



PIPELINE PROCESS ENGINEERING
FLOW ASSURANCE
PIPELINE SERVICES
MULTIDISCIPLINARY ENGINEERING

MISSION

Streamline is a young and dynamic Pipeline Engineering Company with Offices in Milan, Italy.

Our Mission is to give the support to Oil & Gas Companies through the Engineering & Services activities to ensure the pipelines are designed, built and operated in the safest and most efficient way throughout their life.

Streamline staff has over 15 years of experience in the Pipeline Design and Services. Our strength is the Thermo-Hydraulic Analysis, both in the Upstream (Flow Assurance) and Down-

stream; always adopting the most advanced technologies available on the market.

Company's core business is the Process Engineering, Technical Support for Pipeline Services and Multidisciplinary Projects starting from Feasibility Study, through FEED up to the Detailed Engineering and Follow up.

Streamline Engineering is a part of Simeco Group; this allows to Streamline the operation in the entire Engineering field by integrating its staff with dedicated and skilled people.

CORE BUSINESS DESCRIPTION

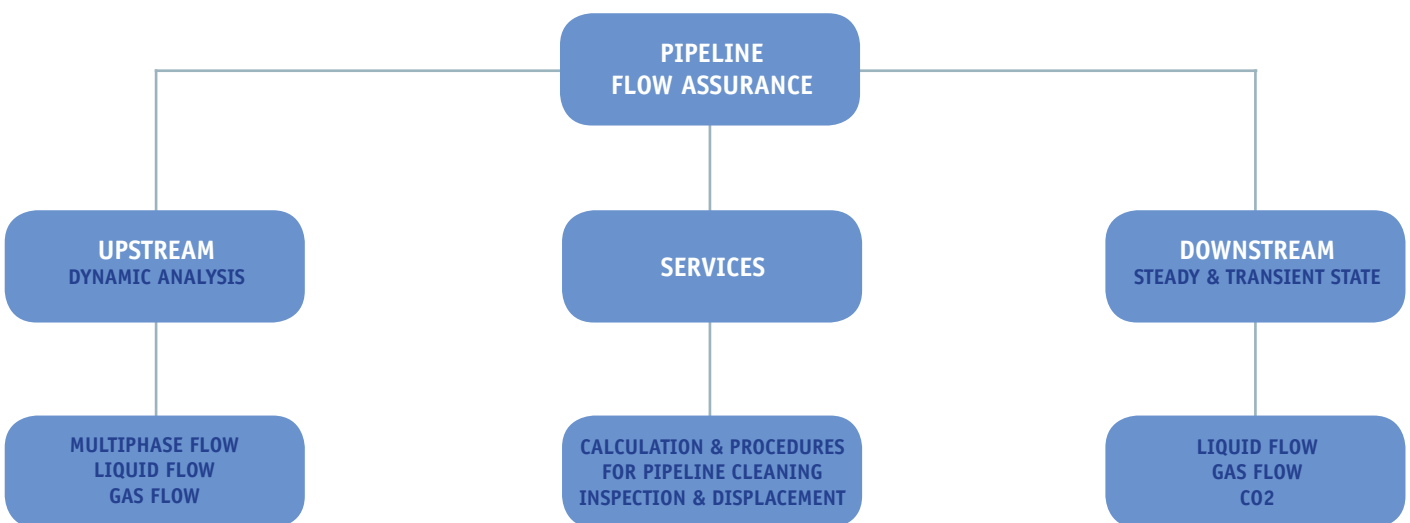
Over the years, Streamline has been engaged in various Oil & Gas Projects, in Italy and on international level.

Our Company supplied procedures for liquid pipelines' displacement with Nitrogen, as well as for their refilling; we issued Pipeline Pigging Philosophies for Multiphase Flow Seelines in the North Sea. Moreover, we assisted the preparation of the FEED documentation for large-diameter Liquid, Gas and LPG Pipelines. For all these Projects we carried out detailed simulations running our Software or, when their effectiveness has not been proven, generating customized models.

