



Mobile NORM Decontamination in the Oil & Gas Industry



**EAN- NORM Topical Day
Dec. 7th 2012, Dresden (Germany)
Zaid Hassan- BAUER Water GmbH**

Agenda

- 1** About BAUER Water
- 2** NORM Background
- 3** NORM: Situation at an Oil Field
- 4** Mobile NORM Decontamination Plant

BAUER Group Company Divisions



Construction



Equipment



Resources

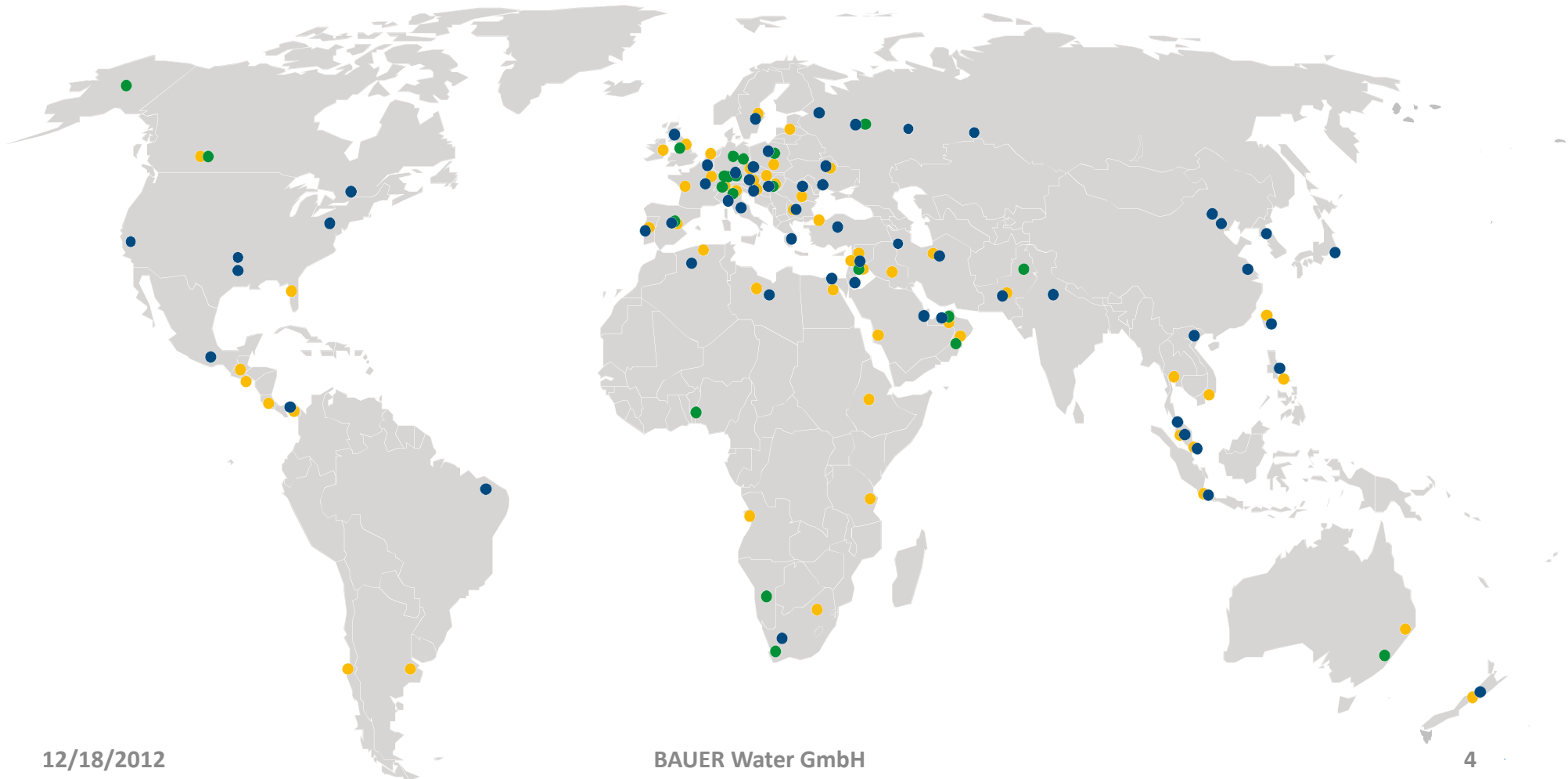


Worldwide network

Business segments with permanent subsidiaries



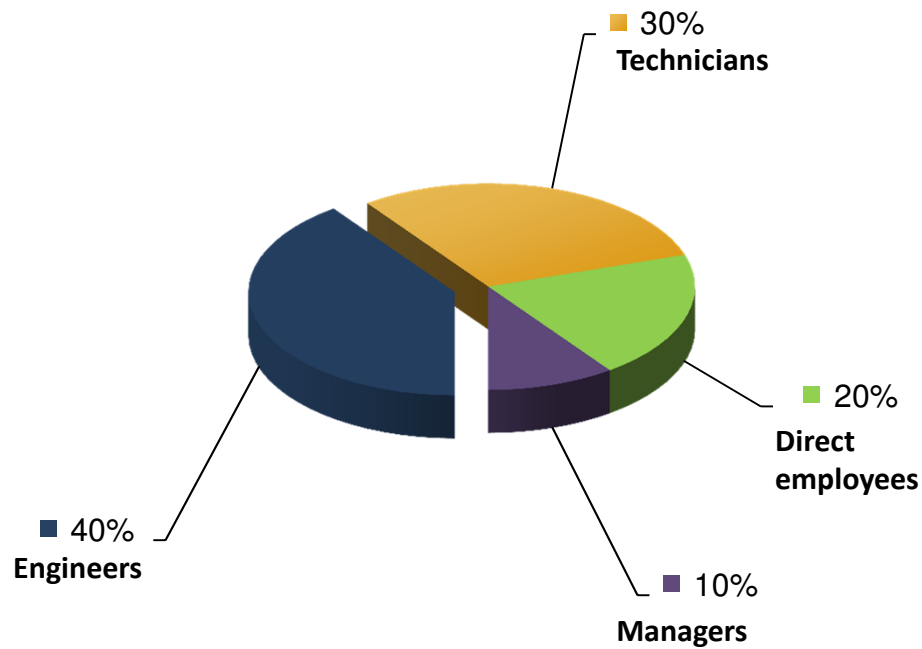
- Construction
