



Design, Installation and Successful Operation of Offshore Swarf Recovery System

Newpark delivered solids control and waste-management services to support the successful milling operations on six wells in the Adriatic Sea for ENI's offshore CCS conversion project. The team engineered, supplied, and operated an online mechanical and magnetic swarf-removal system fed through a bespoke diverter and BOP-bushing assembly. The solution enabled full fluid recovery, efficient swarf extraction, and safe execution with zero NPT, achieved through close coordination with all project stakeholders.

CHALLENGE	SOLUTION	RESULT
• Swarf removal and recovery • Fluid flow management • Restricted space and SIMOPS • No regional precedent • Environmentally sensitive area	• Mechanical and magnetic swarf recovery system • Engineered modular piping and tailored diverter system • Full and continuous online flow management capability • Customized equipment and accessories supplied	• Zero operational NPT achieved • Zero spills • Project completed on schedule • Efficient removal of swarf from active mud system

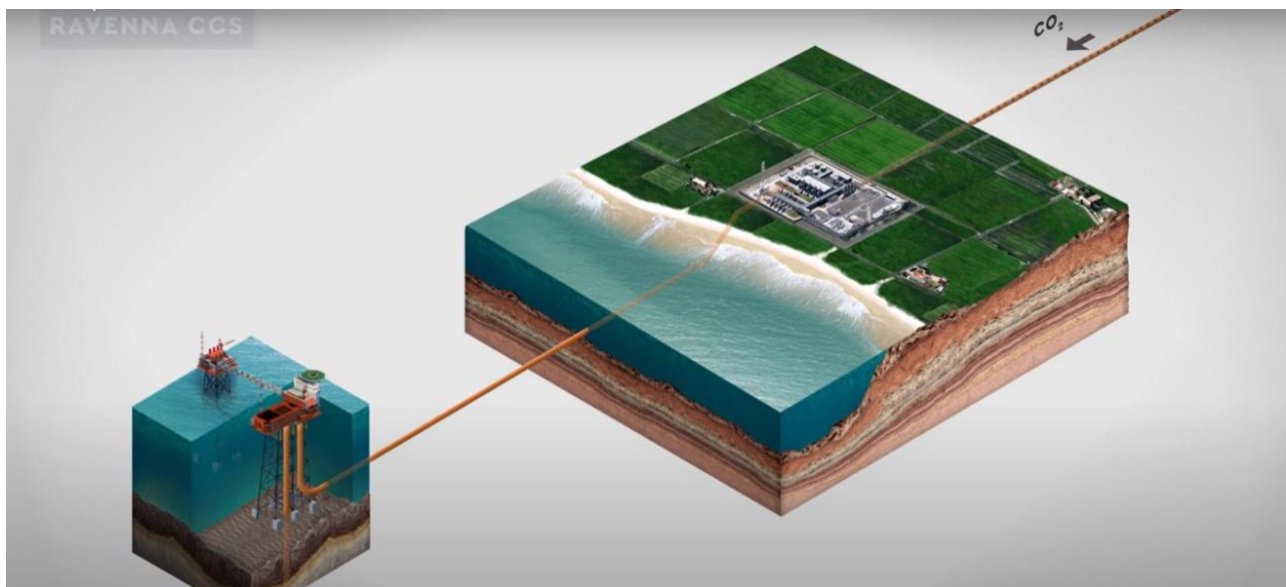


Figure 1 - Ravenna CCS project overview



OVERVIEW

ENI awarded Newpark a contract for operations offshore in the North Adriatic, near the coastal area, as part of a program to convert and prepare 26 depleted gas wells—drilled more than 50 years ago—for carbon capture and storage (CCS). This represents the first CCS-related well-conversion project of its kind in Italy.

The milling phase presented significant complexity, and the Newpark team faced three primary challenges:

- **SIMOPS management:** installation of the diverter system and modular piping, well-monitoring equipment, rig-floor activities, and deck operations while other rig operations were ongoing.
- **Design, engineering, and supply of:**
 - bespoke diverter system and BOP bushing
 - customised unit base frame and piping supports
 - modular fluid-feed piping system
- **Online fluid-flow management,** including contingency planning to ensure uninterrupted operations.

CHALLENGE

Newpark mobilized the swarf-recovery package for the first well with a clear objective: execute the first-ever installation of a customized diverter-fed swarf-removal system within a tight operational window.

The operation was particularly challenging due to the cantilever's requirement to skid laterally between wells, necessitating reconfiguration of the modular piping system when moving between wells. Because the system operated on critical path, 100% of the circulating volume had to be processed and returned to the active system in real time.

With no regional precedent or comparable operations to reference, the project represented a first-of-its-kind execution in the North Adriatic.

