

# An Overview of Subsea Pipeline Decommissioning and Residual Management Using the Reverse S-Lay Technique

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## Objective/Scope

This paper presents the reverse S-lay technique applied in a decommissioning campaign to safely remove subsea pipeline from existing infrastructures and facilities and manage its non-disposable residuals.

The flushing, cutting, and removal were performed on 10 and 16-inches diameter concrete coated and non-concrete coated pipelines, using the *Sapura 1200* heavy-lift vessel. Addressing the environmental and safety aspects, the *Sapura 1200* was also tasked to manage, store, and transport hazardous materials such as Mercury, Arsenic, and Hydrogen Sulfide, back to shore for further treatment and disposal.

The decommissioning campaign took place in Gulf of Thailand, at water depths of 60 to 73 metres during the monsoon season.

## Methods, Procedures, Process

The engineering code applied in the decommissioning campaign is known as “The ULS Criterion for Reverse S-Lay Pipeline Recovery”, a newly developed DNV code under Sapura Energy’s proprietary rights.

The methodology was designed and developed with DNV specifically for this campaign’s offshore operations involved:

- Complying with local authority requirements to ensure no environmental impact. Risk assessments and safety barriers measures were implemented.
- Using a pipeline recovery tool (PRT) attached to an abandon and recovery (A&R) cable from the vessel during recovery, then transfer load from the A&R to the tensioner before cutting.
- Cutting equipment takes center stage in the firing line tunnel, precisely slicing through the pipe.
- Undergoes a thorough inspection during cutting process for hazardous substances, overseen by specialists to ensure safety.
- Water collection, pump system, and transportation of hazardous non-disposable residuals on board *Sapura 1200*. Residuals from the flushing process inside pipeline were not allowed to be disposed in open sea environment

## Results, Observations, Conclusions

The methods applied in reverse S-lay technique and hazardous non-disposable residual management conformed to the local environmental and safety standards. Despite the numerous challenges, the campaign was successfully executed without Serious Incident and Fatality (SIF) and Lost Time Injury (LTI).

## Novel/Additive Information

The methodology applied was considered the first in Asia’s decommissioning campaign, which required cross collaboration and innovation to manage challenges in safety, environment protection, and offshore execution.

The operational viability of reverse S-lay technique for subsea pipeline decommissioning and residual management has been demonstrated.