- Equipment
- Resources



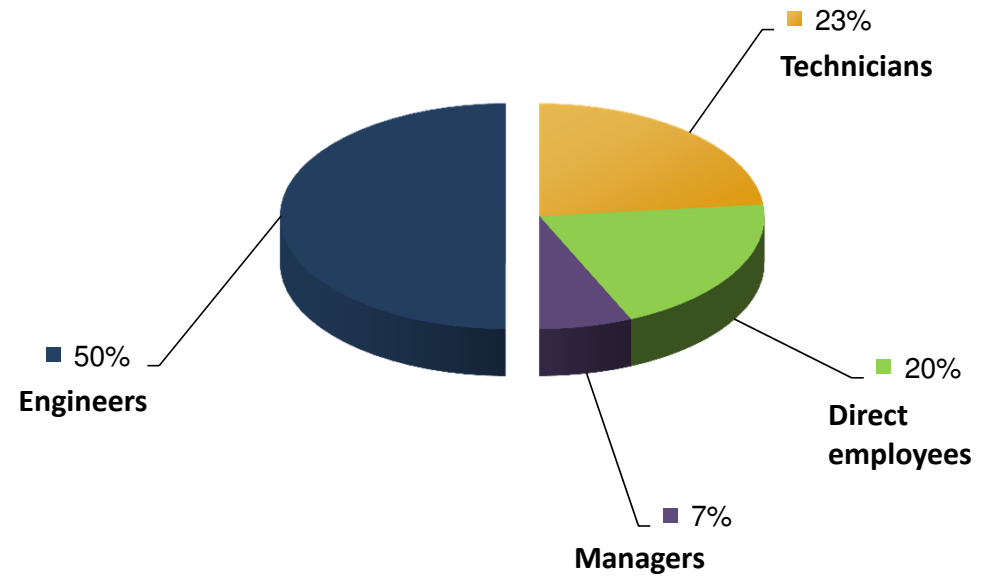
Personal Resources



BAUER Group
Total approx. 9.800 employees



BAUER Water
(Environment Division)
Total approx. 310 employees



BAUER Water business activities





Agenda

2 NORM Background

NORM Background

- ❑ **Acronym: Naturally Occuring Radioactive Materials**
- ❑ **First recognition of NORM in 1930**
- ❑ **NORM received a global attention during last 4 decades**
- ❑ **NORM is mostly a waste problem! (rather than radiological)**

