

ABSTRACT

- Oil and Gas separation facility capable of treating 12920 barrels of oil per day, and 17260 Mscf of gas per day.
 - Separates emulsion from 10 wells into oil, gas, and water.
- Equipment for the facility include:
 - 10 3-phase separators
 - 1 heater treater
 - 5 storage tanks
 - 1 vapor recovery unit (VRU)
 - 1 High Pressure Flare Knockout Drum
 - 1 Low Pressure Flare Knockout Drum
 - 1 Dual HP/LP flare stack
 - 1 Fuel gas scrubber
 - 2 Water Transfer Pumps

INTRODUCTION

- Oil batteries are a major component of the upstream oil and gas industry. After oil wells are drilled and completed, production commences. Production consists of pumping or free flowing the well's emulsion to surface, then transporting to a separating facility (oil battery).
- In this case the produced emulsion from the wells consists of oil, water, and gas that was stored within the pore spaces in the reservoir.
- Once this emulsion reaches surface it is transported to a processing plant, most commonly through a pipeline.
- At the processing facility (oil battery), there are many ways to achieve successful separation by different combinations of a variety of available equipment.
- The separation process can vary immensely between locations and is commonly designed based on oil, water, gas percentages/compositions and regulatory requirements in the area.
- Once separation of the emulsion is achieved, oil is transported to sales by truck or pipeline, gas is transported to sales by pipeline, and water is commonly stored in tanks and trucked out or sent to disposal wells nearby.

SAFETY AND RELIABILITY

- Oil and gas separation facilities are complex systems that must be carefully designed, built, and operated for optimal reliability and best safety. From the construction to end of life for this facility, H2S and first aid permits will be required from all employees and contractors.
- At the design stage, the facility's layout, material, and equipment being selected, along with rates at which water, gas, and oil will flow all must be considered.
- Once underway on this project's completion stage, comprehensive testing of every system within facility will ensue with thorough inspections carried out guaranteeing no apparent risks pose any harm for users occupying premises afterwards.
- While the facility is under operation, proper training of the operators (including use of required PPE) and skill development will determine how well an oil and gas separation facility performs. The procedures used by the producing company and materials used including the pipes, control systems, and separation apparatus, must be fully understood by each operator. Routine inspections, maintenance, and repairs are required to keep the facility in good working order and assure reliability.

EQUIPMENT SIZING

- The equipment for the facility is the following sizes:
 - 5ft x 22ft 3-Phase Separators
 - 6ft x 20ft Heater Treater
 - 24ft x 25ft Storage Tanks
 - 7.5ft x 3ft Low Pressure Flare Knockout Drum
 - 10ft x 4ft High Pressure Flare Knockout Drum
 - 5ft x 1.33ft Fuel Gas Scrubber
 - 3x4 inch Water Transfer Pump
 - 98ft Dual HP/LP Flare Stack
 - 904 Mscf/d Vapor Recovery Unit

