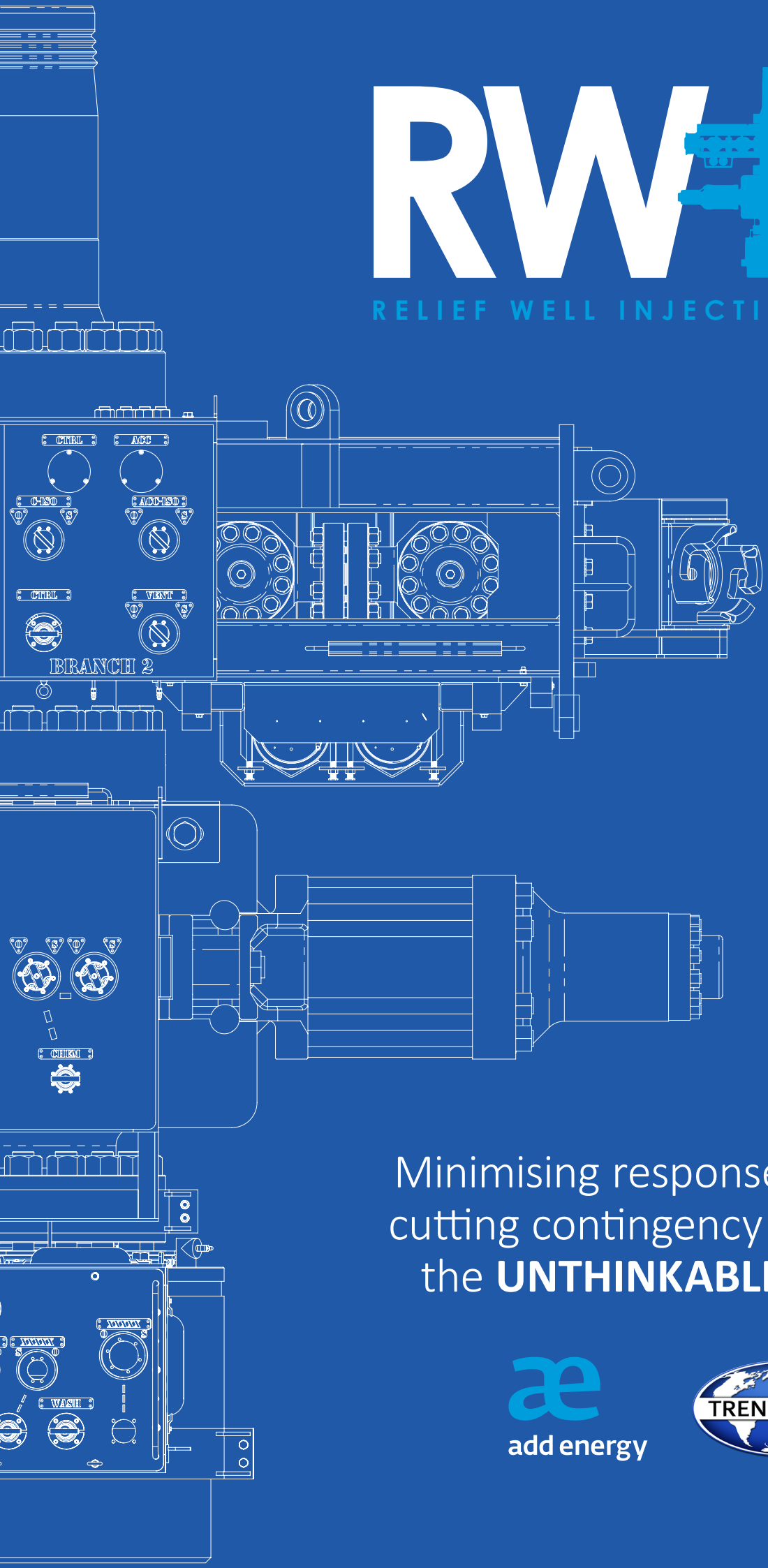
RWIS

RELIEF WELL INJECTION SPOOL

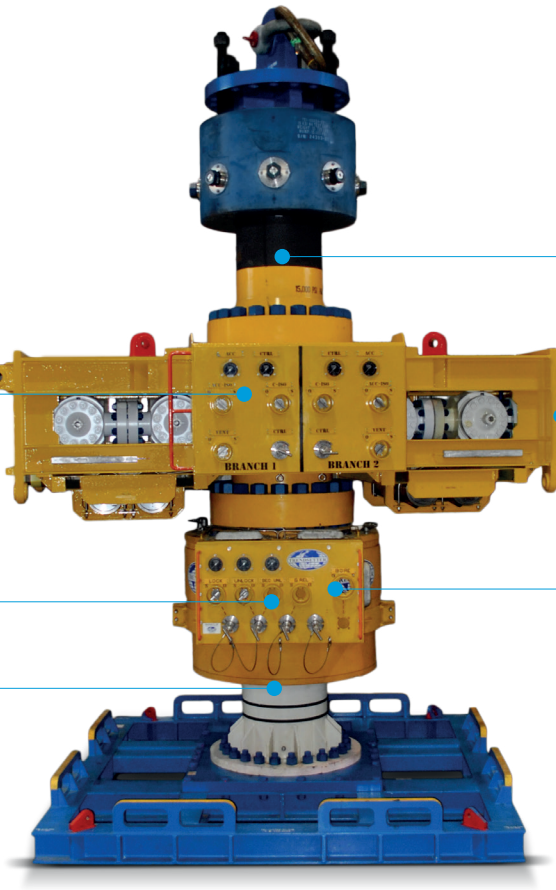


Minimising response times and cutting contingency costs when the **UNTHINKABLE** happens

add energy

TRENDSETTER

Add Energy and Trendsetter Engineering have combined expertise to provide market leading engineering and hardware support services to the industry's most challenging problems in a nimble and responsive environment.



18 3/4 15ksi: Mandrel
H4 VX/VT

4 1/16" Slab Gate Valves
x2 FSC each side

4" Horizonal Connector
each side, API 17H

ROV Panels

18 3/4 15ksi:
Single Pipe Shear / Blind Ram
(optional)

18 3/4 15ksi: Wellhead
Connector - Cameron HCH4

The Relief Well Injection Spool (RWIS) is a piece of specialist subsea equipment that enables operators to stop a blowout from a prolific reservoir safely and efficiently via a single relief well

This is achieved by increasing the pump rate of kill mud into the blowing well by removing the bottle-neck caused by restrictive choke and kill lines from the surface vessel to the seabed.

The RWIS has been designed and built to greatly increase the pumping capacity of a single relief well by enabling the ability to pump in excess of 200 barrels of kill mud per minute through a single relief well, four times as much kill fluid as typically achievable. A significant advance for the industry which utilizes multiple vessels as opposed to the conventional method of multiple relief wells.