Main types of NORM

Oil & Gas Industry



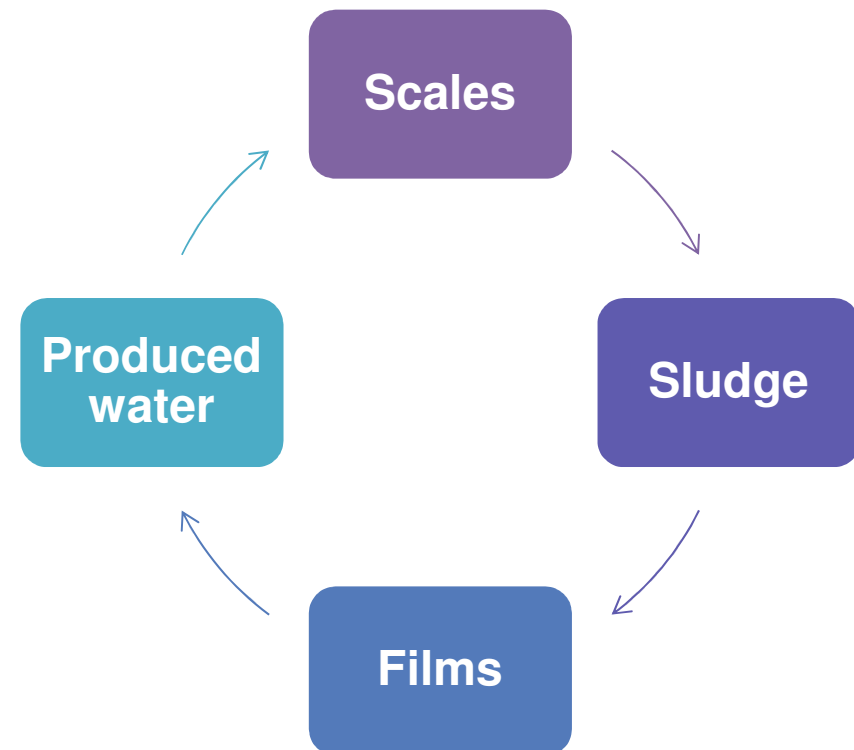
Occurrence

Wet parts of oil production installations; well completions, water treatment plant

