



Horizontal Well Artificial Lift Projects



6-in. Horizontal Well Facility

This facility is designed to study multiphase flow behavior and to test artificial lift performance in a horizontal well. The effect of trajectories and perforations on flow behavior and artificial lift applications can be studied using this facility.

Key Specifications

Fluids

Gas: Air

Water: Tap Water

Operating Conditions¹

Maximum Pressure: 30 psig

Temperature: Ambient

Gas Flow Rate: 0 to 1.02 MMSCFD (Superficial Gas Velocity – 0 to 60 ft/s)

Water Flow Rate: 0 to 302 BPD (Superficial Liquid Velocity – 0 to 0.1 ft/s)

¹Operating conditions are for the current project and are subject to change depending upon the project

Test Section

Pipe Material: Acrylic

Diameter of Pipe: 6 inch

Total pipe length: 236 ft (472 D) lateral, 60 ft (120 D) vertical

Test Section: 176 ft (130 D)

Developing Region: 60.0 ft (120 D)

Lateral Feeds: 3

Inclination Angles: -3 to 3 degree

Configurations: Toe-up, toe-down and multiple undulations

Additional Capabilities: Sump section for artificial lift application

Instrumentation and Flow Characteristics

Measured Parameters	Instrumentation
Liquid Holdup	<ul style="list-style-type: none"> Quick Closing Valves Conductivity Probes
	<ul style="list-style-type: none"> Basler Cameras



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Flow Pattern	<ul style="list-style-type: none"> • Conductivity Probes
Pressure Gradient	<ul style="list-style-type: none"> • Differential Pressure Transducer
Film Reversal	<ul style="list-style-type: none"> • Colored Brine Injection System • Basler Cameras • Conductivity Probes
Liquid Film Height	<ul style="list-style-type: none"> • Conductivity Probes

Detailed Specifications on Liquid and Gas Supply Systems

Air Compressor

Model: Gardner Denver (GD – ES II 60 Hz)
 Power: 200 HP
 Flow Rate: 1030 SCFM
 Discharge Pressure: 100 psig
 Suction Pressure: 0 psig

Air Flow Meter

Model: Endress Hauser Promass F
 Nominal Mass Flow Rate: 1002 kg/h
 Max. Mass Flow Rate: 2004 kg/h
 Measurement Uncertainty: $\pm 0.35\%$ of Flow Rate

Water Pump

Model: Dayton Submersible Pump 1LSP1
 Discharge Rate: 35 GPM
 Discharge Diameter: 2 in.

Water Flow Meter

Model: Endress Hauser Promass F
 Nominal Mass Flow Rate: 500 kg/h
 Max. Mass Flow Rate: 1000 kg/h
 Measurement Uncertainty: $\pm 0.05\%$ of Flow Rate



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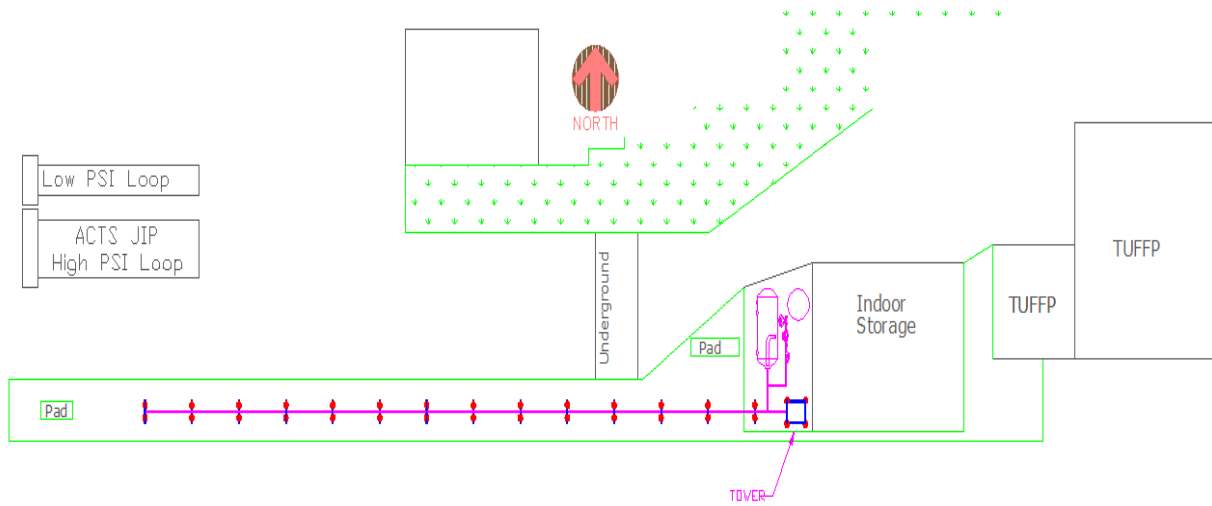