SOLUTION

Following detailed site surveys and engineering reviews, Newpark developed a tailored plan aligned with both client and drilling-contractor requirements. The plan accounted for workflow sequencing, operational priorities, and the offshore layout, including cantilever movements.

Once the final layout—including the purpose-built diverter—was approved, the system was delivered and installed safely, on schedule, and within budget.

The rig-up involved a layered installation of several components:

- BOP bushing and diverter system
- well-monitoring package
- 12-inch modular piping from the wellhead to the swarf-removal unit



This required coordinated execution across multiple contractor teams. The operation followed a comprehensive job-risk analysis and detailed work instructions prepared and communicated by Newpark.

To address space and flow constraints, the swarf-recovery system was installed on the main deck. All well fluids were routed through the BOP bushing, diverter, 12-inch piping, swarf-removal unit, and recovered fluid pumped back to the active fluid system. A dedicated gravity-fed return line provided high-rate backup capacity to maintain operational continuity.

An initial crew of two Newpark technicians operated the system, later increased to four to ensure full coverage during extended operations.

After the first campaign, the scope expanded to include additional equipment, optimized skid dimensions and enhanced control systems to improve system flexibility and workflow efficiency.

Newpark Equipment Provided:

- 1 x BOP Bushing System
- 1 x Diverter System (Well head + C plate)
- 1 x Swarf trap (extra well monitoring equipment installation point)
- 1 x Set of 12" rigid and flexible modular piping
- 1 x Swarf removal system (magnetic + mechanical)
- 2 x Centrifugal pumps
- 1 x Tailored supporting skid with ancillaries



Figure 2 - Swarf unit package & flexible feeding pipe



Figure 3 - diverter package with C plate

Case History

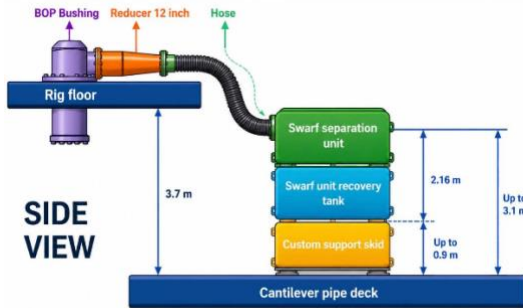


Figure 4 - installation layout design

Modular feed piping spreadsheet (for pumping back solution an extra 2m of flexible hose will be added)

Piping configuration POWA 15/16	Piping configuration POWA 14/17	Piping configuration POWA 4/13	Piping configuration POWA 12/18
Required length	Required length	Required length	Required length
mm	mm	mm	mm
inch	inch	inch	inch
bop bushing	bop bushing	bop bushing	bop bushing
swarf trap	swarf trap	swarf trap	swarf trap
x-over 20-12	x-over 20-12	x-over 20-12	x-over 20-12
injector	injector	injector	injector
12" hose	12" hose	12" hose	12" hose
45° elbow	45° elbow	45° elbow	45° elbow
45° wye	45° wye	45° wye	45° wye
12" flange	12" flange	12" flange	12" flange
Estimation	Estimation	Estimation	Estimation
mm	mm	mm	mm
inch	inch	inch	inch
Required length	Required length	Required length	Required length
mm	mm	mm	mm
inch	inch	inch	inch
Total material length	Total material length	Total material length	Total material length
mm	mm	mm	mm
inch	inch	inch	inch
Difference	Difference	Difference	Difference
mm	mm	mm	mm
inch	inch	inch	inch
Additional material	Additional material	Additional material	Additional material
mm	mm	mm	mm
inch	inch	inch	inch
12" flanged pipe	12" flanged pipe	12" flanged pipe	12" flanged pipe
12" flange	12" flange	12" flange	12" flange
12" flange	12" flange	12" flange	12" flange
12" flange	12" flange	12" flange	12" flange
12" flange	12" flange	12" flange	12" flange

Figure 5 - Length calculations of modular piping

RESULTS

Two key outcomes emerged as operations progressed:

System performance and integration:

All components of the swarf-recovery package performed within design specification. Despite the complexity and number of variables, the assembly and commissioning proceeded smoothly. Thorough engineering and planning resulted in a robust, reliable system.

Operational efficiency and fluid management:

The equipment successfully processed 100% of fluid returns, removing all swarf efficiently, maintaining programmed flow rates and without delaying rig operations. No stoppages or fluid spills occurred throughout the operation, including during ditch, shaker header box and deck cleaning. Both the drilling contractor and the client provided highly positive feedback.

About Newpark Solids Control and Waste Management Services

Newpark's Solids Control and Waste Management Specialists deliver engineered, project-specific solutions that maximize fluid recovery and minimize waste volumes, improving overall fluid economics while meeting stringent environmental regulations. High-reliability equipment, robust contingency planning, and experienced technical oversight help reduce the risk of operational downtime when processing on the critical path. For more information, please contact your local Newpark representative.