



Webinars

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Webinars

Updating Your Skills and Knowledge for Today's Petroleum Engineering Professional

Ayasha Nickie





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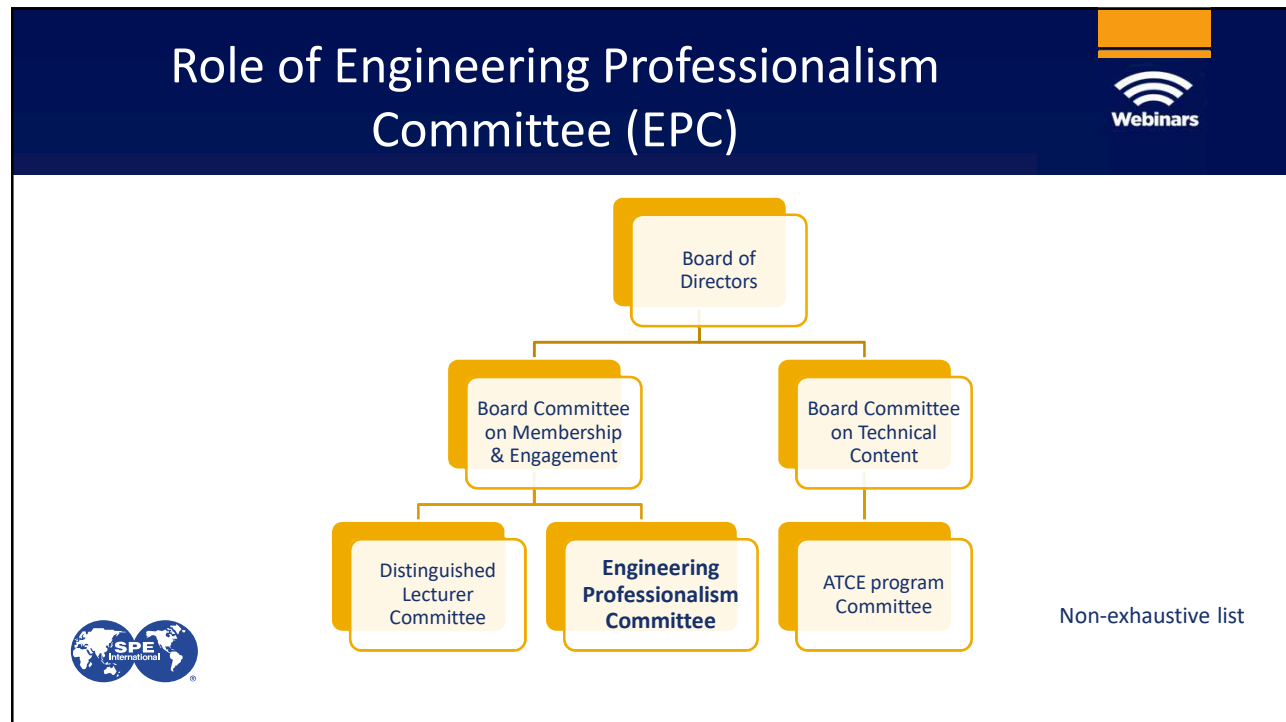
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Outline

- Role of Engineering Professionalism Committee (EPC)
- Objective of SPE Competency Matrix
- Purpose/Reason for Revised Matrix
- Key Changes
- Summary
- Way Forward





Role of Engineering Professionalism Committee (EPC)

Charged with the integration of professional activities and practices, primarily:

Petroleum Engineering Certification Examination Construction

Based on SPE Competency Matrix

SPE Petroleum Engineering Certification Questions

SPE Competency Matrix Example

DRILLING TASK	KNOWLEDGE / SKILL		
	MINIMUM COMPETENCE BREADTH	MINIMUM COMPETENCE DEPTH	ABOVE MINIMUM COMPETENCE
Maintain Well Control	Calculate mud weight necessary to maintain well control	Design and / or implement procedure to successfully circulate out an influx	Design and / or implement procedure to successfully control an underground blowout

Related activities

Objective of Competency Matrix



Incoming Petroleum Engineers
(young graduates/recently
entered the industry)



Become better Engineers

Objective of Competency Matrix



Become better Engineers

**BEGIN
WITH
THE END
IN MIND**



- Support Academia
- Training programs
- Define the SPE's Petroleum Engineering Certification process and exam.



Purpose/Reason for Revised Matrix



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- Help academia and current industry gauge the knowledge of the petroleum engineers



- Develop questions for SPE Certification Exam.



Purpose/Reason for Revised Matrix



- Consistent with the Revised SPE technical disciplines



Data Science
& Engineering
Analytics



Production &
Operations



Drilling



HSE



Completions



Projects,
Facilities and
Construction



Reservoir



Purpose/Reason for Revised Matrix



What the Matrix is **not**?