When it comes to the calculation tools, they enable the development of all the common calculations required by a Pipeline

Thermo - Hydraulic Analysis. The software used for the multiphase liquid calculations is a semi-dynamic CFD software, able to handle the variations in fluid state over the time and along the pipeline length. The software is capable of simulating Pipeline Slug Formation, Pigging, Start-up and Cool-down, as well as the Pipeline Filling and Emptying and Corrosion Inhibitor Tracking.

However, Liquid Pipelines' waterhammer and surge transient events are analysed by means of another specialized tool, able to handle pipelines having various characteristics, incorporating an integral steady-state solver to calculate the initial conditions and seamlessly transfer these to the transient solver.



Pipeline Flow Assurance results have been used as a base for development of Multidisciplinary Projects of different level: Feasibility, FEED and Detailed Design. However, involvement of other departments (Civil, Mechanical, Piping, Instrumentation & Telecommunication) is essential, especially in advanced project stages.



RECENT PROJECTS

In the recent past Streamline has been involved in several Projects for many Clients. Some of them are:

[Venezia – Mantova DN20”+10”. Pipeline Re-conversion. Detailed Engineering.](#)

Plant: Porto Marghera Pumping Station; Worked Products Pipelines of diameter 20” + 10” and length 2.5 km + 125 km; Mantova Arrival and Storage Facilities

Description: Re-conversion feasibility study was composed of Hydraulic Study for Worked Products and Spillage Analysis necessary for identification of valves to be motorized. The following step was the Multidisciplinary Detailed Engineering relative to the plants of Porto Marghera and Mantova, which incorporated the works of Pipeline Process (P&ID, lines and equipment sizing, operating philosophy), Mechanical (safety & slop tanks with respective pumps, relief and safety valves), Piping arrangement and Stress Analysis, Civil (documentation for construction permits, sizing and drawings of reinforced concrete), Instrumentation and Electrical Works (instruments’ specifications), as well as Hazardous Areas Classification. Finally, technical support was provided for pipeline displacement.

Client: MOL Group / Foster Wheeler (Italy)

[Venezia Refinery. 42” Pipeline Re-conversion. Revamping of Isola dei Petroli. FEED Engineering](#)

Plant: Pipeline San Leonardo – Isola dei Petroli, Diameter 42”, length 11 km; Isola dei Petroli.

Description: The first step was the Feasibility Study, namely Hydraulic Study and basic P&IDs’ elaboration with an aim to propose the solution for Worked Products’ transfer. In the next phase, FEED, re-vamping of Isola dei Petroli was carried out, including lines and equipment sizing and specification, along with detailed mechanical drawing preparation.

Client: Eni R&M (Italy).

[Pegli – Sannazzaro DN32”. Pipeline displacement.](#)

Plant: Crude Oil Pipeline Pegli – Sannazzaro, Diameter 32”, Length 90 km

Description: Displacement and filling calculation and procedures were prepared, in order to insert two valves along the pipeline DN32”, connecting Genova and Ferrera, whose total length is 90 km, but the displacement has been carried out for a 20 km long pipeline section.

Client: Eni (Italy)

[Technical support for sealines’ cleaning and inspection.](#)

Plant: Natural Gas Sealines Luna B – Luna A, BEAF – Luna A and Luna A – Crotona, interconnected with platforms and of respective diameters 14”, 10” and 16”.

Description: Operability analysis of three sealines with an aim to predict the outcome of sealines’ cleaning and subsequent inspection.

Client: TECMA & Ionicagas (Eni) (Italy).

[Feasibility Study for Sour semi-Coke gas transportation.](#)

Plant: Gas-Condensate Pipeline of length 18 km

Description: A feasibility study was performed with the aim to assess the design of a 18 km long pipeline transporting semi-coke gas, produced as by-product in the production of shale oil. Flow assurance studies, process and pipeline engineering and budget quotation of the entire pipeline were the main activities.

Client: Foster Wheeler (Italy).



[Spillage Analysis. Leak Detection Study and Main Line Valves motorization.](#)

Plant: Worked Products Pipelines, Diameter 16" and 8", length 26 km max el. 520 m.

