Offshore Well Casing Splash Zone Remediation and Repair Alternatives

Chanat Sirisoonthorn
Chevron Thailand Exploration and Production, Ltd.
Email; CSAH@chevron.com

Well integrity issue on surface casing of aging facilities has been experienced during the recent years, especially in Gulf of Thailand which has more than six hundred surface casings operated since day one. Statistically, the vulnerable areas always located on splash zone which is the most challenging working area for maintenance team in the aspect of safety, economy and complexity between topside crews and divers. This project covers the pros, cons and selection of remediation and repair alternatives for surface casing at splash zone and implementation in order to prevent loss of containment event, affecting to environmental and business impacts.

The project includes remediation methodology (Epoxy Sleeve(diver-less) and Composite Wrapping) to prevent external corrosion from sea water and repair methodology (Welded Leak Box Repair (underwater welding), Cold Bonding, Under Water Composite Wrapping and Customized Mechanical Clamp) to resume pressure contain ability of surface casing. The comparison of each alternative has been engineering analyzed and proved through mock-up tests and real-world implementations to ensure practicality, effectiveness and economic justification. Also, the selected alternative should not create post-activity problem in the future such as obstructing rig to perform Plug & Abandonment activity. After evaluating, Customized Mechanical Clamp is the most outperforming alternative for repair scenario due to less time consuming, sequence complexity, total cost assessment and equipment capability and Epoxy Sleeve (diver-less) is the best remediation option to extend casings' service life at splash zone.

Moreover, the study also considers on a new diver-less concept to assist repair and remediation at splash zone by innovating "Dry habitat chamber" for topside crews to safely work under water which could save diver cost tremendously. This technology will play a significant role to expand well integrity solutions for many surface casings by reducing diver operation cost.

Regarding to the study and implementation, Thailand has successfully secured the well integrity through remediation and repair over ten surface casings and continued by Epoxy Sleeve(proactive) and Customized Mechanical Clamp (reactive). The concept of splash zone remediation and repair can be applied for any pressure containing and non-pressure containing equipment in the different configuration.

Challenges:

- The design and constructability sequence are the most challenging issue since it is the pioneer project to study and implement remediation and repair jobs at splash zone areas. The feasibility, cost control and safety concern should not show any stoppers.
- Working at splash zone area is risky and costly. Good planning and back-up plan are required to avoid unexpected event leading to unsafe working condition or delay of diving operation (major cost of the project).

Comments:

- This study and implementation were the first time in Thailand that we explored the opportunity to prevent re-drill the well to continue operating and maintaining surface casing integrity in the aspect of proactive and reactive methods. The results showed the effectiveness and practicality including real spending to achieve the job. It can be applied to pressure or non-pressure containing part at splash zone area, benefiting to any BU that have the same integrity issues.