- Detailed and prescriptive for accreditation
- Hiring Petroleum Engineers
- Curricula requirements

Matrix should be used as GUIDELINES



Key Changes



- Moved from 5 to 8 disciplines

1. General Engineering
2. Drilling Engineering
3. Formation Evaluation
4. Production Engineering
5. Reservoir Engineering



1. General Engineering
2. Drilling Engineering
3. Completion Engineering
4. Production Engineering
5. Reservoir Engineering
6. Health, Safety, Environment & Sustainability
7. Project, Facilities and Construction
8. Data Science and Engineering Analytics



Key Changes



- Focused on:
 - **Minimum Competence Breadth** - what a recent graduate from a Petroleum Engineering Curriculum should know or do
 - **Minimum Competence Depth** - what an engineer with five years or more of experience and knowledge should know or do
- Removed **Above Minimum Competence Column**
 - Column initially intended for persons exceeding 5 years of experience
 - Persons in this category may access Corporate or SPE Competency Management Tools



Key Changes-General Engineering



No.	Task	Minimum Competence Breadth <i>Approximate Years of E&P Experience = <1</i>	Minimum Competence Depth <i>Approximate Years of E&P Experience = 5</i>
1	Understand and use common petroleum engineering terminology.	Understand general terminology common to all sub-disciplines.	Understand terminology specific to the sub-discipline.
2	Identify and use relevant industry and company design standards.	Identify API, ISO & Corporate. Standards & RPs exist in all sub-disciplines.	Distinguish and use conventional standards specific to the sub-discipline.
3	Maintain regulatory compliance.	Identify what regulatory bodies have jurisdiction and where to find documentation of the applicable regulations. Describe the essential rules and approval process relevant to the work project.	Complete necessary regulatory compliance permitting and reporting specific to the sub-discipline.



Key Changes-Drilling Engineering



No.	Task	Minimum Competence Breadth	Minimum Competence Depth
		<i>Approximate Years of E&P Experience = <1</i>	<i>Approximate Years of E&P Experience = 5</i>
1	Well control	Calculate mud weight necessary to maintain well control and volume of mud required to fill the hole while tripping out. Explain the main methods for shutting in and securing a well. Identify the main kick/influx indicators and warning signs.	Layout and/or implement procedure to successfully circulate out an influx. Determine fluid type of influx with data collected after influx. Outline relationship between geologic depth reference and drilling depth reference. Explain the different methods to circulate out an influx, along with the advantages/disadvantages of each of these types of procedures: Driller's, Wait and Weight, Static volumetric and stripping, Circulating volumetric.



Key Changes-Completion Engineering



No.	Task	Minimum Competence Breadth	Minimum Competence Depth
		<i>Approximate Years of E&P Experience = <1</i>	<i>Approximate Years of E&P Experience = 5</i>
1	Design tubing	Describe basic design principles (burst, collapse, tension, compression that the tubing will encounter) for the anticipated pressure/temperature environment and associated expected flow or injection rates.	Design a tubular system given a set of completion, stimulation, production or injection requirements.
2	Select and design completion equipment	Discuss the need for various completion equipment components including packers, flow control devices, and subsurface safety valves.	Select the appropriate completion equipment needs for a given completion scenario and associated metallurgy.



Key Changes-Production Engineering



No.	Task	Minimum Competence Breadth <i>Approximate Years of E&P Experience = <1</i>	Minimum Competence Depth <i>Approximate Years of E&P Experience = 5</i>
1	Pressure Containment Barriers; Hydrostatics & Well Control	Explain Primary & Secondary Pressure Containment Barriers. Prepare a depth pressure plot. Convert Oil, Gas & water densities to pressure gradients. Calculate proper kill fluid density. Exemplify general awareness of need to conduct operations safely, following company and regulatory guidelines and honor geometry of wellbore in recommending steps in well kill procedures.	Summarize sequential steps required to demonstrate barrier effectiveness. Detail the R/U for initial Production & Well Servicing operations. Sequence shut-in or well kill; BOP installation & well service or workover operations and steps to maintain prudent well control throughout all operations. Sequence thru-tubing or workover operations including equipment retrieval, zone isolation, perforation, stimulation, equipment installation & wellhead hook-up.



Key Changes-Reservoir Engineering



No.	Task	Minimum Competence Breadth <i>Approximate Years of E&P Experience = <1</i>	Minimum Competence Depth <i>Approximate Years of E&P Experience = 5</i>
Reservoir Characterization			
1	Geology	Be familiar with the fundamentals of general, structural, and petroleum geology.	Be able to apply the fundamentals of general sedimentology, structural, and petroleum geology to reservoir characterization and geological modeling. Uncertainty analysis in reservoir modeling. Basin modeling.
Pressure, Rate, and Formation Testing			
8	Short-term Pressure Transient Analysis (PTA)	Know pressure-transient test options to obtain specific reservoir characteristics.	Be able to select appropriate test for specific characterization needs (flow vs shut-in tests; production vs. injection tests, single-well vs. interference tests, etc.) and appropriate procedures for running tests. Concept of convolution and deconvolution.



