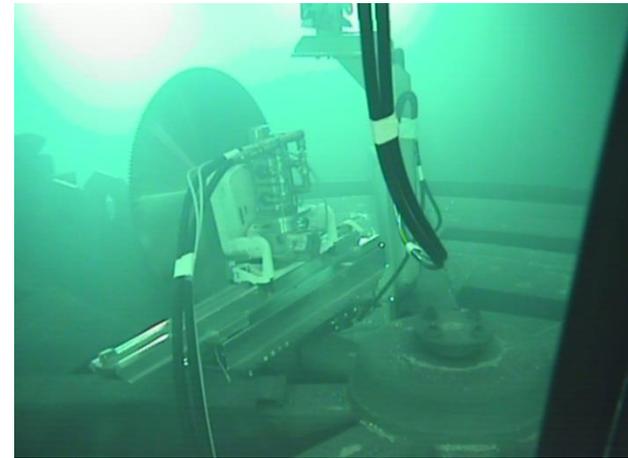
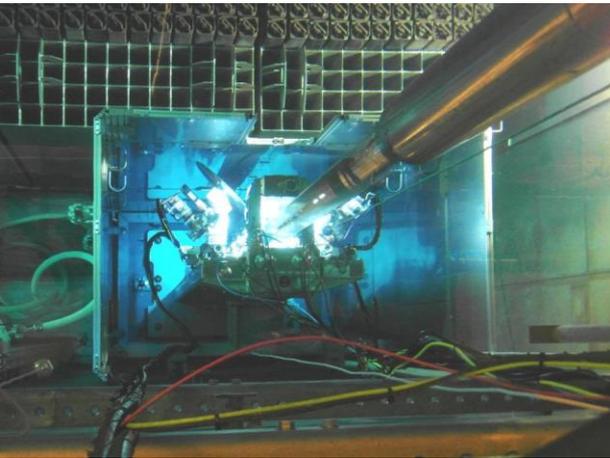


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DECOMMISSIONING TECHNOLOGIES

Technologies for the safe decontamination and dismantling of nuclear and conventional facilities



Founded in 1848 – innovations for generations



1848



1965



1982



2009

1890



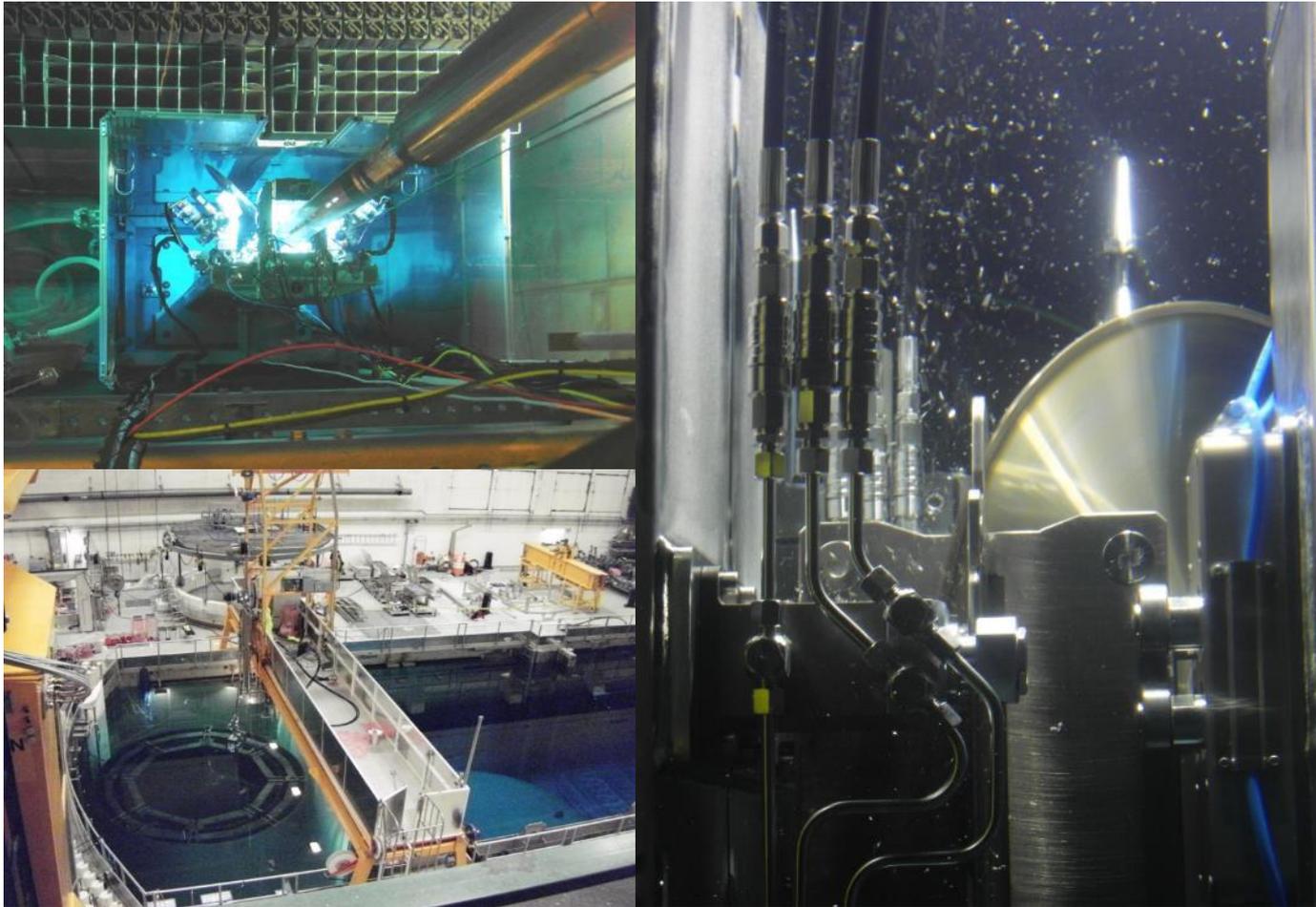
1979



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Dismantling of reactor core components

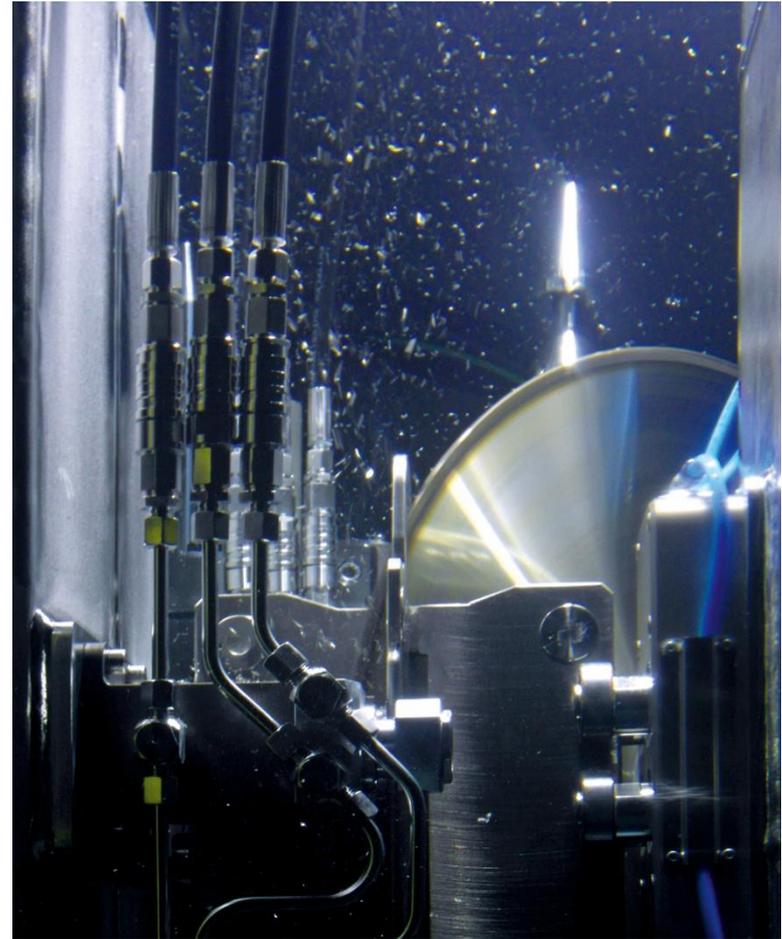


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DECOMMISSIONING TECHNOLOGIES

BRAUN Cold Cutting Saw

- Mobile and light weight machine
 - weight: 40 kg
- Remote controlled
- Cutting depth up to 530 mm
- Hydraulic or electric driven
- Suitable for underwater cutting up to 20 meters – IP68



BRAUN Cold Cutting Saw

- Safe & cold separation of
 - High-alloyed steel
 - Copper
 - Lead
 - Composite materials
 - Metal structures
- Different mounting options
 - Vacuum suction pads
 - Magnetic feet
 - Automatic clamping units
 - Many other customized solutions