Description: Analysis of spilled liquid volume due to leak in pipeline was carried out with the scope to identify the position of valves to be motorized, in order to improve pipeline safety and introduce new LDS methods.

Client: Iplom (Italy).

[Hydraulic Study and DCS System Design of Northern Italy Pipeline Grid](#)

Plant: System of pipelines connecting the Pumping Stations, Nodes and Plants: Multedo, San Quirico, Arquata, Lacchiarella, Nodo Berck, Busalla, Nodo di Zinasco, Nodo C, Cremona, Trecate.

Description: Hydraulic Studies in Steady State and Transient Condition, followed by Cause & Effects Matrices' definition, relative to six bi-directional pipelines having 10 pumping directions.

Client: Sigemi (Italy).

[Project: LC02 Separation Plant. Process & Thermodynamics.](#)

Plant: Separation Unit to clean Cuttings from HCs'.

Description: Design of Pilot Unit capable of cleaning the oil of cuttings, remaining from drilling processes, and even the ground debris, using the solvent power of CO₂ in its liquid state.

Client: MI-SWACO/Fedegari

[Nord Stream Pipeline. Landfalls Process Engineering.](#)

Plant: Twin Gas Sealine, Diameter 48", length 1250 km.

Description: The focus of the project were engineering of Pig Trap Area and Pre-commissioning, Commissioning, Operating & Pigging Procedures, as well as Blow Down Study.

Client: Saipem (Italy).

[EL-Merk EPC Contract. Pipeline Flow Assurance.](#)

Plant: Five Flowlines (DN 6 and DN 8) and three Pipelines (DN 18)

Description: Flow Assurance for Fuel Gas Production, Initial Start-up and First Oil Production Phase of X-mas tree production

Client: ABB (Italy)

[Project: Bordolano Early Injection Plant. Basic & Detailed Multidisciplinary Engineering.](#)

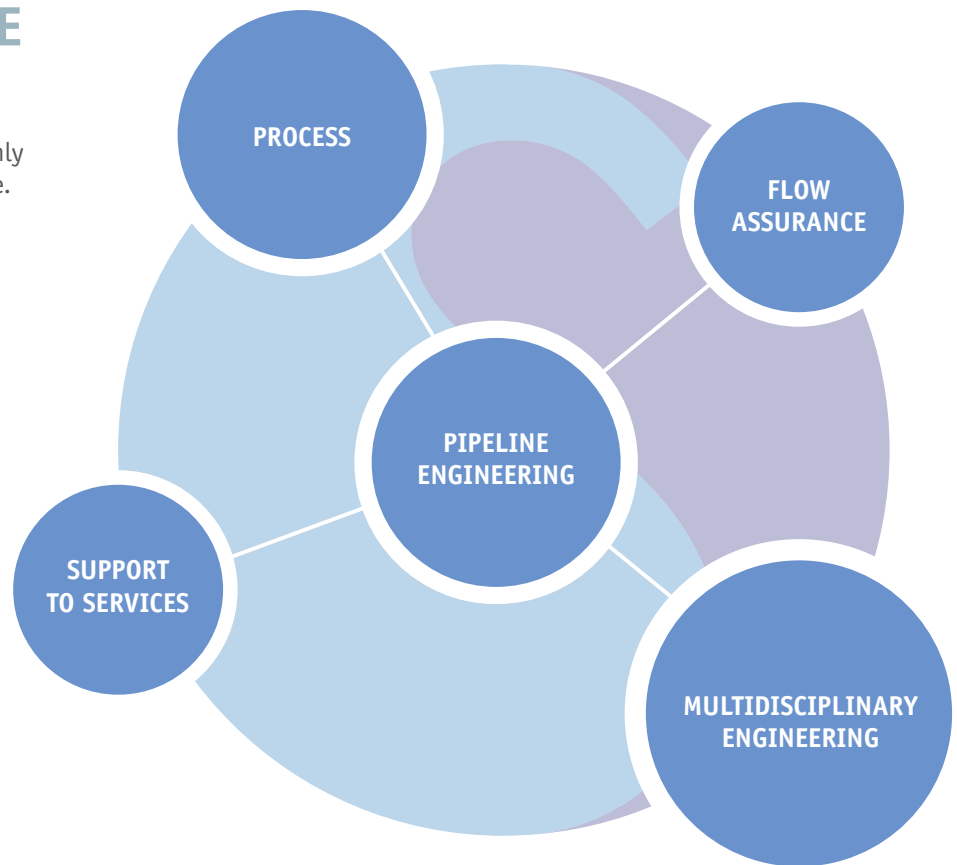
Plant: Compression Units

Description: Compression Units to Inject Gas in order to create the reservoir cushion