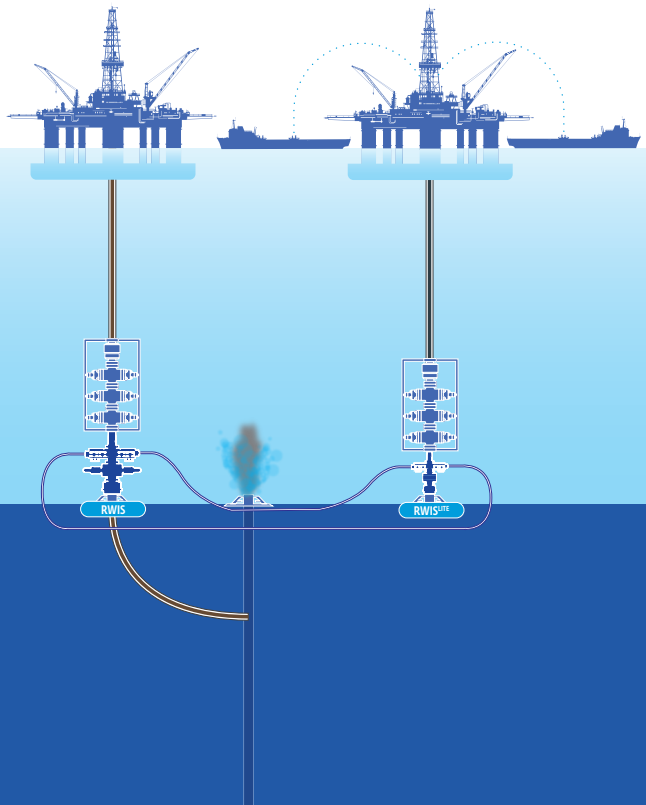
The RWIS is installed on the relief well wellhead beneath the blowout preventer (BOP) to provide additional flow connections into the wellbore. Using high-pressure flex lines, the inlets enable pumping units from separate floating vessels, in addition to the relief well rig, to deliver a high-rate dynamic kill.

To find out more about the RWIS visit addenergy.no/rwis

Benefits of using the RWIS

- Simplified solution that improves safety of a well kill operation
- Enables relocation of pumping and storage off the rig to dedicated pumping vessels
- Meets legislative requirements, allowing operators to drill in environmentally sensitive areas
- No rig modifications are required or interference with primary well control equipment
- Can be easily moved and transported
- Rapid kill of a blowing well – through high volume, high pressure fluids into a blowing well

A single relief well with the Relief Well Injection Spool (RWIS) installed on its wellhead was used in the simulations to pump kill mud into the target wellbore. Several iterations were made using different kill muds and hardware configurations to achieve a successful kill



Sample Results

The study demonstrated that a prolific worst-case blowout scenario could in this case, be killed with a single relief well using the RWIS due to a significant increase in kill mud pumping capacity.