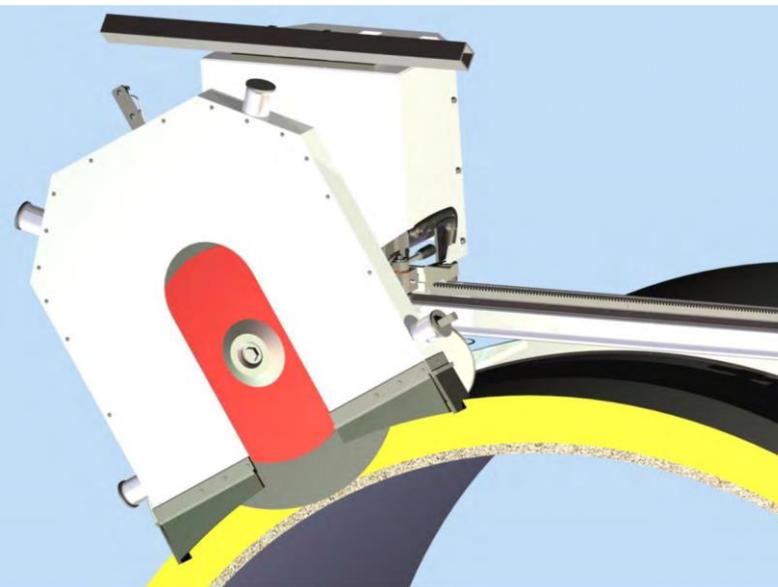


BRAUN Cold Cutting Saw – application examples

Cutting of a pressurizer for Vattenfall (Sweden) in cooperation with EBS



Pressurizer



First cut around (100 mm deep)
20 mm are left for the final cut
No hot zone area has to be arranged

BRAUN Cold Cutting Saw – application examples

Cutting of a pressurizer for Vattenfall (Sweden) in cooperation with EBS



90 % of the cuts were done under normal conditions



Final cut of 20 mm was made remote controlled via cameras

BRAUN Cold Cutting Saw – application examples

Cutting of a pressurizer for Vattenfall (Sweden) in cooperation with EBS



Saw head equipped with cameras



Finished piece of pressurizer
(sample for micro structure analyses
of the welding)

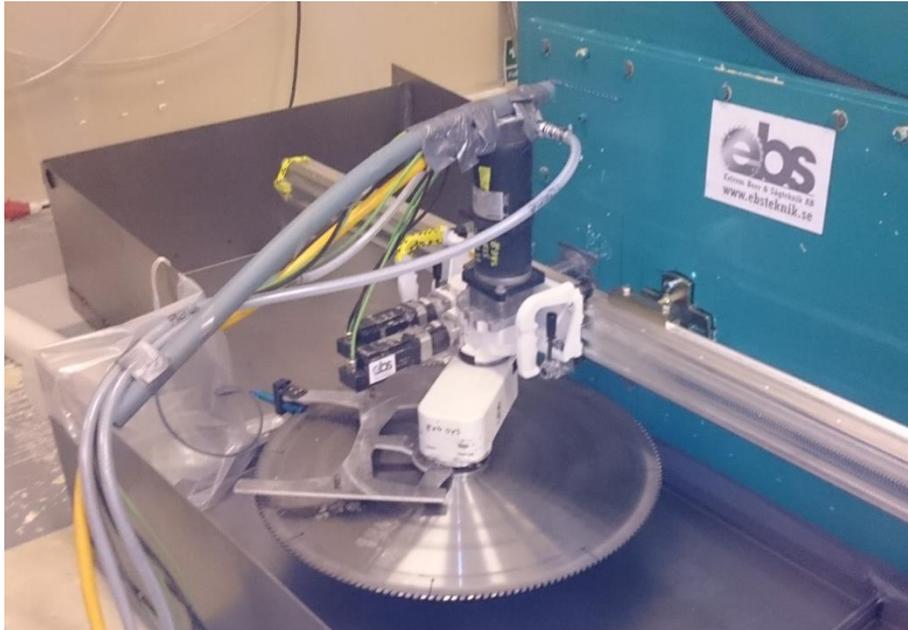
BRAUN Cold Cutting Saw – application examples

Reactor top test samples in Ringhals for Vattenfall in cooperation with EBS

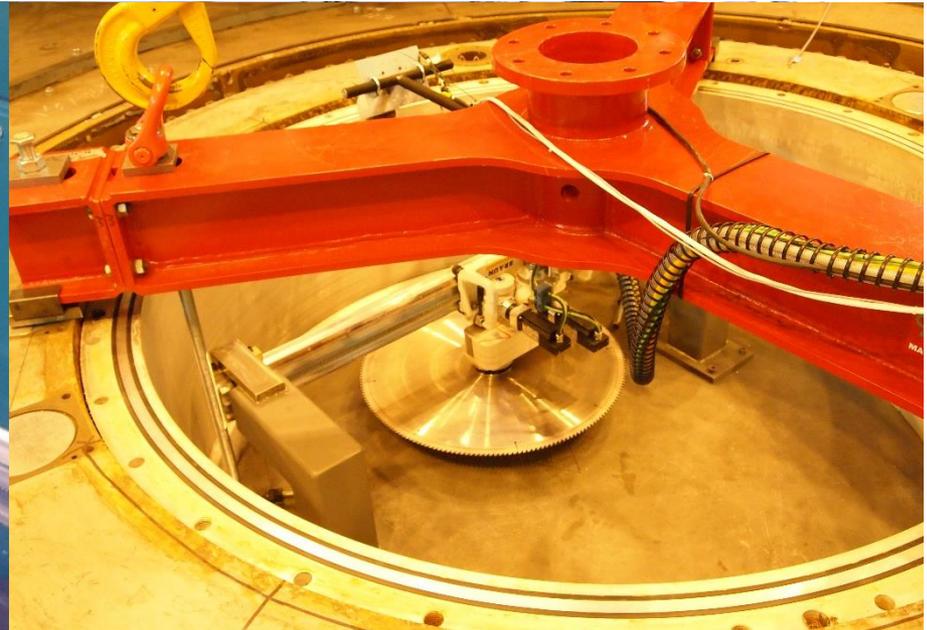


BRAUN Cold Cutting Saw – application examples

Cutting of a pressure vessel for Risø DTU (Denmark) in cooperation with EBS



Cutting of doors between hot cells



Cold Cutting Saw mounted on a radiation shield to cut the reactor tank

BRAUN Cold Cutting Saw – application examples

Cutting of a radiation shield for NIS Simpelkamp

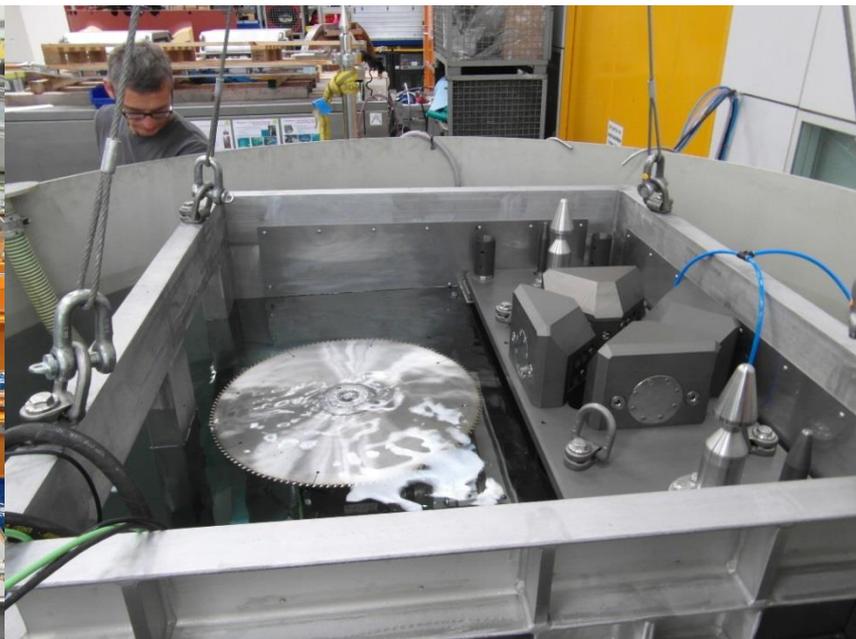
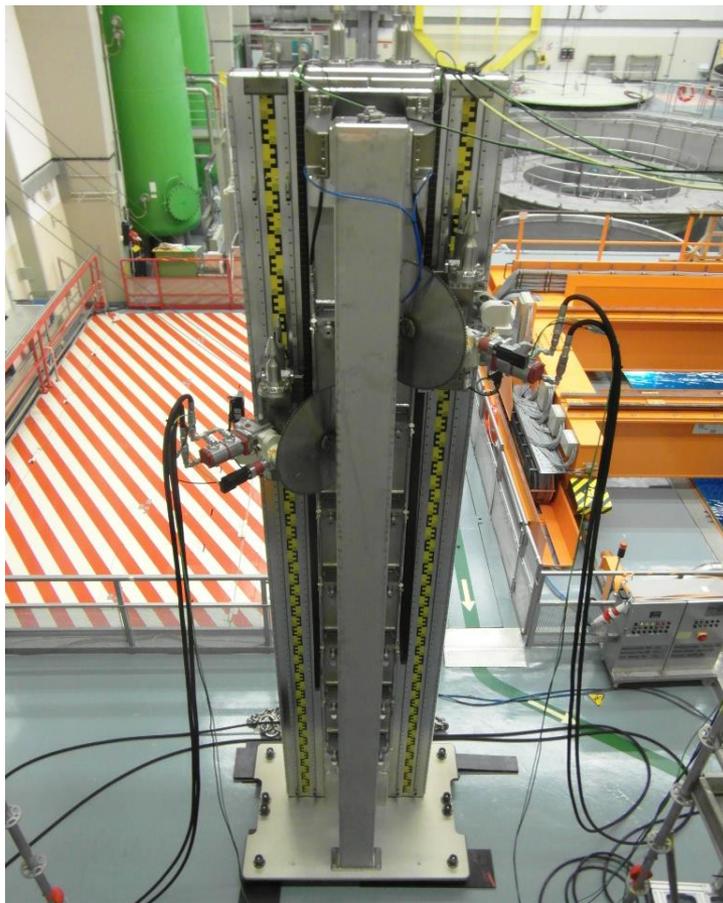