Client: Bonatti/Eni (Italy)

AREAS OF EXPERTISE

Streamline main activities may be roughly divided into following areas of expertise.



Pipeline Flow Assurance

In the area of Pipeline Flow Assurance, the transport of the multiphase fluid is followed from the reservoir to point of sale. Our studies cover the pipelines carrying various kinds of fluids, having a wide range of diameters and diverse lengths. Both flat and hilly-terrain pipelines have been covered by our studies. When it comes to the transported fluids, our staff has experience in the pure liquid, gas and multiphase pipelines, as well as the LC02 & SCC02 installations.

Hydraulic calculations are foreseen in the steady-state condition for all kinds of transported fluids. For the Liquid Pipelines a transient surge analysis is foreseen, and it entails valves' closure and safety system verification. For the Gas and Multiphase Pipelines, a dynamic analysis, including pipeline start-up, pigging, ramp-up and turn down operations, is provided. Also, pipeline filling and blow down make part of final report.

Pipeline Process

When it comes to the area of Pipeline Process, it comprises the definition of the entire pipeline process, starting from the Pump/Compressor Station and ending with the Receiving Tank or the tie-in with the sale point. Process definition activities include PFD and P&IDs' drawing, definition of diameters, valves and equipment to be installed, and machinery specification. Furthermore, it brings together departments of process engineering and instrumentation, resulting in development of operating philosophies, whose aim is to guide management of plants and pipelines in a safe way.

Technical Support for Pipeline Services

The area covering the Support to Pipeline Services includes preparation of procedures for Pipeline Cleaning, Nitrogen Displacement and ILI Specifications. Furthermore, our staff is experienced in following on site the above mentioned activities.

Multidisciplinary Engineering

Multidisciplinary Engineering activities include basic study prepared by Flow Assurance and Pipeline Process Departments, followed by documentation elaboration by the following departments: Civil, Mechanical, Piping and Instrumentation.

Civil department provides technical specifications necessary for construction permits and develops sizing, calculation reports and drawings of reinforced concrete. Mechanical department is in charge of equipment sizing and specifications (pumps, storage tanks, safety valves and safety tanks, pig traps, etc.), as well as Stress Analysis, while the Piping department is responsible for piping arrangement. Instrumentation department covers vast area of activities, from instrument specifications to Leak Detection and SCADA System Optimization.



SOFTWARE

Streamline Engineering can help you adopting the most advanced technologies on the market. Following a list of the major Software adopted by our staff:

Kongsberg - LedaFlow

It is a semi - CFD Software; its powerful can allow to cover all the calculations required by a Pipeline Flow Assurance Study. The software can model, Dynamically, all kind of fluid in any kind of state (Gas, Liquid or Multiphase).

KBC – Multiflash

It is a PVT and EOS modelling software package dedicated to modelling of reservoir fluids phase behaviour and evaluation of fluids' physical properties.

AFT – Impulse

It is a liquid systems dynamic simulation tool used to analyse the pipeline and piping systems in terms of pressure surges and transients. Differential equations are solved adopted the Characteristics Method.

AFT – Fathom

It is an incompressible flow analysis tool, with thermal analysis capabilities including piping heat transfer, heat exchanger modelling and variation of fluid properties.

AFT – Arrow

It is a compressible flow analysis tool, with thermal analysis capabilities including piping heat transfer, heat exchanger modelling and variation of fluid properties.

COADE – Caesar II

It is a CFD Software for Piping and Pipeline Stress Analysis.



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