Key Changes-Reservoir Engineering



No.	Task	Minimum Competence Breadth <i>Approximate Years of E&P Experience = <1</i>	Minimum Competence Depth <i>Approximate Years of E&P Experience = 5</i>
Reservoir Engineering			
23	Improved/Enhance Oil Recovery (IOR/EOR)	Be familiar with the principles of Improved/Enhance Oil Recovery (IOR/EOR). Understand the differences of thermal, chemical and miscible methods and their key tertiary recovery mechanisms. Have an awareness of Carbon Capture Utilization and Storage (CCUS) mechanisms	Be able to (a) identify the right EOR method for a given reservoir candidate (b) perform laboratory/numerical screenings study for EOR evaluation; (c) design injectivity tests, EOR pilot and data acquisition program (d) interpret and analyze performance data from IOR/EOR pilots/projects for optimizing injectivity and recovery
Reservoir Management			
26	Field & Asset Management	Be familiar with the basic elements of field-scale projects and asset management	Be able to combine engineering and economic principles for reservoir management; be able to apply various surveillance tools to monitor then optimize field production; be able to select appropriate EOR approach based on field characterization.



Key Changes-HSE & Sustainability



No.	Task	Minimum Competence Breadth <i>Approximate Years of E&P Experience = <1</i>	Minimum Competence Depth <i>Approximate Years of E&P Experience = 5</i>
1	Occupational health Management	Awareness of the key health (both physical and mental) risks faced by workers in the industry (e.g. hearing loss, respiratory impacts, repetitive stress, cancer) and key protective measures used to reduce these risks.	Understand the key health risks faced by workers within your company or facility and key controls/safeguards in place and key performance indicators used to measure.



Key Changes-Projects, Facilities & Construction Engineering



No.	Task	Minimum Competence Breadth <i>Approximate Years of E&P Experience = <1</i>	Minimum Competence Depth <i>Approximate Years of E&P Experience = 5</i>
Projects			
1	Project Management	Demonstrate the capability to identify and characterize the key elements and processes in project management including, project life cycles, process groups and key project communications.	Ability to develop a project management process diagram identifying the key processes and the knowledge areas critical to each process including scheduling, cost, resource, quality and risk management.



Key Changes-Data Science & Engineering Analytics



No.	Task	Minimum Competence Breadth	Minimum Competence Depth
		<i>Approximate Years of E&P Experience = <1</i>	<i>Approximate Years of E&P Experience = 5</i>
2	Data Science and Analytics Terminology	Explain general terminology of all sub-disciplines of petroleum engineering and data science. Perform data gathering and cleansing for structured/unstructured data and preparation for detailed descriptive analysis.	Describe terminology specific to the sub-discipline of petroleum engineering and data science. Be able to use sample theory to characterize the data set used for building models.
3	Data Standardization	Identify what data standards (industry wide and company specific) exist in all sub-disciplines of petroleum engineering (drilling & completions, production and operations, reservoir and earth science).	Explain and use relevant data standards and definitions specific to the subdiscipline of petroleum engineering.



Summary



- Competency Matrix-5 W's & H approach:
 - Who?
 - What?
 - Why?
 - When?
 - Where?
 - How?



Summary



- **Who** is the Competency Matrix targeting?
 - A. Petroleum Graduates
 - B. Petroleum engineers with 10 years experience
 - C. Retired professionals
 - D. **Petroleum graduates and engineers with up to 5 years experience**
- **What** is the purpose of the SPE Competency Matrix?
 - A. To assess the skills of lawyers
 - B. **To help petroleum engineers become better engineers**
 - C. To assess the Knowledge of university professors
 - D. To assess the skills of doctors



Summary



- **Why** did the EPC team revise the Competency Matrix?
 - A. To give Petroleum Graduates more work
 - B. To help academia and current industry gauge the knowledge of the petroleum engineers**
 - C. To give EPC team more work
 - D. To give university professors more work
- **When** was the Revised Competency Matrix approved?
 - A. On December 25th 2021
 - B. At ATCE 2021**
 - C. At ATCE 2010
 - D. On January 26th 2022



Summary



- **Where** can an individual find information on the revised Competency Matrix?
 - A. In the Petroleum Engineering Handbook
 - B. <https://www.spe.org/en/training/competency/>**
 - C. <https://www.google.com>
 - D. At any Library
- **How** was the Revised Competency Matrix developed?
 - A. Through a review process by members of the Distinguished Lecturer Committee
 - B. Through a review process primarily by members of the EPC team**
 - C. Through a review process by members of the ATCE Program Committee
 - D. Through a review process by members of the AAPG



Way Forward



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- Review Competency Matrix
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Way Forward



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See the list of current volunteer opportunities.



Volunteer Recognition

Thank you for your dedication to SPE and the E&P industry.



Volunteer Stories

Learn how our volunteers are contributing to SPE.



2023 Engineering Professionalism Committee



THE END

References



- SPE Petroleum Engineering Certification-
<https://www.spe.org/en/training/certification/>
- [USDA 2020-2025 Employment Opportunities – in Food, Agriculture, Renewable Natural Resources, and the Environment \(purdue.edu\)](#)
- SPE Competency Matrices-
<https://www.spe.org/en/training/competency/>



QUESTIONS/COMMENTS

