
- Began CAD on the laser foil prototype.
- Analysed company and market data on bicycles and E-Bikes as part of a feasibility study and potential roll-out plan for a fold-able E-Bike to Beelivery riders and the general public.
- Created various concept designs on CAD for the fold-able E-Bike.

EDUCATION

Undergraduate Degree in Petroleum Engineering at the
UNIVERSITY OF ABERDEEN
(September 2015 - June 2019)
First Class with Honours

Dissertation Title: Modelling of mineral wettability to oil and water based on the modified DLVO theory- application to miscible CO₂ injection and carbon dioxide geological storage

Dissertation Grade: First Class, with Honours

- Produced and analysed a range of mathematical models, showing the wettability profile of a water/brine, oil, mineral interface below the subsurface - using existing literature.
- Adapted these mathematical models, to produce unique models showing the profile of a supercritical carbon dioxide, oil, mineral interface below the subsurface - with relevance to carbon dioxide injection for sequestration and enhanced oil recovery.