

**Competency Matrix for Production Engineering
SPE Task Force on Minimal Competency**

Production Task	Production Knowledge/Skill		
	Minimum Competence Breadth	Minimum Competence Depth	Above Minimum Competence
Tubing Design for Dynamic Producing/Stimulation Conditions	Awareness that tubing shortens or lengthens because of changes in pressures and temperatures during the stimulation process and production life of a well; stretch calculation.	Can calculate the specific length changes or packer forces due to the piston effect, ballooning, temperature, helical buckling.	Design same for high temperature/pressure corrosive environment, e.g. H ₂ S, CO ₂ , impact on design.
P&A Procedure	Calculate proper kill fluid density, demonstrate general awareness of need to conduct operations safely, following company and regulatory guidelines and honor geometry of wellbore in recommended steps.	Possess specific knowledge of sequential steps, e.g. safety kill well and R/U for initial operations; throughout all operations maintain prudent well control; ability to properly sequence operations with several stages of operations including equipment retrieval and zone isolation.	Design same for difficult well conditions, e.g. major fishing job, casing collapse, underground blowout, swabbing operations.
Fracture/Acidizing Treatments	Aware of basic fracture-gradient models and key parameters. Calculate basic system pressure drop due to friction given all parameters and bottom hole treating pressures.	Calculate required flow rate accounting for pressure losses and velocity constraints. Vary perforating density to direct fracture volume for a given rate and fixed surface pressure to different zones along with size and strength considerations in proppant selection. Also able to incorporate desired P/I increases in job design and economics.	Accommodate fluid additives/rheology for high temperature, high pressure formations.

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Workover Procedure Involving Squeeze Cementing and Recompletion	Awareness of use of cement bond log to define problem area, GR/cased hole log to correlate zones, able to calculate hydrostatic pressure involving two or more fluids of different density, simple cement yield volume, tubing capacities, general awareness of need to conduct operations safely following company and regulatory guidelines and honor geometry of wellbore in recommended steps.	Possesses specific knowledge of sequential steps, e.g. pumping schedule for a waling squeeze or a balanced plug. Ability to calculate appropriate shot density/perforation size for desired production conditions.	Design squeeze job for gas channeling or horizontal laterals, micro-annulus remediation.
Nodal Analysis	Awareness that the optimum producing configuration is a function of initial reservoir inflow performance, wellbore pressure drops, surface conditions and the wellbore configuration will need to accommodate changes in reservoir performance and changes in produced fluid constituents over the full life cycle of production.	Able to design the appropriate wellbore configuration given initial and projected reservoir inflow performance, surface conditions and produced fluid constituents.	Able to design the appropriate wellbore configuration for surface conditions such as subsea or deep water operations or high pressure, high temperature completions with substantial non-hydrocarbon components.
Surface Equipment	Awareness of the impact of pressure and temperature changes on the produced fluid constituents and basic equipment to separate and provide saleable quality hydrocarbons.	Ability to design surface equipment to segregate produced fluids, treat the fluids to saleable quality and/or deliver those sales.	Ability to design surface equipment for high temperature, high pressure operations with substantial non-hydrocarbon components or harsh conditions such as arctic or offshore operations. Understand and optimize custody transfer metering.
Artificial Lift	Awareness of the various options to assist in lifting produced fluids; the basic ranges of pressure and fluid volumes for each lift option; and the hydraulic and mechanical forces associated with each option.	Able to select and design the appropriate artificial lift system for the typical range of pressure and fluid volumes for conventional operations including the use of various downhole pumps with associated surface equipment. Incorporate P/I performance in design and economic evaluation of completion/lift options.	Design the appropriate artificial lift system for horizontal completions or harsh conditions such as arctic; offshore or subsea operations.

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Production Logging	Awareness of the basic suit of cased hole logs to assure mechanical integrity, measure downhole conditions, assess hydrocarbon potential and support downhole operations including completion, remediation and P&A.	Able to interpret and incorporate data from production logging operations into the design and implementation of completion, remediation and P&A operations for conventional oil and gas completions.	Able to interpret and incorporate data from production logging operations into the design and implementation of completion, remediation and P&A operations for horizontal, high pressure, high temperature or harsh well control situations.