Cutting of 700 mm thick plates



Smooth cutting surface even though the cut was done from two sides

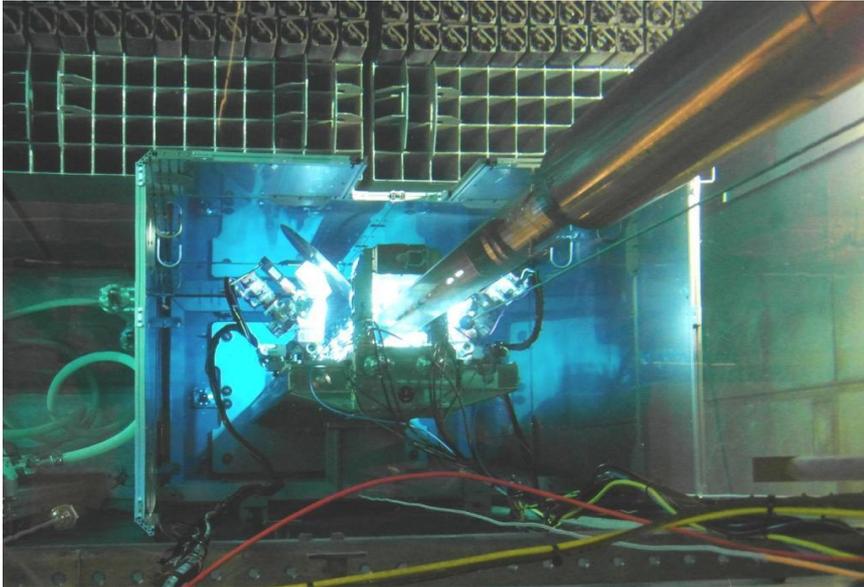
BRAUN Cold Cutting Saw – application examples



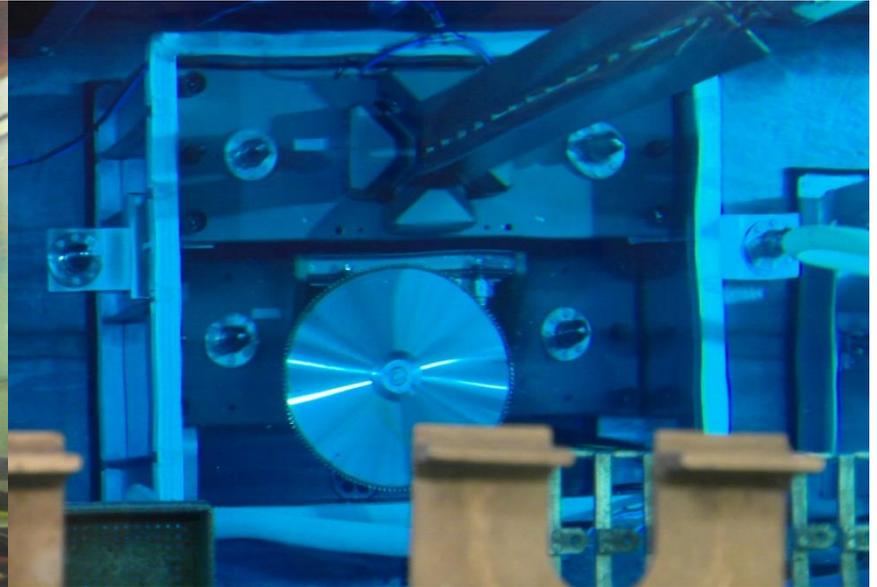
The saws for testing and certification
by nuclear authority
before delivery to jobsite
(NPP Isar-1 Germany)

BRAUN Cold Cutting Saw – application examples

Cutting of control rods in Isar-1 (Germany) in cooperation with AREVA



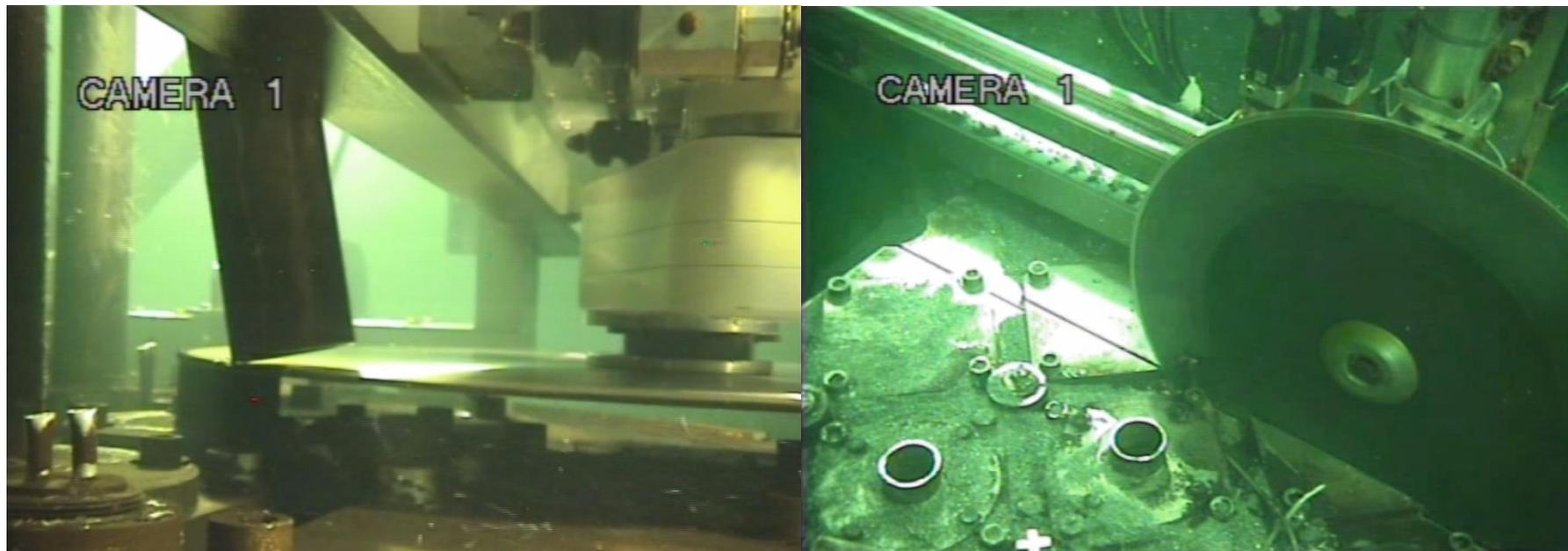
Control rods cut underwater inside the cooling pond of the nuclear power plant



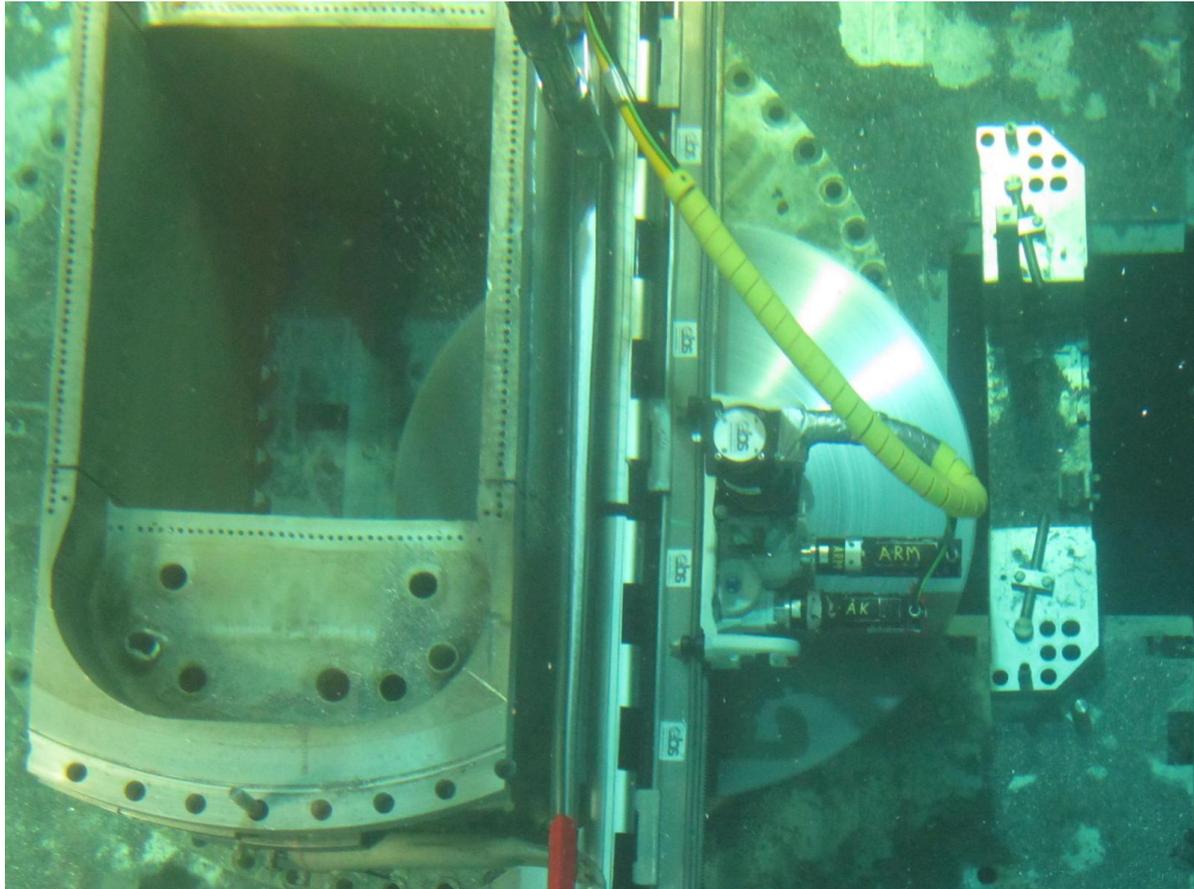
Horizontal cut to cut off the base of the control rod