Figure 1. Schematic of Test Facility Location

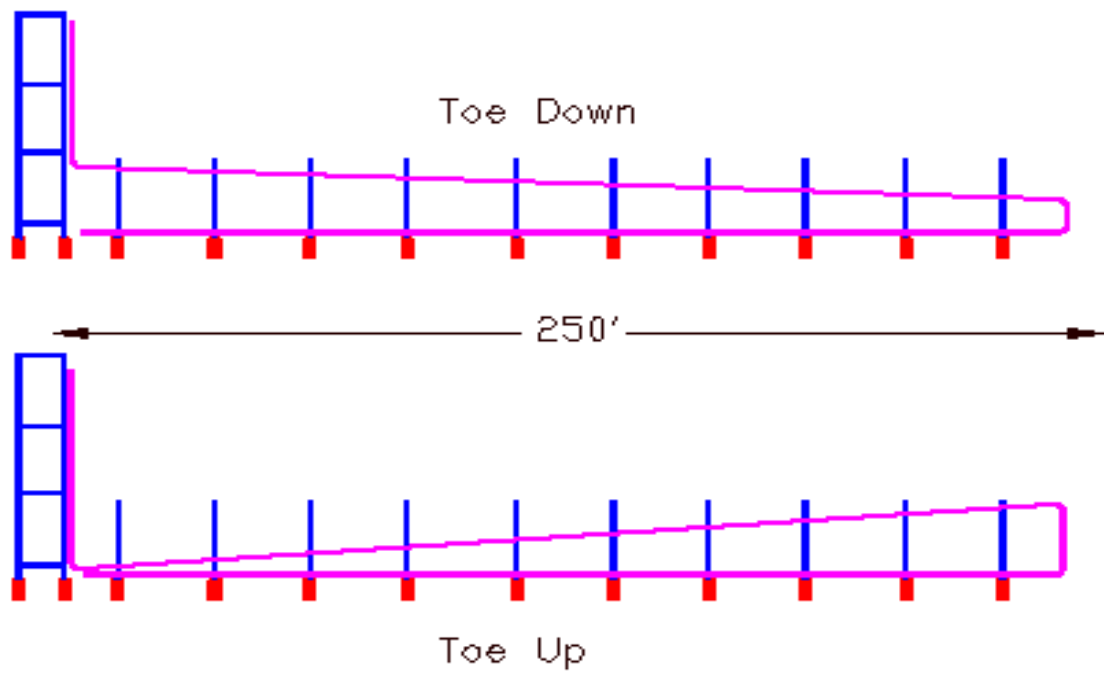


Figure 2. Schematic of Toe-Up and Toe-Down Configurations



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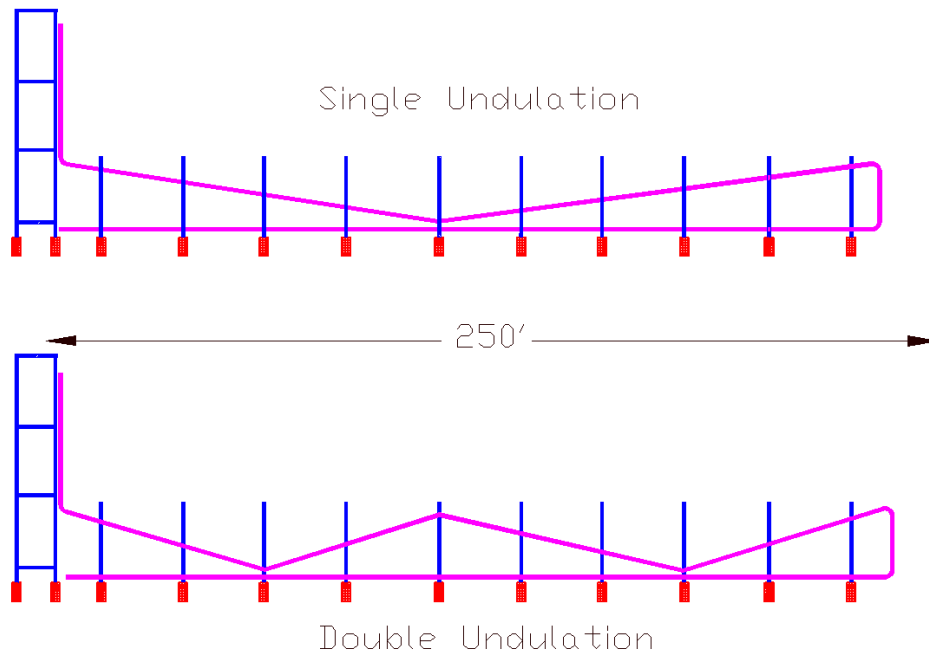


Figure 3. Schematic of Undulated Configurations

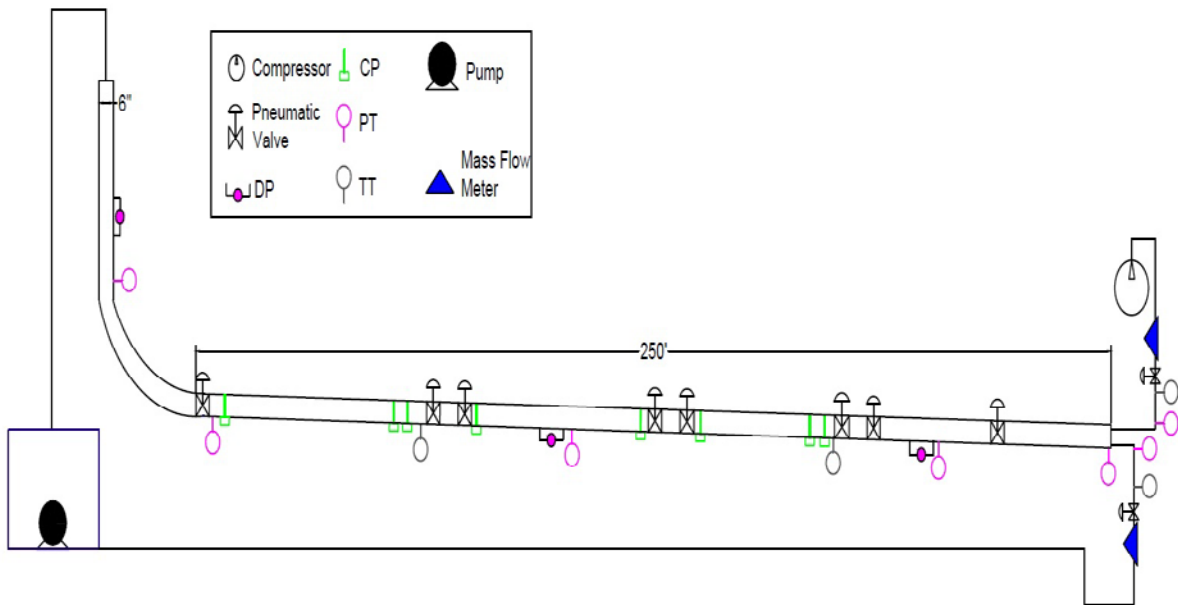


Figure 4. Schematic of Test Section Configuration and Instrumentation



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Figure 5. Tower of 6-in. Horizontal Well Facility

TU Horizontal Well Artificial Lift Projects
University of Tulsa
2450 East Marshall,
Tulsa, Oklahoma 74110

www.tuhwalp.ens.utulsa.edu
Phone: (918) 631-5110
E-Mail: kelley@utulsa.edu



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Figure 6. View of 6-in. Horizontal Well Facility

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Figure 7. View of the horizontal section for 6-in. Horizontal Well Facility

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