Ubiquitous in production facilities. Low activity but very large volumes

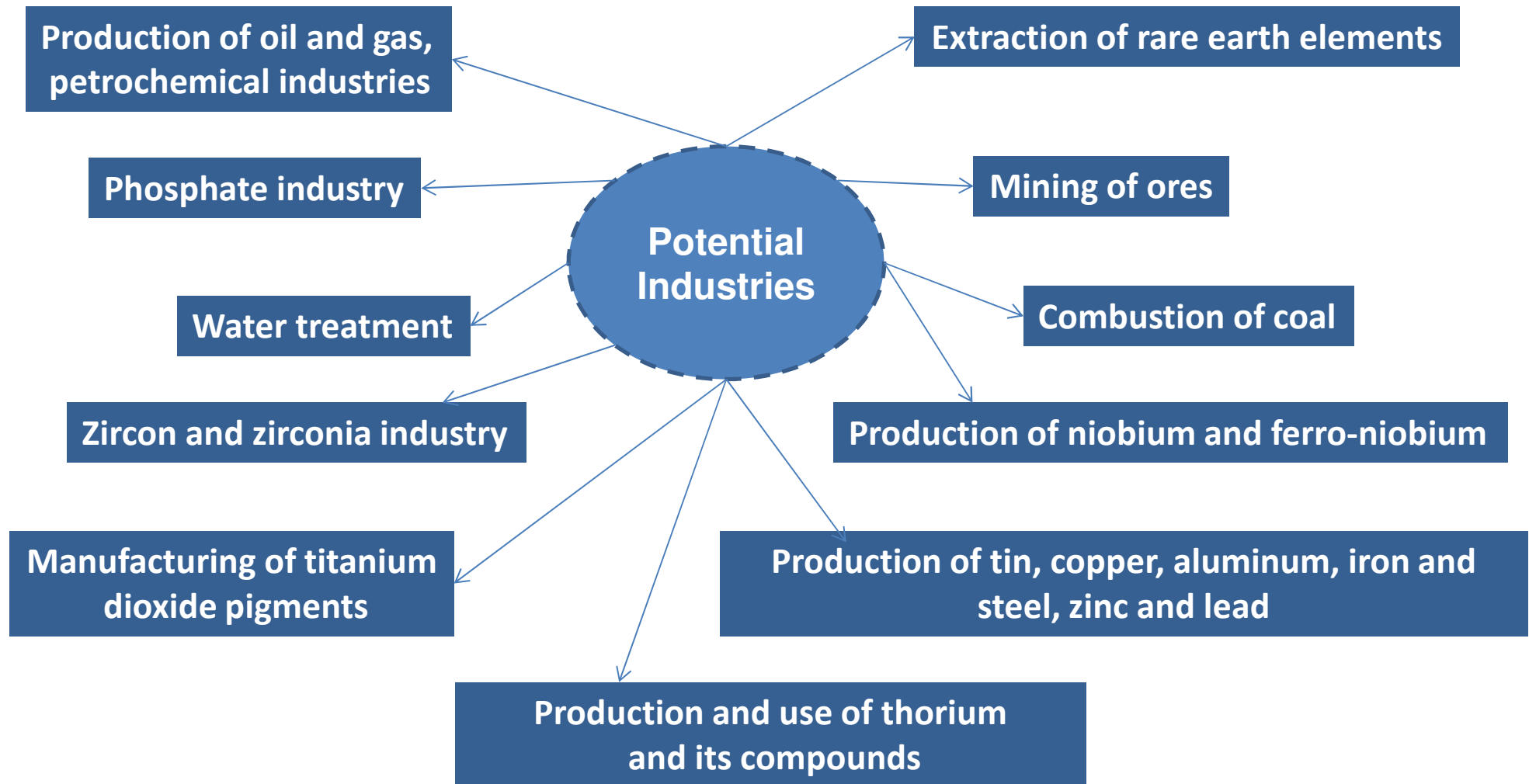
Separators, skimmer tanks, water treatment equipment, and water storage vessels

Wet parts of gas production and processing installations; well completions



NORM

Potential Industries



NORM

Global Issue



NORM Decontamination

Triggers for Industry



- Increased regulatory enforcement
- Growing Business-to-Business litigation associated with producing oilfield property transactions
- Economical Feasibility
- Potential contamination threat to workers and a long-term environmental liability (Public Awareness)



Agenda

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NORM: Situation at an Oil Field