BRAUN Cold Cutting Saw – application examples

Underwater segmentation of a reactor vessel in Zorita (Spain)
for Westinghouse in cooperation with EBS

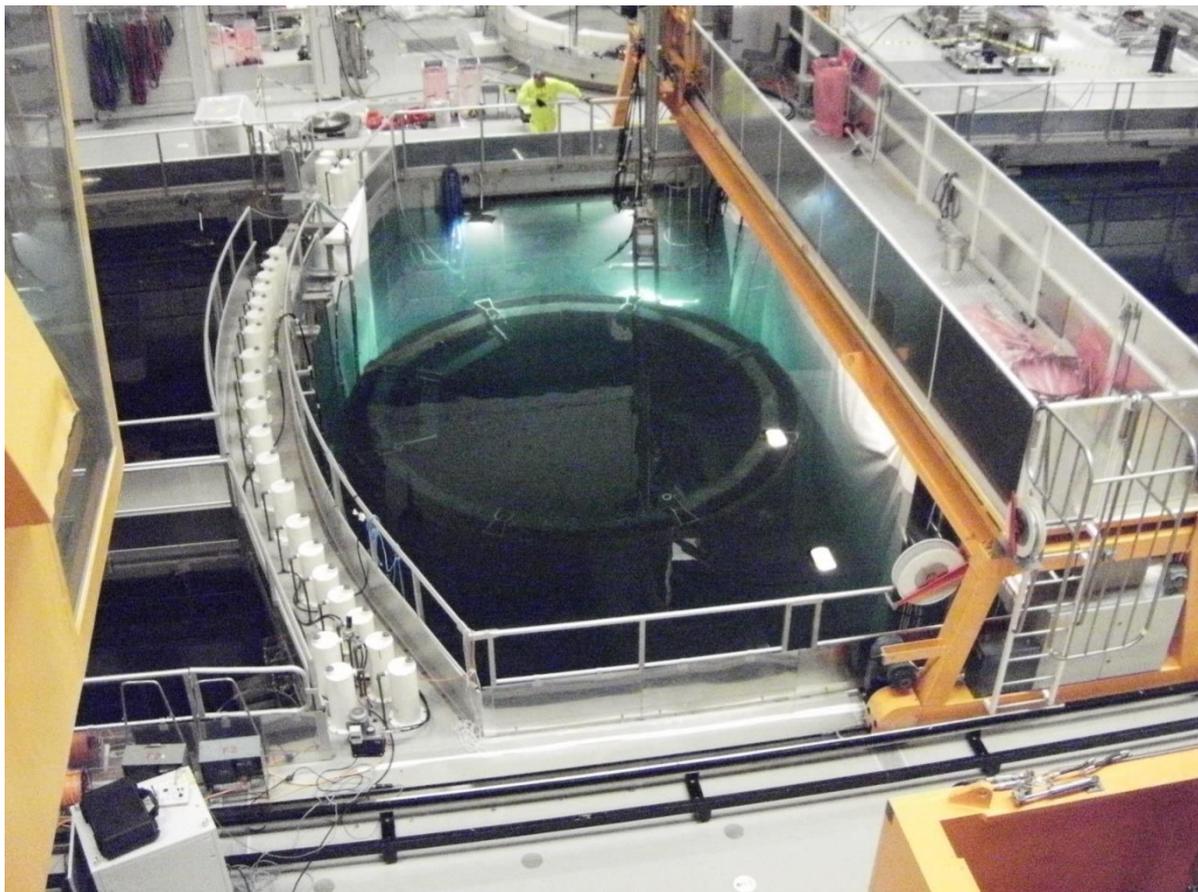


BRAUN Cold Cutting Saw – application examples



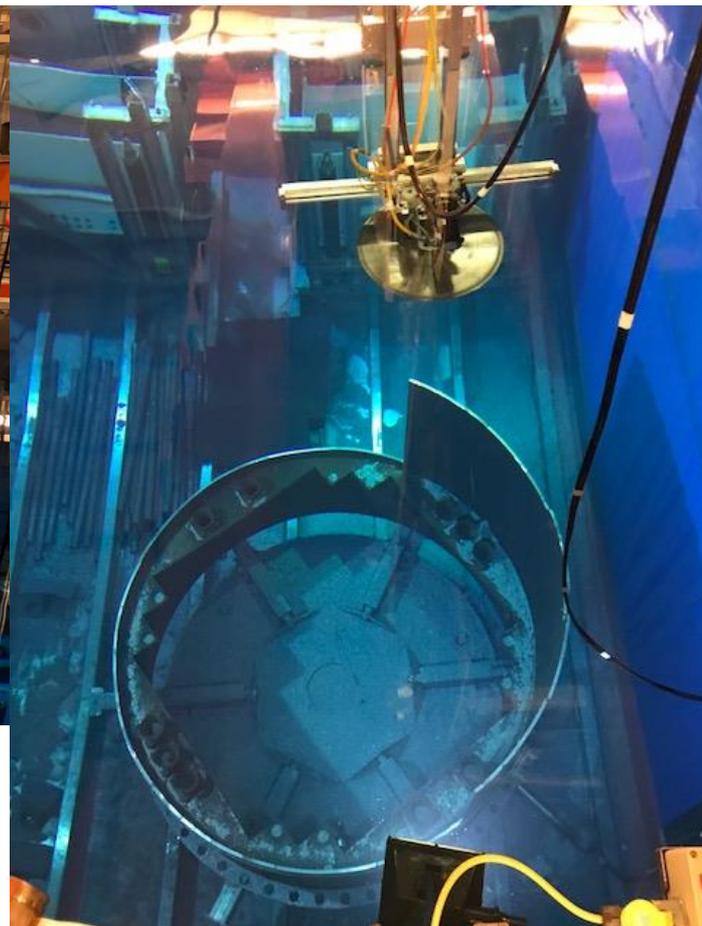
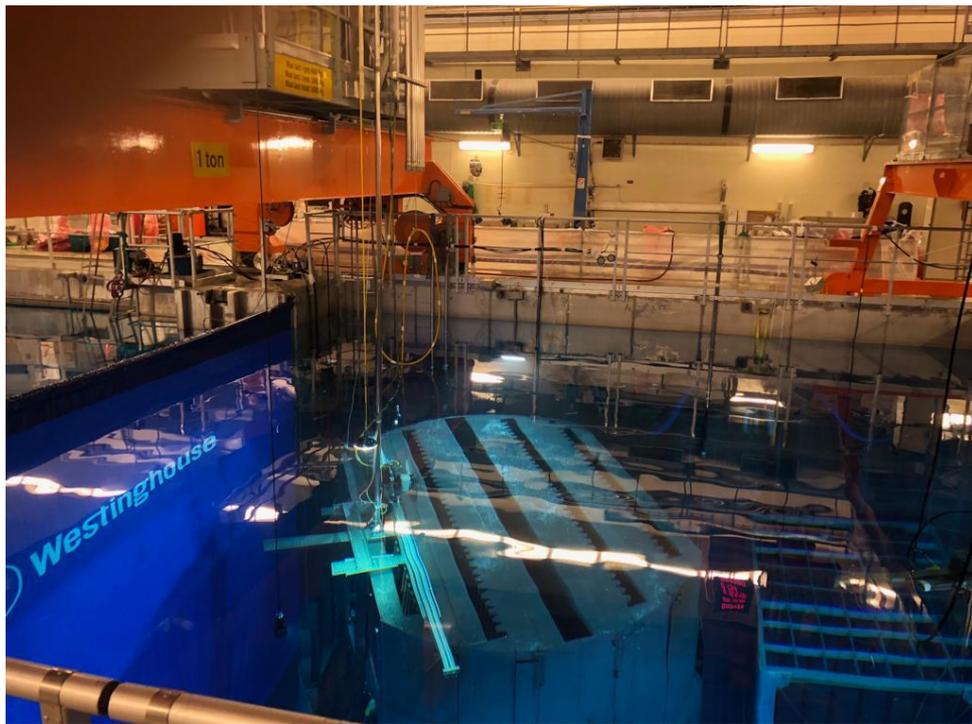
Underwater cutting of a research reactor in Sweden (SVAFO) for AREVA in cooperation with EBS