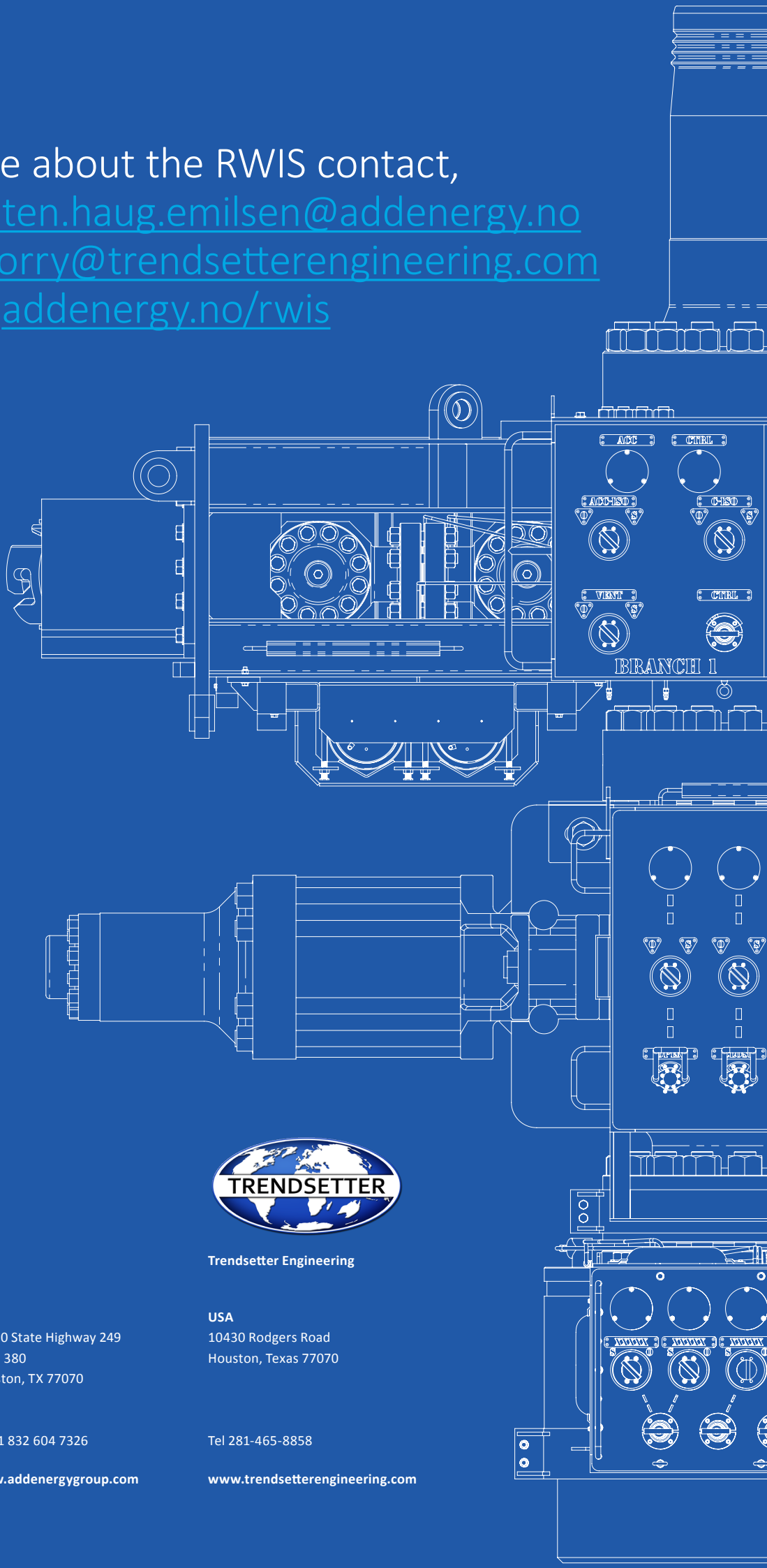
REDUCED REQUIRED RIGS FROM 4 to 2

260%

INCREASE OF INJECTION RATES OF KILL MUD

REDUCED REQUIRED INTERCEPTS FROM 4 to 1

To find out more about the RWIS contact, Morten on morten.haug.emilsen@addenergy.no or Brett on b.morry@trendsetterengineering.com or you can visit addenergy.no/rwis



add energy

Add Energy Group AS
Well Control & Blowout Support

NORWAY
Visiting address:
Strandveien 33, N-1366 Lysaker
P.O. Box 26,
N-1324 Lysaker, Norway

Tel +47 66 98 32 90

USA
19500 State Highway 249
Suite 380
Houston, TX 77070

Tel +1 832 604 7326

www.addenergygroup.com

TRENDSETTER

Trendsetter Engineering

USA
10430 Rodgers Road
Houston, Texas 77070

Tel 281-465-8858

www.trendsetterengineering.com