NORM: Situation at an Oil Field



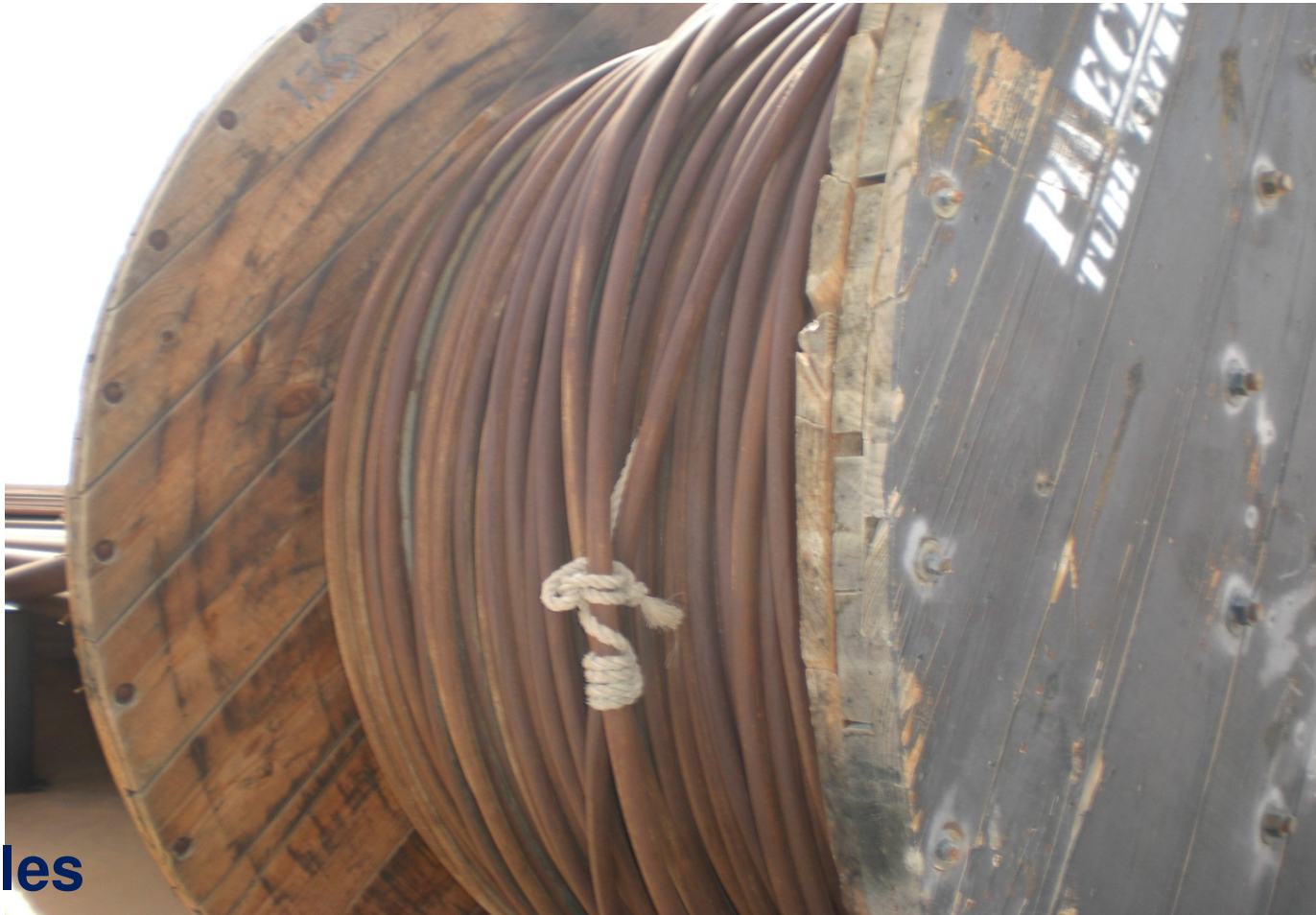
- NORM contaminated equipment is stored in open yard
- There is a potential contamination threat to workers and a long-term environmental liability

NORM Accumulation

... In production tubulars

... In Electrical Submersible Pumps (ESP)





In Cables

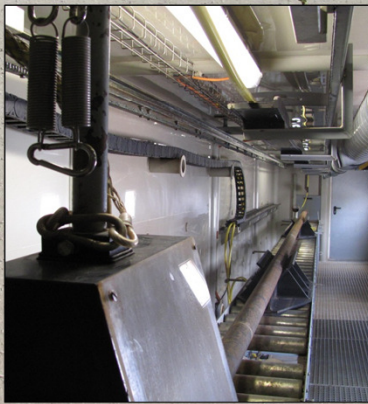


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Mobile NORM Decontamination Plant

Mobile NORM Decontamination Plant



NORM Decontamination plant



- Central decontamination unit
- Clearance measurement unit
- Ultra high pressure water jetting system
- Roller conveyor system
- Water treatment system
- Off-gas treatment system
- Process control system
- Power supply unit
- Radiation protection package