BRAUN Cold Cutting Saw – application examples



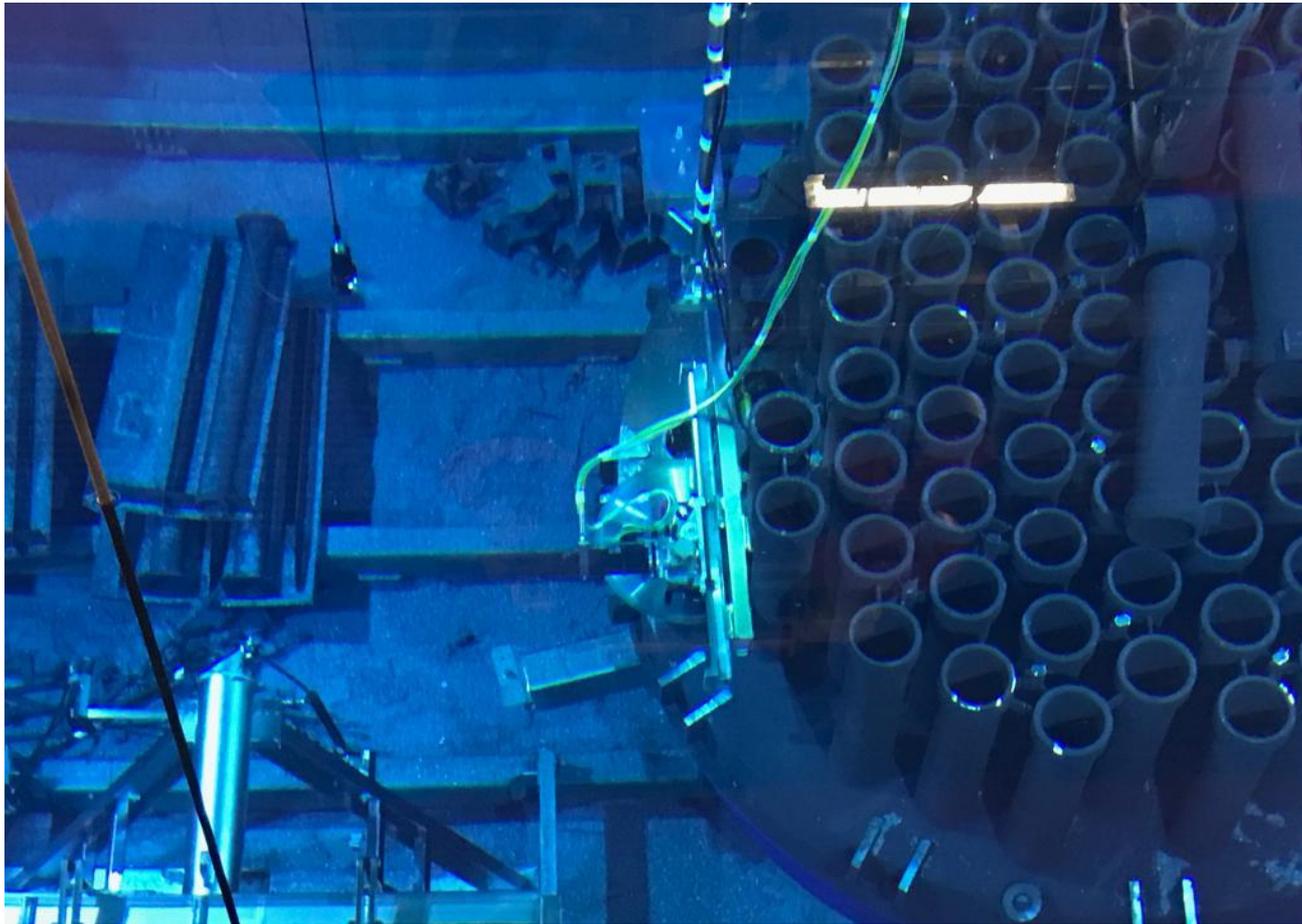
Underwater dismantling of a
steam dryer in Sweden
(Forsmark)
by using an operation bridge
above the cooling pond
(Westinghouse)

BRAUN Cold Cutting Saw – application examples



Underwater dismantling of a steam dryer in the cooling pond (NPP Barsebaeck Sweden) for Westinghouse in cooperation with EBS

BRAUN Cold Cutting Saw – application examples



Cutting control rod
guiding pipes under
water in
Neckarwestheim
Germany
(Westinghouse)

BRAUN Wall Shaver for decontamination

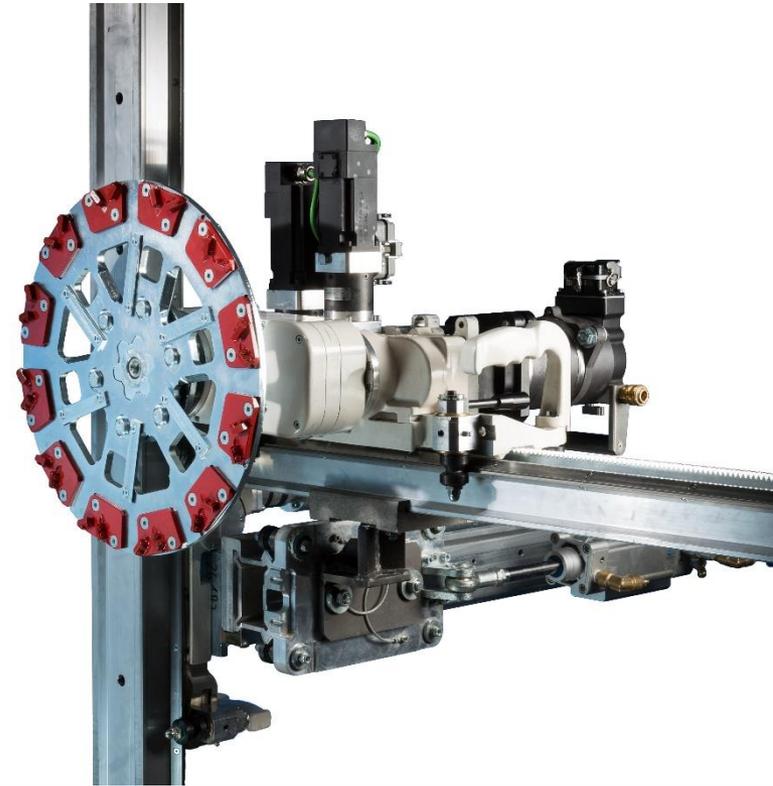


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BRAUN Wall Shaver for decontamination

- Removal of coatings and contaminated surfaces or layers
- Shaving depth up to 10 mm in one step
- Electrically driven (max power 22 kW)
- Max. shaving diameter \varnothing 600 mm
- Dust free processing
- Wide variety of mounting options
 - Vacuum plates
 - Telescopic lift for ceiling shaving



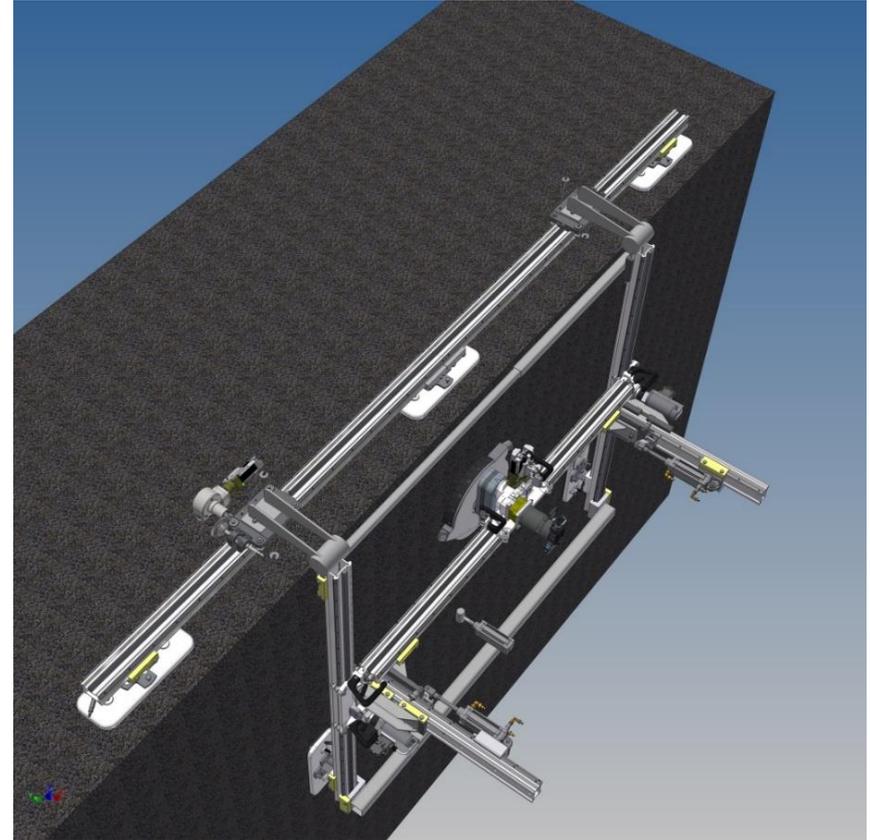
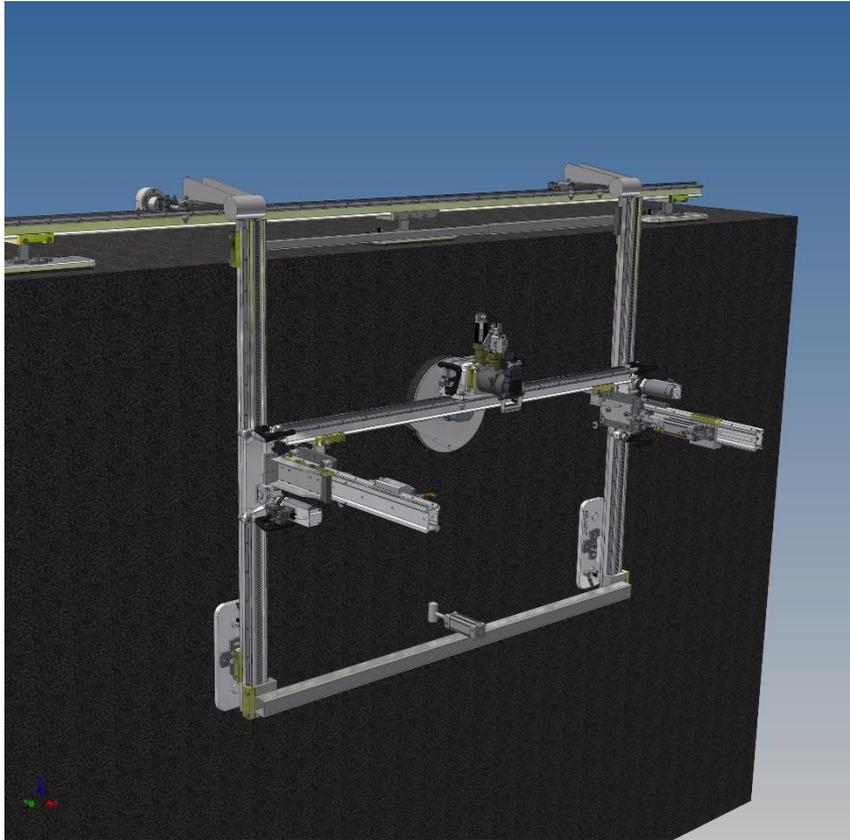
BRAUN Wall Shaver for decontamination – different mounting options



