Professional Certificate in Subsea Engineering for Oil and Gas

Subsea Intervention and Workover

Subsea Intervention and Workover Key Terms and Vocabulary:

Subsea intervention and workover are critical operations in the oil and gas industry. Understanding the key terms and vocabulary associated with these processes is essential for professionals in the field. This comprehensive guide will provide a detailed explanation of the key terms and concepts related to subsea intervention and workover.

1. Subsea Intervention:

Subsea intervention refers to the activities carried out on subsea wells to maintain or restore production. This can include tasks such as well maintenance, well stimulation, well integrity repairs, and well abandonment. Subsea intervention is crucial for ensuring the continued operation of subsea wells and maximizing their production potential.

2. Workover:

Workover is a type of intervention that involves the removal and replacement of downhole equipment in a well. This process is typically performed to restore or enhance the productivity of a well that is not performing up to its potential. Workover operations can include tasks such as cleaning out the wellbore, repairing damaged equipment, or installing new production tubing.

3. Subsea Well:

A subsea well is a well that is drilled on the seabed, typically in offshore oil and gas fields. Subsea wells are connected to production facilities on the surface through subsea infrastructure such as pipelines and control systems. Subsea wells are designed to withstand the harsh conditions of the marine environment and produce hydrocarbons from beneath the seabed.

4. Subsea Infrastructure:

Subsea infrastructure refers to the equipment and facilities installed on the seabed to support the operation of subsea wells. This can include subsea christmas trees, manifolds, control systems, and pipelines. Subsea infrastructure plays a crucial role in the production and transportation of hydrocarbons from subsea wells to the surface.

5. Subsea Christmas Tree:

A subsea christmas tree is an assembly of valves, spools, and sensors installed on a subsea wellhead to

control the flow of hydrocarbons. The christmas tree is typically mounted on top of the wellhead and is used to regulate the production of oil and gas from the well. Subsea christmas trees are essential components of subsea production systems.

6. Subsea Manifold:

A subsea manifold is a structure installed on the seabed to distribute and control the flow of hydrocarbons from multiple subsea wells. Manifolds are used to collect production fluids from different wells and direct them to production facilities on the surface. Subsea manifolds play a key role in optimizing the production efficiency of subsea fields.

7. ROV (Remotely Operated Vehicle):

An ROV is a robotic device used for underwater operations in the oil and gas industry. ROVs are equipped with cameras, sensors, and manipulator arms that allow them to perform a wide range of tasks, including inspection, maintenance, and intervention on subsea equipment. ROVs are essential tools for conducting subsea intervention and workover operations.

8. Subsea Intervention Vessel:

A subsea intervention vessel is a specialized ship equipped with tools and equipment for performing subsea intervention and workover operations. These vessels are equipped with ROVs, well intervention systems, and other tools to support subsea operations. Subsea intervention vessels play a crucial role in maintaining and servicing subsea wells.

9. Well Stimulation:

Well stimulation is a process used to enhance the productivity of a well by improving the flow of hydrocarbons from the reservoir to the wellbore. This can involve techniques such as hydraulic fracturing, acidizing, or matrix stimulation. Well stimulation is often used during workover operations to revitalize underperforming wells.

10. Well Abandonment:

Well abandonment is the process of permanently sealing a well that is no longer producing or economically viable. This involves plugging the wellbore with cement and setting barriers to prevent the migration of fluids between formations. Well abandonment is a critical part of responsible well management and environmental protection.

11. Well Integrity:

Well integrity refers to the condition of a wellbore and its ability to contain and control the flow of fluids. Maintaining well integrity is essential for ensuring the safety and reliability of a well. Well integrity can be

compromised by factors such as corrosion, mechanical damage, or fluid migration. Regular monitoring and maintenance are required to preserve well integrity.

12. Subsea Control System:

A subsea control system is a set of equipment and software used to monitor and control subsea production facilities. This includes components such as umbilicals, hydraulic power units, and control modules. Subsea control systems enable operators to remotely operate subsea equipment and optimize production performance.

13. Intervention Tooling:

Intervention tooling refers to the specialized tools and equipment used during subsea intervention and workover operations. This can include tools for well intervention, well stimulation, wellhead maintenance, and ROV operations. Intervention tooling is designed to withstand the harsh conditions of the subsea environment and perform precise and reliable tasks.

14. Subsea Wellhead:

A subsea wellhead is the component of a subsea well that provides the interface between the wellbore and the subsea production equipment. The wellhead is typically equipped with valves, connectors, and sensors to control the flow of hydrocarbons and facilitate intervention activities. Subsea wellheads are critical components of subsea production systems.

15. Hydrate Formation:

Hydrate formation is a common challenge in subsea operations, where water and hydrocarbons combine to form ice-like crystals that can block flowlines and equipment. Hydrate formation can impede production and pose safety risks to subsea operations. Preventive measures such as chemical inhibitors or heat tracing are used to mitigate hydrate formation.