NORM Decontamination Pre & Post

Contaminated Tube
Pre decontamination

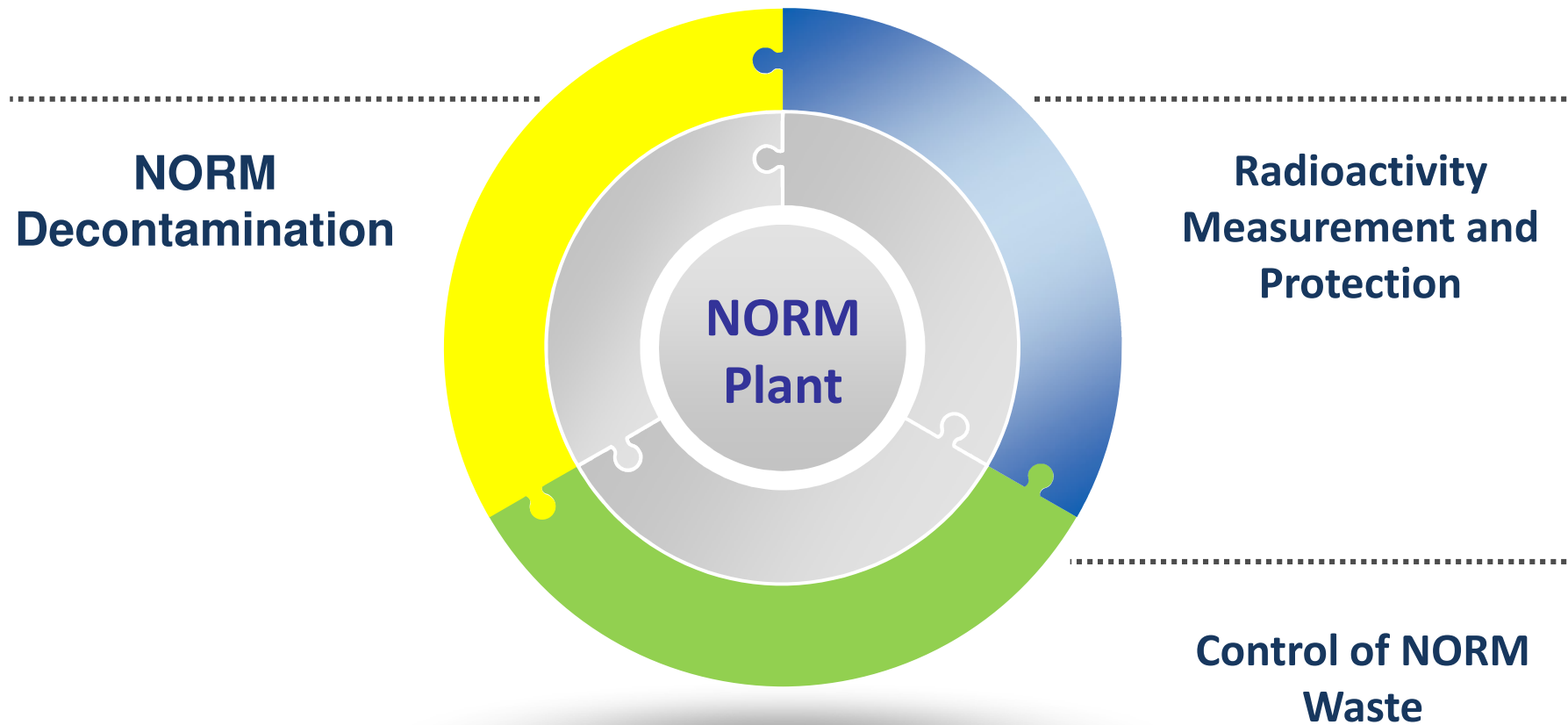


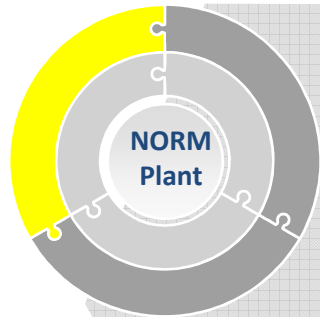
Decontaminated Tube
Post decontamination



NORM Decontamination Plant

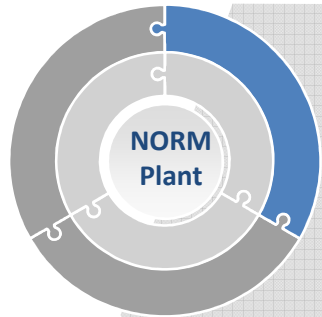
Main Services





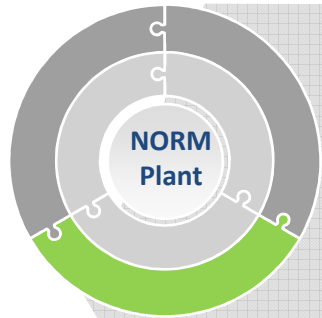
NORM Decontamination

- Carry out NORM decontamination of tubulars by applying precisely engineered Ultra High Pressure Water Jetting Technology
- Cleaning is applied to both outer and inner surface of the tubular
- Average decontamination rate is 15 min / tubular
However, this is dependent upon the pollution and is determined by “ trial and error “
- The plant can be modified to handle other equipment used in the oil and gas industry such as Electric Submersible Pump (ESP) ,valves, Christmas trees, cables, heaters, spools, and separators, etc.