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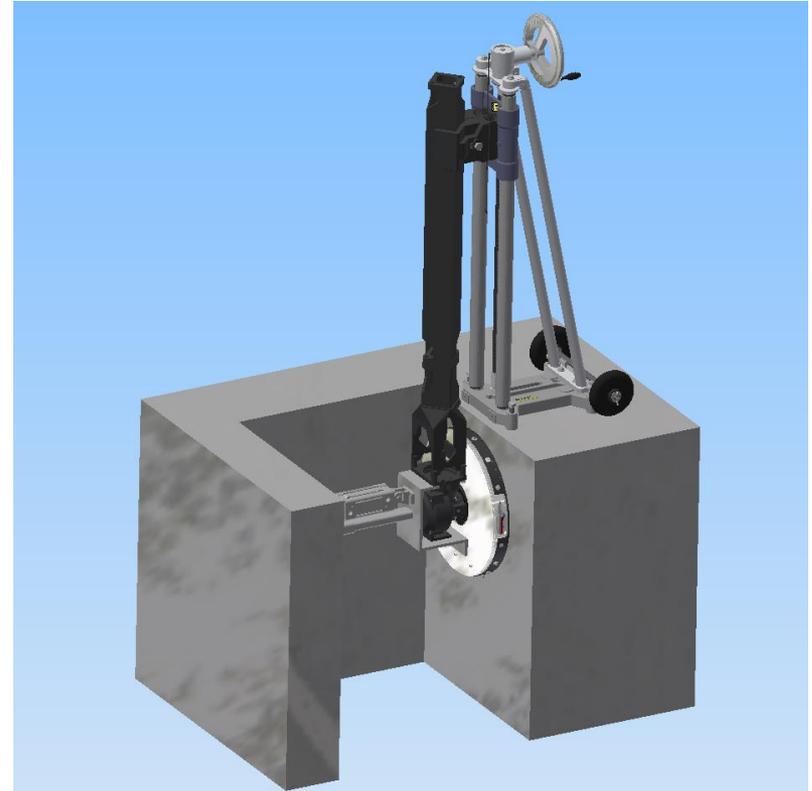
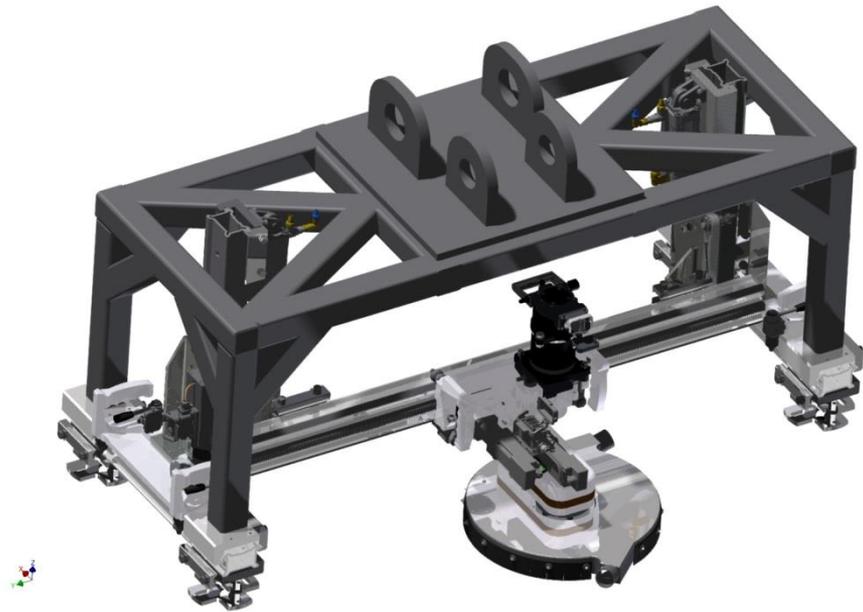
BRAUN Wall Shaver for decontamination – different mounting options



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BRAUN Wall Shaver for decontamination – different mounting options



BRAUN Wall Shaver for decontamination – application examples

- Shaving depth – up to 10 millimeters per step
- Removal rate 10 times higher than hand held machines
- Screwed milling disc can be equipped with different segments



BRAUN Wall Shaver for decontamination – application examples

Shaving trial for a storage pond in Sellafield



Wall Shaver mounted directly above the water level via dowel feet



Shaving of 10 mm in one step

BRAUN Wall Shaver for decontamination – application examples

Decontamination for Danish Decommissioning in cooperation with EBS



Removal of the decont-coating



Wall shaver mounted on a ceiling via vacuum plates

BRAUN Wall Shaver for decontamination – application examples



Wall Shaver in the research center
Jülich (Germany)

Movable carriage in combination with
vacuum plates makes it easy to move
the Wall Shaver to the left or right or to
another wall

BRAUN Wall Peeling for deeper decontamination



Cutting depth up to
50 mm in one step



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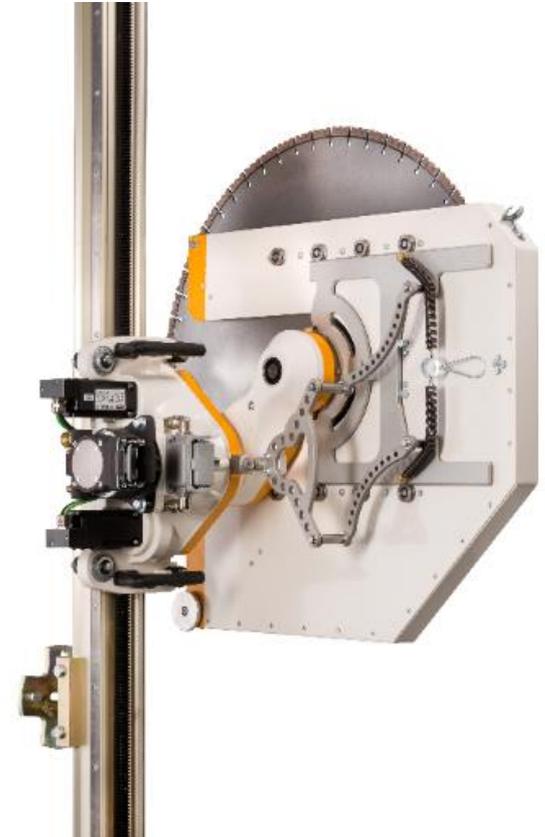
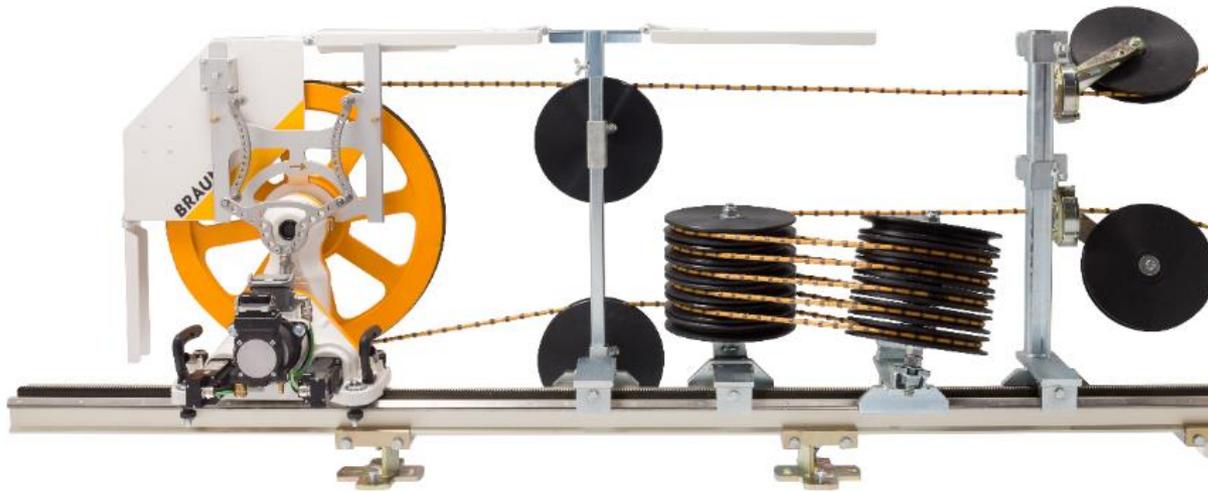
BRAUN conventional technologies for dismantling after decontamination



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DECOMMISSIONING TECHNOLOGIES