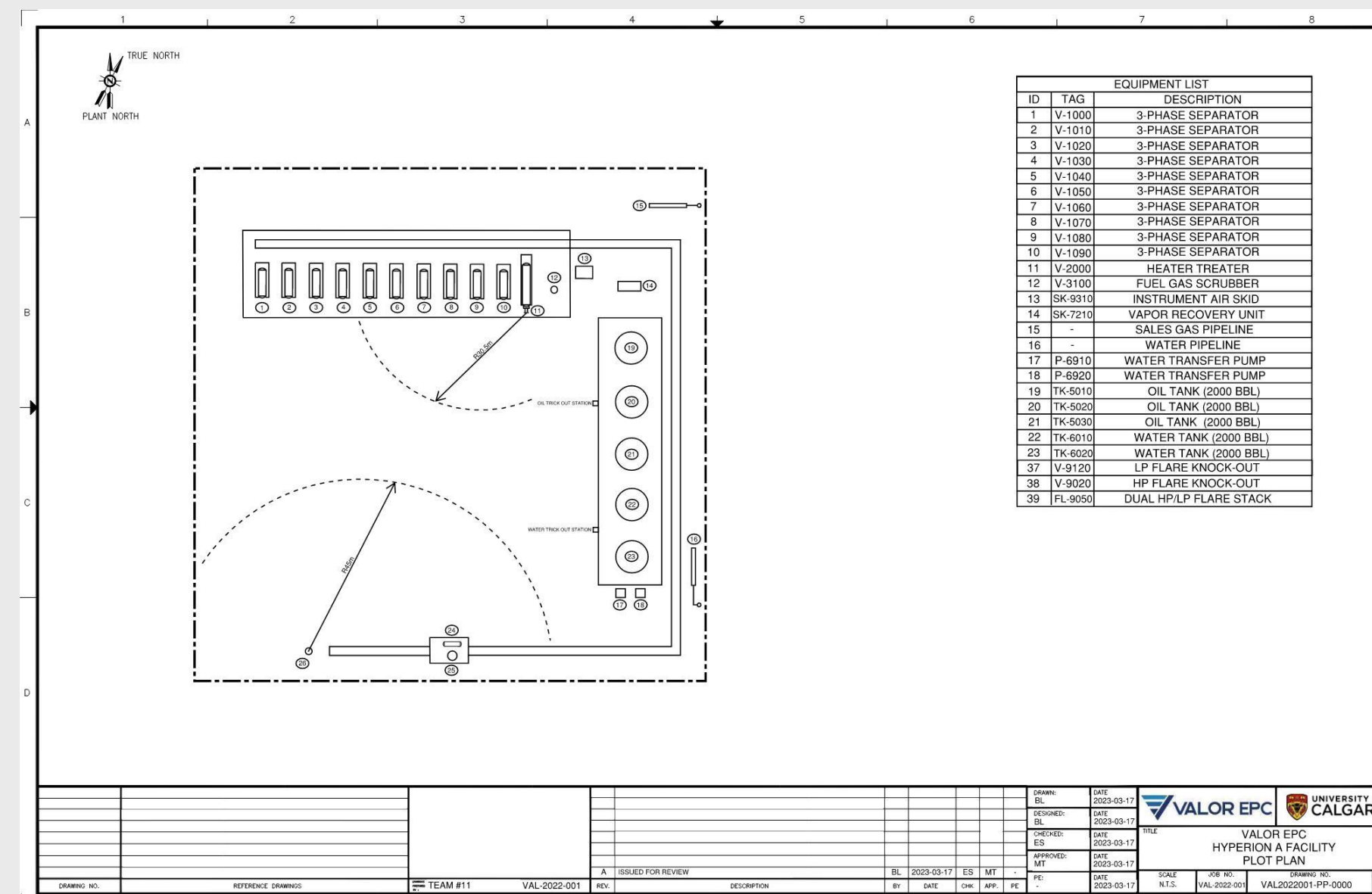


Figure 1. Plot Plan

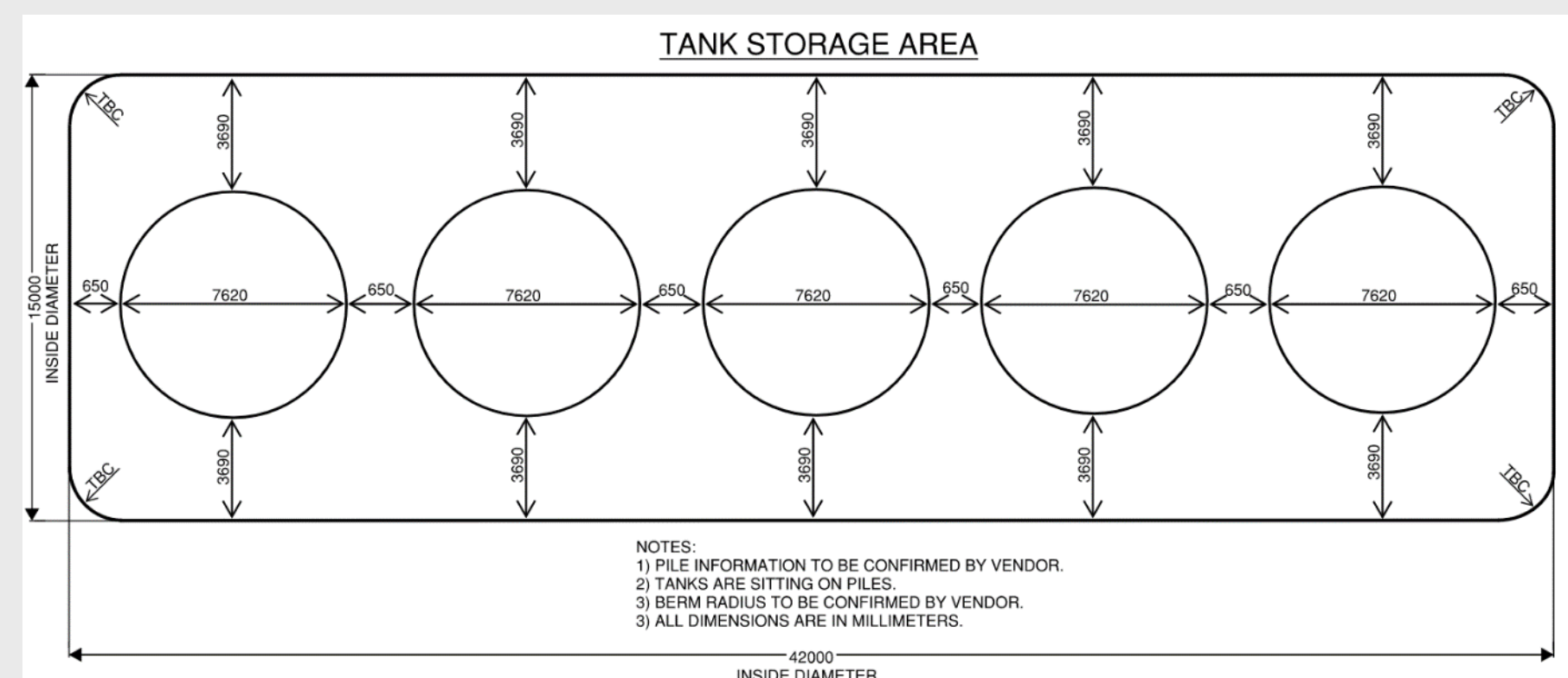


Figure 2. Tank Storage Area

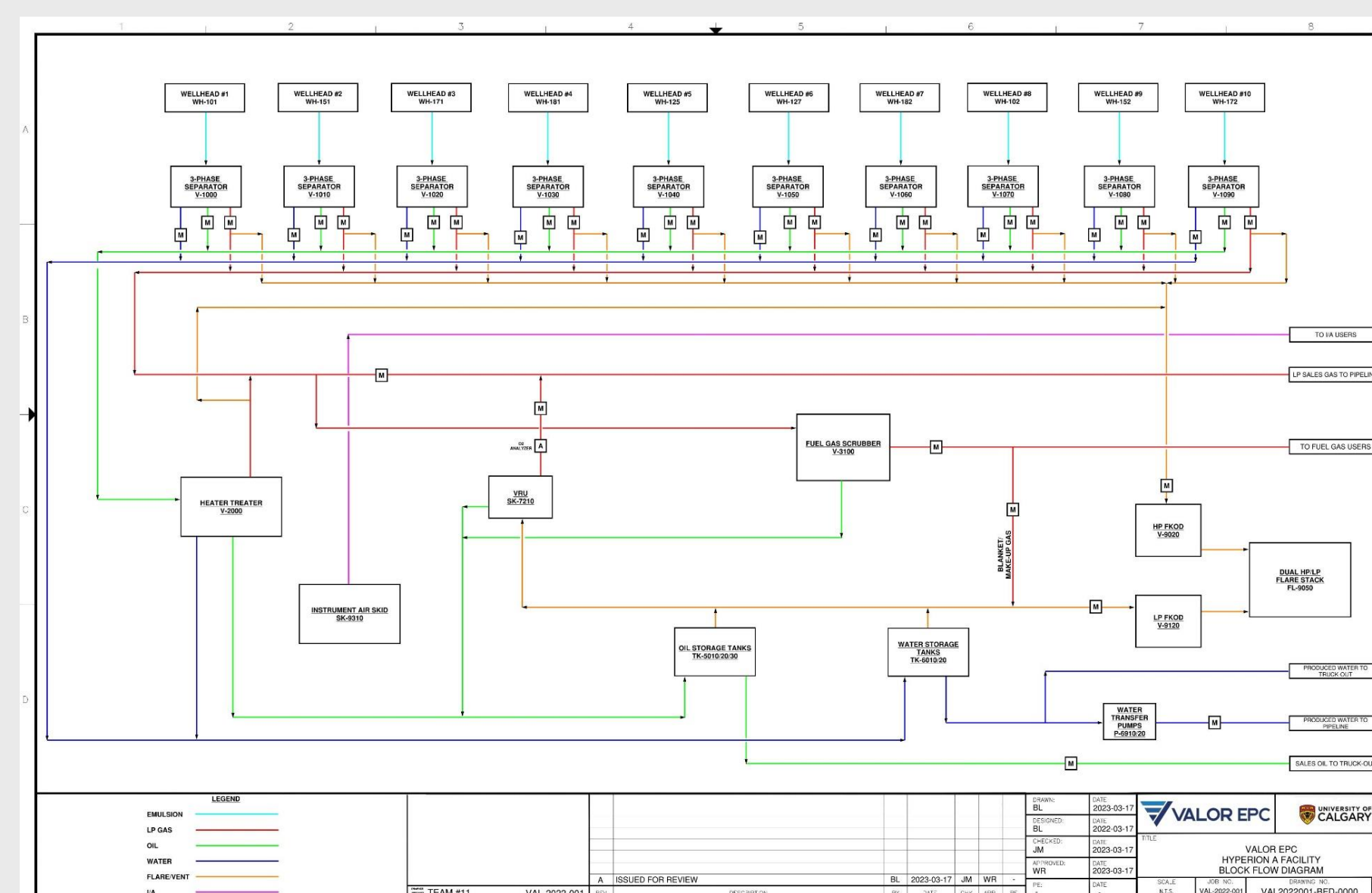


Figure 3. Block Flow Diagram

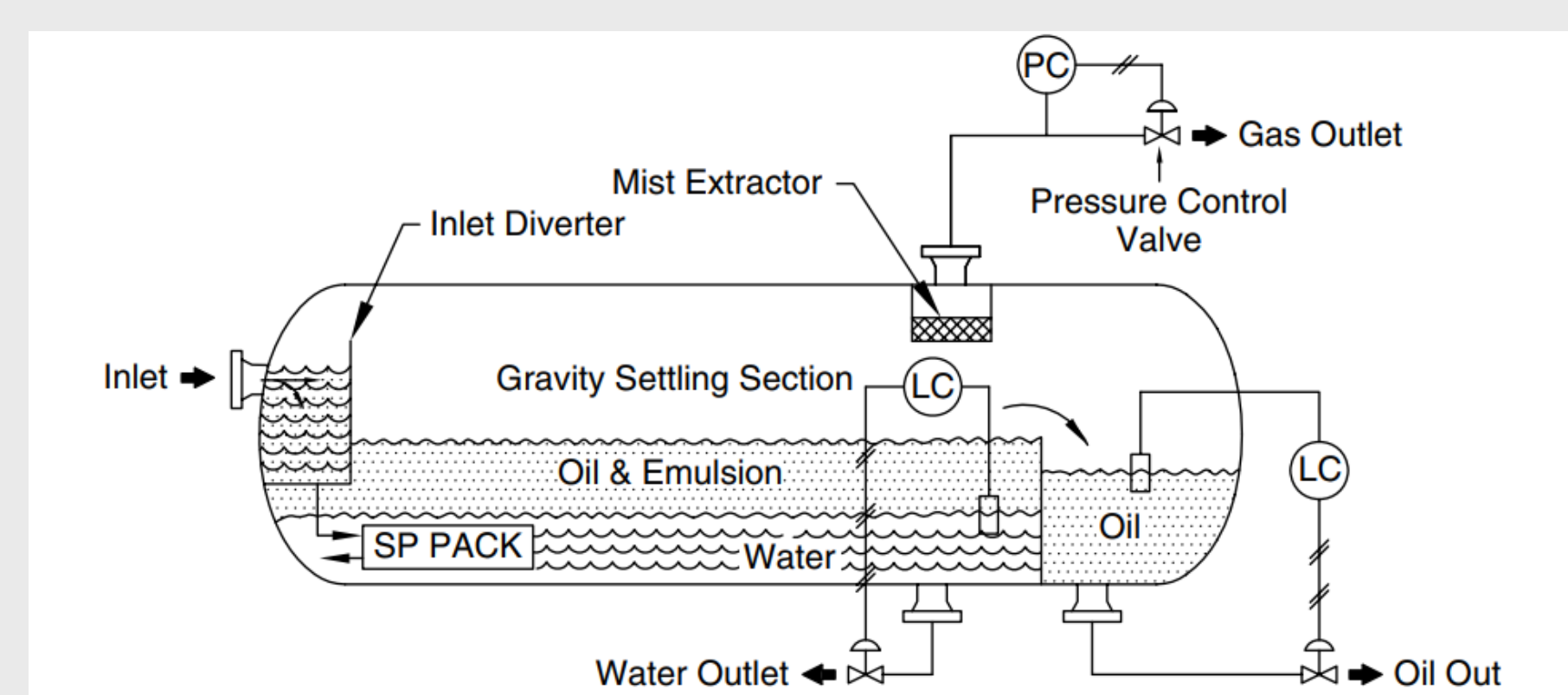


Figure 4. Typical 3-Phase Separator [2]

FACILITY LAYOUT

- The facility will be fed by a singular pipeline carrying emulsion from a satellite directly north of our facility lease that collects fluid from ten sweet wells.
- This emulsion will feed our facility by going into ten three-phase inlet separators. Once the oil, water and gas are separated off, we intend to send the oil to another phase of separation in a horizontal treater vessel to assist in further separating of any excess gas and water from the oil.
- After this final stage of separation, the oil and water will be sent and stored in separate tanks. The oil from the oil tanks will be metered and sent to the oil truck-out terminal. The water from the water tanks is either sent directly to the water truck-out terminal or to a transfer pump. This transfer pump helps boost the water pressure and increases flow for preparation of being pipelined off-site.
- Any high-pressure non sales spec gas from the heater treater and three-phase inlet separators is sent to the high-pressure flare knockout drum.
- Low-pressure sales gas will be sent to a sales pipeline or re-directed into a fuel gas scrubbing unit. The fuel gas scrubber assists in removing free liquids present in the low-pressure gas. This allows it to be used as a blanket/make-up gas.
- The low-pressure tank vent gasses are sent to either the vapor recovery unit (VRU) or the low-pressure flare knockout drum. The vapor recovery unit takes the tank vent gasses and boosts them up to sales spec gas pressure.

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