16. Subsea Umbilical:

A subsea umbilical is a bundle of cables and hoses used to provide power, communication, and control signals to subsea equipment. Umbilicals connect subsea production systems to surface facilities and enable operators to monitor and control subsea operations remotely. Subsea umbilicals are essential for the reliable operation of subsea fields.

17. Subsea Pipeline:

A subsea pipeline is a long-distance pipeline laid on the seabed to transport hydrocarbons from subsea wells to onshore facilities. Subsea pipelines are designed to withstand high pressures, corrosive environments, and external loads. Pipeline integrity is crucial for the safe and efficient transportation of oil

and gas from subsea fields.

18. Subsea Well Testing:

Subsea well testing is a process used to evaluate the productivity and reservoir characteristics of a subsea well. This involves measuring flow rates, pressures, and fluid properties to assess the performance of the well. Subsea well testing is essential for optimizing production strategies and making informed decisions about well interventions.

19. Subsea Well Monitoring:

Subsea well monitoring involves the continuous surveillance of subsea wells to track production performance, detect anomalies, and ensure operational safety. Monitoring systems use sensors, gauges, and data acquisition systems to collect real-time data on well conditions. Subsea well monitoring enables operators to identify issues early and take corrective actions.

20. Subsea Intervention Challenges:

Subsea intervention presents various challenges due to the harsh operating conditions and complex equipment involved. Challenges such as limited access, high pressures, corrosive environments, and remote locations can make subsea intervention operations difficult. Overcoming these challenges requires specialized equipment, advanced technologies, and skilled personnel.

21. Subsea Workover Challenges:

Subsea workover operations face similar challenges to subsea intervention, including the need for specialized equipment, technical expertise, and effective planning. Workover operations can be complex and time-consuming, requiring careful coordination and execution to ensure the success of the operation. Addressing workover challenges is essential for maximizing well productivity and efficiency.

22. Subsea Intervention Best Practices:

To ensure the success of subsea intervention operations, it is important to follow best practices and industry standards. This includes proper planning, risk assessment, equipment inspection, and contingency planning. Adhering to best practices helps to minimize risks, improve efficiency, and achieve the desired outcomes of subsea intervention activities.

23. Subsea Workover Best Practices:

Similarly, subsea workover operations benefit from following best practices to ensure safe and effective execution. Best practices for workover operations include detailed well diagnostics, equipment selection, well control procedures, and post-operation evaluation. By adhering to best practices, operators can optimize the performance of subsea wells and mitigate operational risks.

24. Subsea Intervention Technologies:

Advancements in technology have led to the development of innovative tools and systems for subsea intervention. Technologies such as intervention risers, intervention skids, and intervention packages have improved the efficiency and effectiveness of subsea intervention operations. Embracing new technologies can enhance the capabilities of subsea intervention teams and enable them to overcome operational challenges.

25. Subsea Workover Technologies:

Similarly, workover operations benefit from the use of advanced technologies to enhance efficiency and safety. Technologies such as coiled tubing, snubbing units, and hydraulic workover units are commonly used in subsea workover operations. These technologies enable operators to perform complex interventions in subsea wells with precision and control.

26. Subsea Intervention Certification:

Professionals involved in subsea intervention and workover operations may seek certification to demonstrate their competence and expertise in the field. Certification programs provide training on safety procedures, equipment operation, and intervention techniques. Obtaining certification can enhance career opportunities and ensure compliance with industry standards.

27. Subsea Intervention Regulations:

Subsea intervention activities are subject to regulations and guidelines set by regulatory authorities to ensure the safety and environmental protection of subsea operations. Compliance with regulations such as well control, well integrity, and environmental protection is essential for conducting subsea intervention activities. Operators must adhere to regulatory requirements to prevent incidents and minimize risks.

28. Subsea Intervention Planning:

Effective planning is crucial for the success of subsea intervention operations. Planning involves identifying objectives, assessing risks, selecting equipment, and developing procedures for the operation. Detailed planning helps to optimize resource allocation, minimize downtime, and ensure the safety of personnel and equipment during subsea intervention activities.

29. Subsea Workover Planning:

Workover operations also require thorough planning to achieve the desired outcomes and minimize risks. Workover planning includes well diagnostics, equipment selection, contingency planning, and logistics coordination. By developing a comprehensive workover plan, operators can streamline operations, enhance efficiency, and achieve the desired results of the workover operation.

30. Subsea Intervention Case Studies:

Examining real-world case studies of subsea intervention operations provides valuable insights into best practices, challenges, and lessons learned. Case studies can highlight successful interventions, innovative technologies, and effective strategies for overcoming operational difficulties. Analyzing case studies helps to improve knowledge and skills in subsea intervention and workover operations.

In conclusion, mastering the key terms and vocabulary related to subsea intervention and workover is essential for professionals in the oil and gas industry. By understanding these concepts, professionals can enhance their knowledge, skills, and capabilities in conducting subsea operations. Continuous learning and staying updated on industry trends and technologies are crucial for success in the dynamic field of subsea engineering.