BRAUN conventional technologies for dismantling after decontamination



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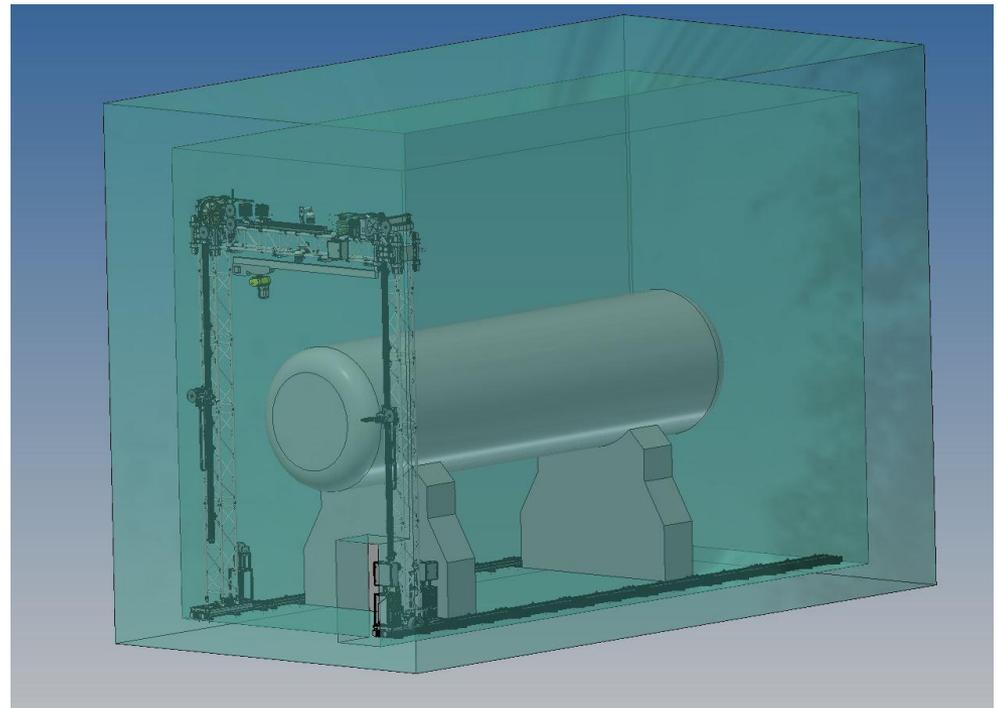
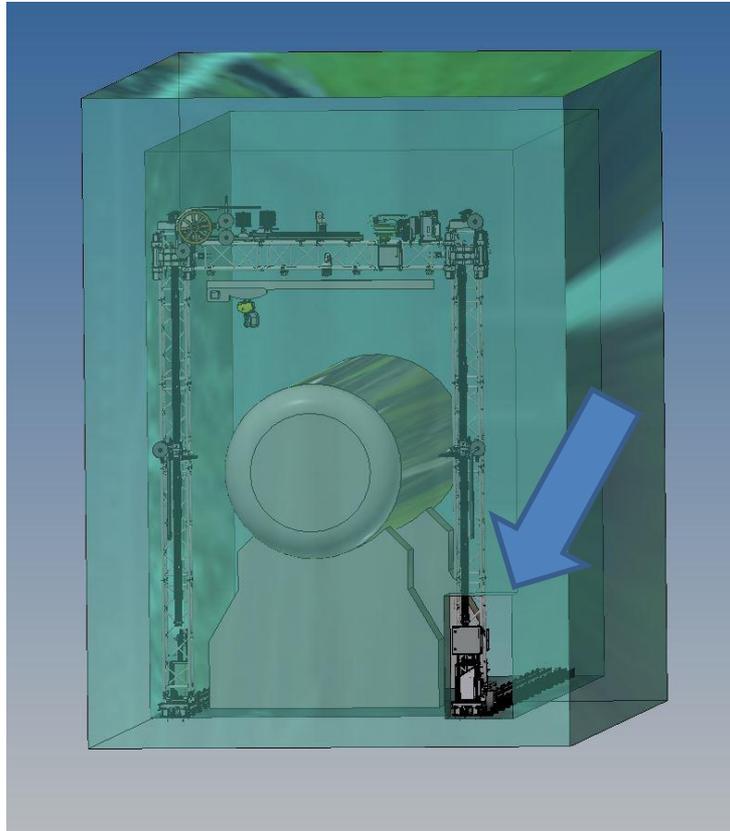
DECOMMISSIONING TECHNOLOGIES

BRAUN Bridge Saw

- Movable and mobile system
- Combines multiple cutting technologies
- Can be adjusted to the object that needs to be cut due to modular construction
- Integrated gantry crane
- For Russian nuclear power plant Novovoronezh



BRAUN Bridge Saw



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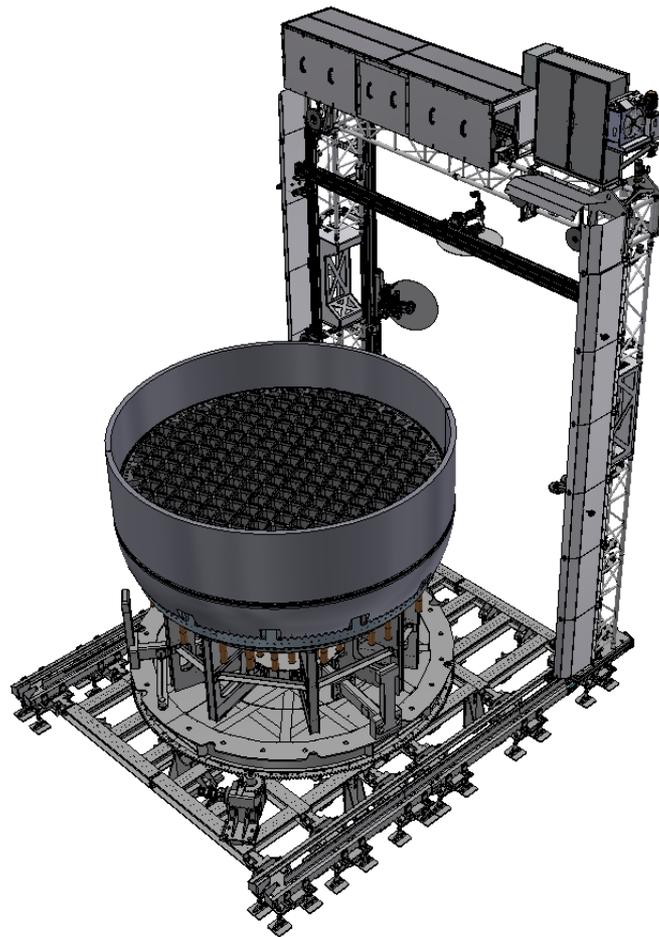
BRAUN Bridge Saw



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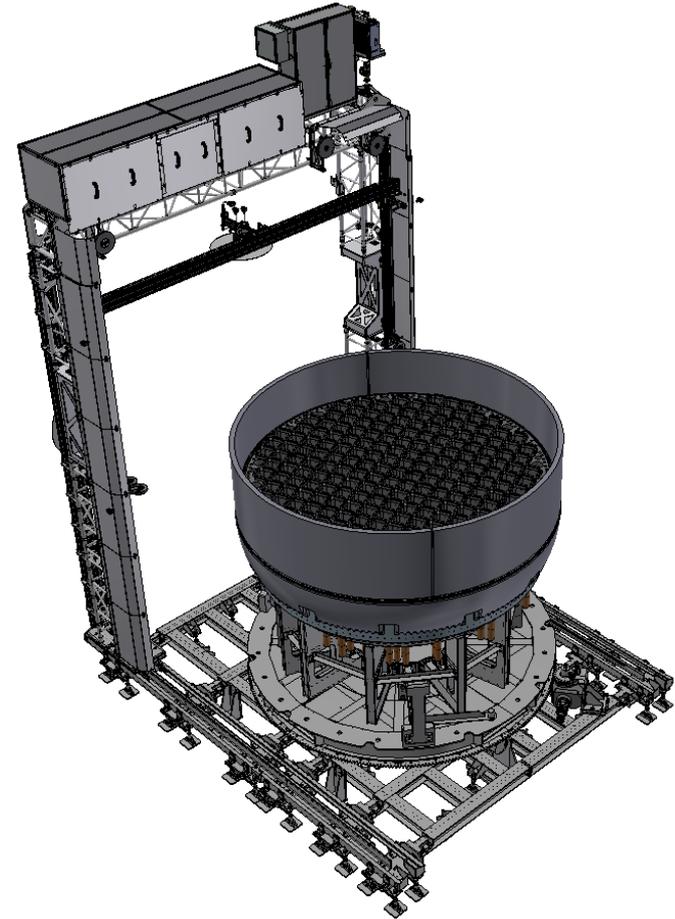
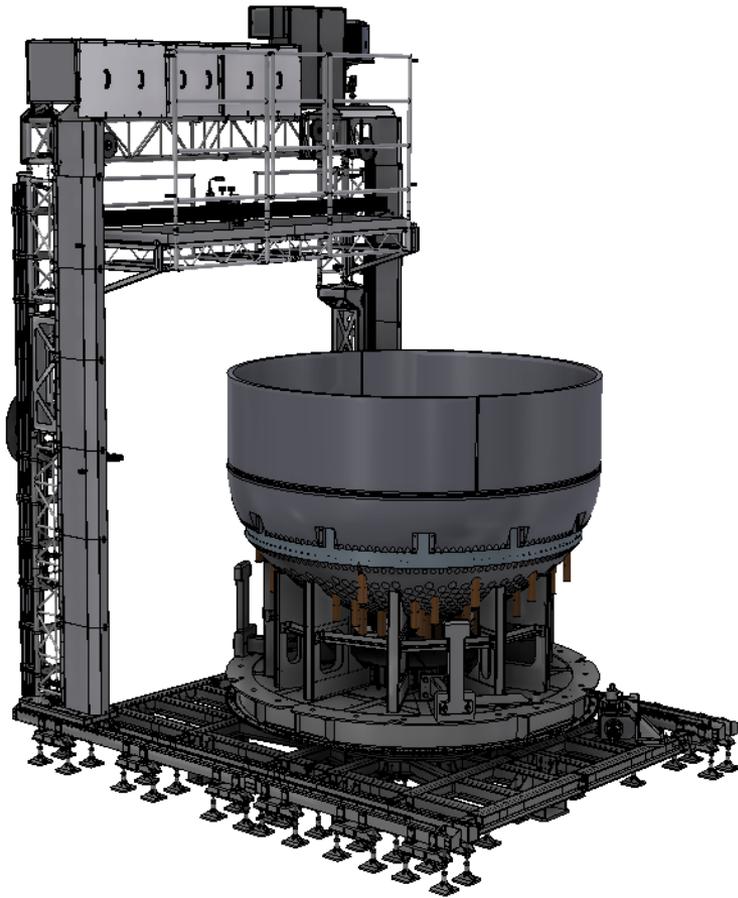
DECOMMISSIONING TECHNOLOGIES

