DOCUMENT FACEPLATE

CLIENT:	Gas Networks Ireland
PROJECT:	CGI Facility for Biomethane
TITLE:	Front End Engineering Design Summary Report

1.0 INTRODUCTION

Gas Networks Ireland (GNI) have appointed Fingleton White (FW), NeoDyne (ND) and Fehily Timoney (FT) as consultants to carry out the design of a proposed Central Gas Injection (CGI) facility close to Mitchelstown. This includes the design of decanting units, pressure reduction skids, metering, compressors, gas analysers, interconnecting pipework, injection facility and tie-in at Corracunna AGI.

2.0 DESIGN

FW's design proposal incorporates a CGI facility adjacent to Corracunna AGI. The CGI design parameters are as follows:

Parameter	Value
Design Pressure	250 barg
Minimum Inlet Pressure	20 barg
Maximum Decanting Time	4 hrs
Maximum Operating Flow	20,000 SCMH (i.e. 8 trailers decanting)
Minimum Operating Flow	500 SCMH (CV analysis flowrate through BNEF on initial startup)
Minimum Outlet Pressure	40 barg
Maximum Outlet Pressure	70 barg
Inlet & Outlet Design Temperature Range	-20°C / +60°C

Table 1 – Station Design Parameters

The principle design codes and standards used in the design modifications are listed below, the latest edition applies. The design, as a minimum, meets the requirements of the following standards:

Document No.	Document Title
I.S. 328:2015	Code of Practice for Gas Transmission Pipelines and Pipeline Installations and amendments
ASME B31.8 2016	Gas Transmission and Distribution Piping Systems
I.S. EN 12186:2014	Gas Supply Systems – Gas Pressure Regulating Stations for Transmission and Distribution - Functional Requirements
I.S. EN 12583:2014	Gas Infrastructure – Compressor Stations – Functional Requirements

Table 2 Principle Standards

The facility, as a minimum, shall be subject to the following non-exhaustive list of regulations:

- Control of Major Accident Hazards (COMAH) Regulations 2015
- ATEX Directive 2014/34/EU
- Pressure Equipment Directive 2014/68/EU
- Machinery Directive 2006/42/EC
- Pressure System Regulations (S.I. No. 445 of 2012)
- Planning & Development Regulations
- 2014 Environmental Impact Assessment Directive
- Energy (Miscellaneous Provisions) Act 2006
- Natural Gas Safety Regulatory Framework for Ireland CER/17/103

- Safety, Health and Welfare at Work Act 2005
- Safety, Health and Welfare at Work (Construction) Regulations 2013 (S.I. No. 291 of 2013)
- European Agreement Concerning the International Carriage of Dangerous Goods by Road (ADR)

A designer's risk assessment is maintained throughout the design process.CER/16/106 ALARP Guidance Part of the Petroleum Safety Framework and the Gas Safety Regulatory Framework will be referred to along the HSE guidance for Land Use Planning. Along with the general principles of prevention and industry standards, Measurement Risk Assessment HAZID, QRA, HAZOP, LOPA workshops and studies have been carried out as part of the design to ensure the design risk is managed to ALARP.

3.0 OPERATION

The station is capable of injecting gas over 24 hours, however deliveries will be restricted to be 08:00 to 20:00 7 days a week. Facilities for two full time GNI personnel and 5 drivers are included in the design.

The 8 no. modular bays feed the gas into a common header towards a BNEF unit, where it is enriched with LPG, odorised, metered and passes through a Remotely Operated Valve (ROV) before entering Corracunna AGI.

The facility is completed with 2 no. Packaged Boiler Units, a CNG refuelling unit for outgoing trailers, LPG tanks, a fuel gas skid and a gas flare system.

The biomethane CGI facility comprises several pieces of equipment which ensure that the biomethane is compliant with all necessary standards and regulations, before it enters the transmission gas network. Producers must deliver biomethane which is compliant with the requirements of the GNI Biomethane Network Entry Facility Specification.

The CGI facility is required to perform:

- Gas analysis for compliance monitoring
- Pressure reduction and control
- Metering
- Enrichment with LPG to meet CV value and Wobbe Index requirements
- Odorant injection
- Telemetry required for monitoring the biomethane flowrate, CV, gas quality, temperature and pressure, and for the closure of a Remotely Operated Valve (ROV), to ensure biomethane that is out of specification does not enter the network.

The biomethane is delivered to site via road tankers which are connected up to decanting stanchion units with flexible hoses. When a truck is connected, a gas sample is automatically taken and only if all gas parameters are compliant with the agreed gas specification, shall the inlet valve open to allow the gas into the facility. If not, the gas shall be rejected and the tanker sent away.

The nominal pressure in the tankers upon arrival is 250 barg which is let down to line pressure with a PRS arrangement per bay. The gas is then enriched with LPG to meet the requirements of the code of operations. Gas is continuously being sampled during enrichment and when correct dosage level has been reached, the gas to grid valve will open.

The biomethane is then odorised in line with gas odourisation at all entry points to the Irish gas network. It passes through a network operator controlled ROV valve which isolates the

biomethane site from the gas network and is seen as the final safety mechanism before grid entry.

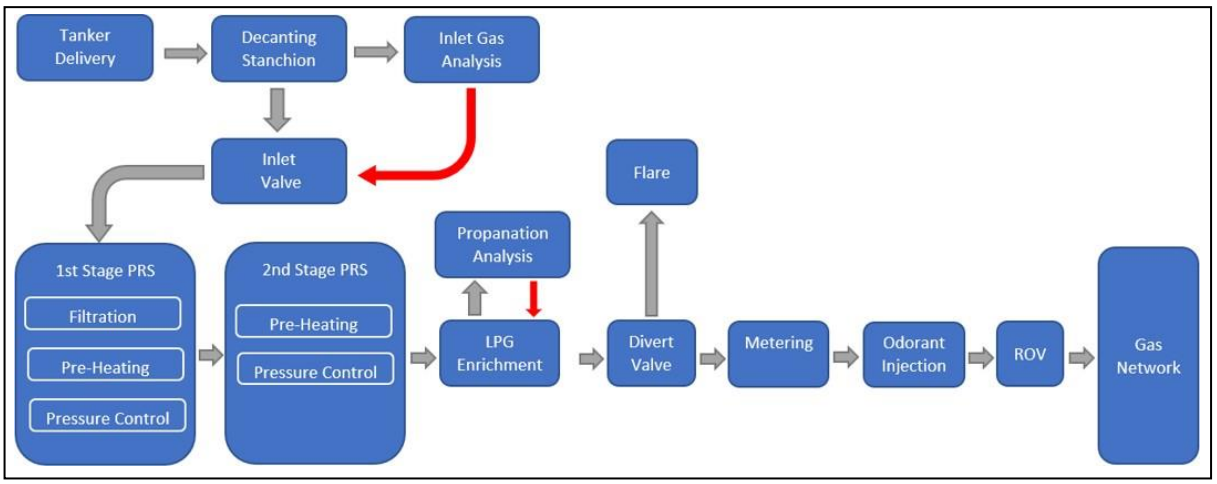

Figure 1 – Biomethane Injection Process Map

Figure 2 - 3D VISUALISATION

4.0 PLANNING

A planning application for the CGI facility has been granted Cork County Council following the completion of a HAZID for the project, to ensure any findings raised are captured at planning stage. The application was subject to appeal to An Bórd Pleanála, which it again was granted.

The site has been classified as a lower tier establishment under the COMAH Regulations, which means the requirements of the Regulations in relation to risk assessment, notifications to the HSA, preparation of a safety management system, a major accident prevention plan, etc. will have to be complied with in full.