BRAUN Underwater Bridge Saw with 360° turntable



Bridge saw with 2 cold cutting saws and 1 wire saw and an additional subconstruction for German nuclear power plant Mülheim-Kärlich

BRAUN Underwater Bridge Saw with 360° turntable



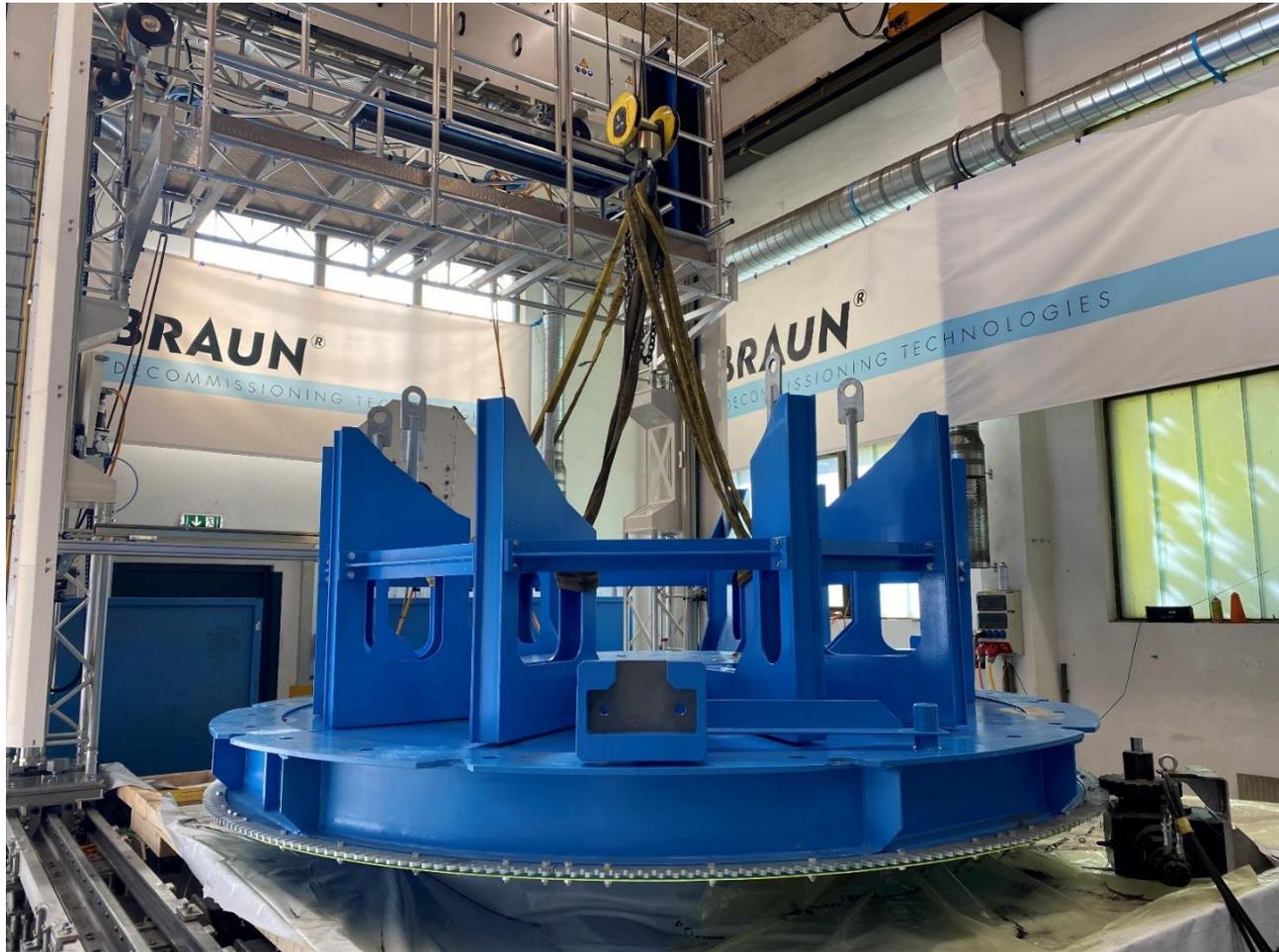
BRAUN Underwater Bridge Saw with 360° turntable



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BRAUN Underwater Bridge Saw with 360° turntable



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BRAUN Centrifugal Cutter



When (contaminated) pipes
need to be cut from the inside

Cutting without feed drive

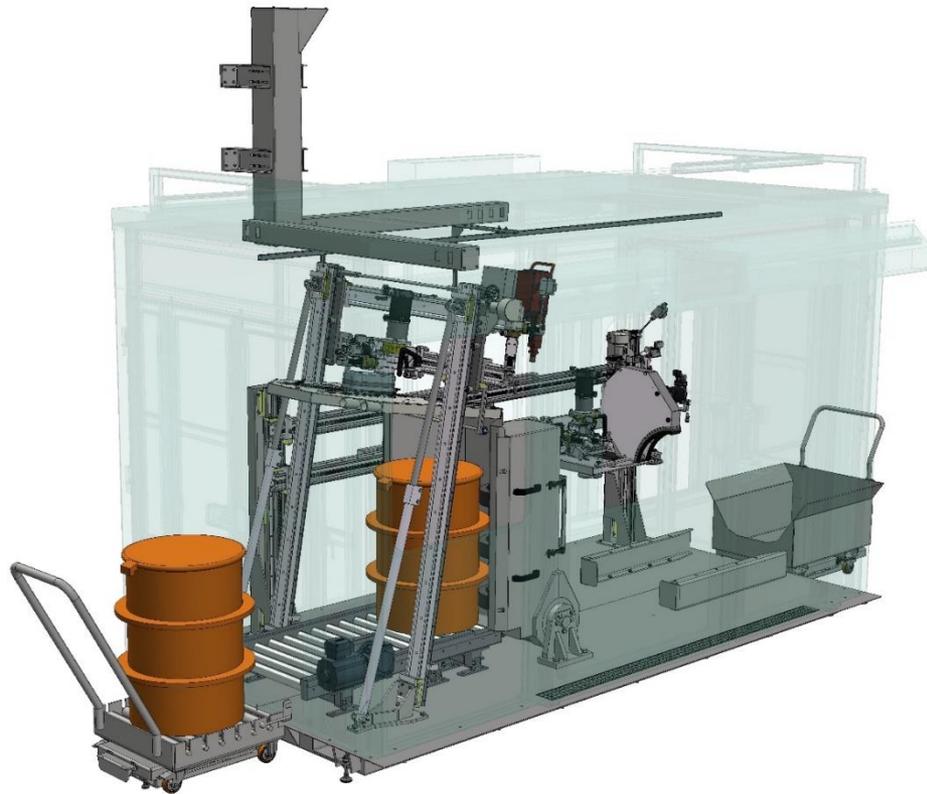
BRAUN Internal Cutter



For cutting larger pipes underwater

BRAUN Drum Disassembling Machine

For the interim storage of Austria for nuclear waste (Seibersdorf)



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BRAUN Drum Disassembling Machine

- Combination of cutting and milling as well as drilling solutions
- Dismantling of homogeneous and inhomogeneous drums containing radioactive waste
- Separation of contaminated material from non-contaminated
- Repacking in new drums
- Considerable reduction of final storage volume



BRAUN Drum Disassembling Machine



BRAUN Drum Disassembling Machine



BRAUN Drum Disassembling Machine





BRAUN Drum Disassembling Machine



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BRAUN Drum Disassembling Machine



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BRAUN Drum Disassembling Machine

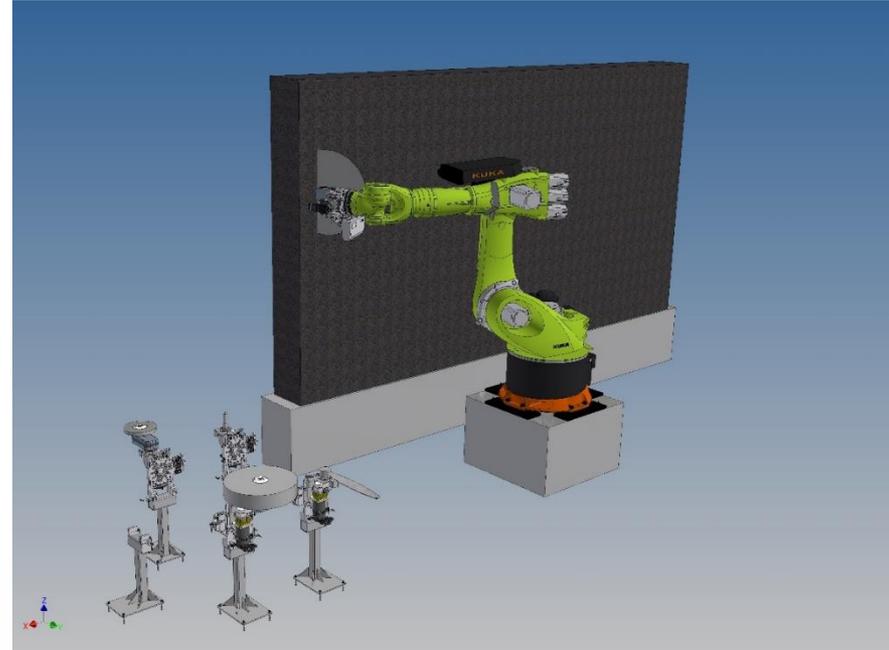


BRAUN[®]

DECOMMISSIONING TECHNOLOGIES

Customized solutions – robot controlled processing modules

Fully automated processing modules to cut openings in pre-fabricated brick walls in a brick factory (modules are changed automatically)





Thank you for your attention



BRAUN[®]

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