Radioactivity Measurement and Protection

- Radiation protection services
- NORM monitoring
- NORM awareness training
- Sampling for NORM
- Personal dosimeter and calibration services
- Risk assessment and feasibility studies



Control of NORM Waste

- Consultancy for NORM waste treatment, storage and disposal
- Assistance in the licensing procedure



... Input rack for tubulars prepared for decontamination



... Radioactivity measurements prior to decontamination



... Transporting a tubular to the NORM decontamination plant





... Radioactivity levels are continuously monitored to ensure safe working environment



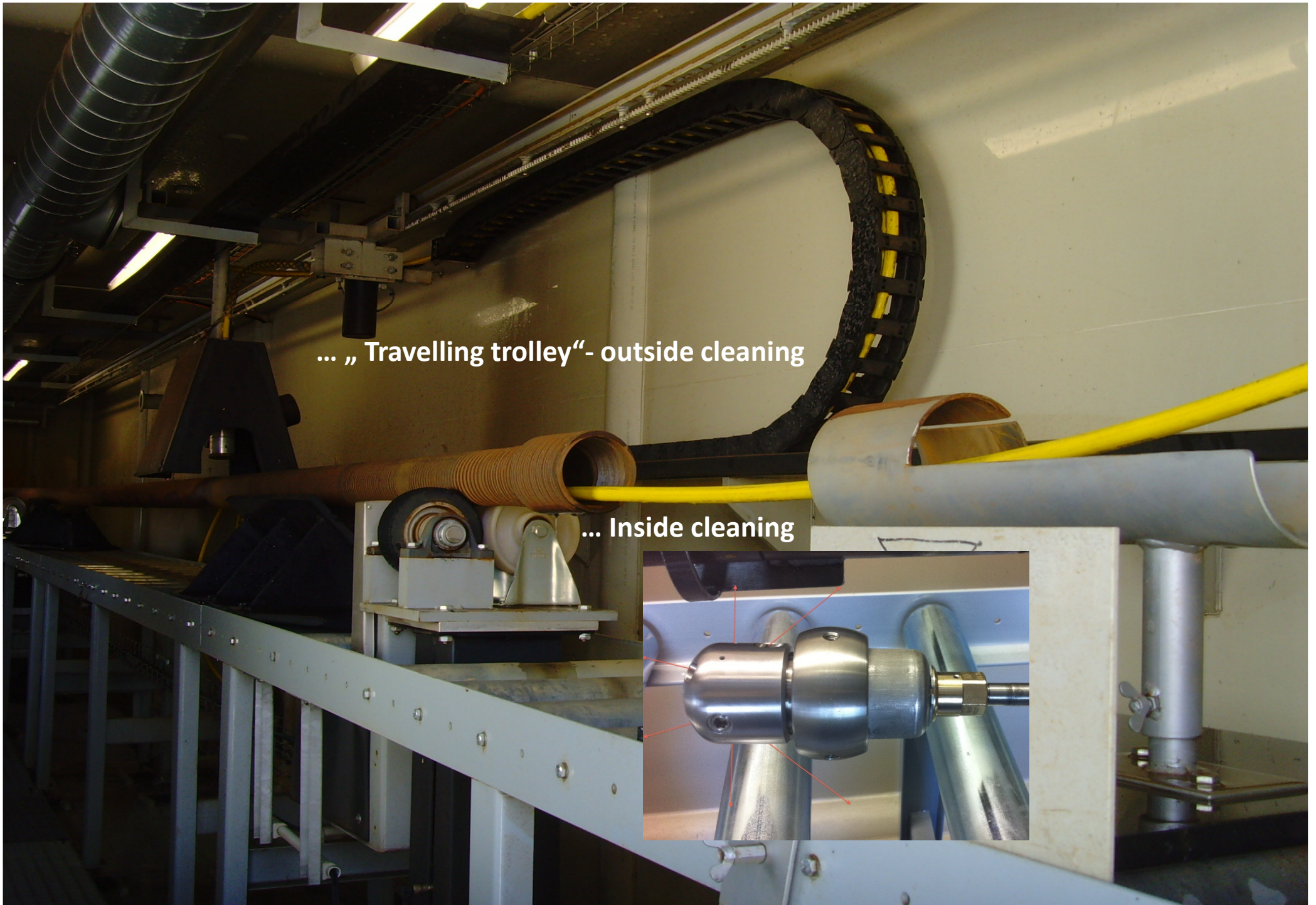
NORM المنطقة الخطرة
NORM Hazardous Area

أي إدخال قبول
الشخص المخول
No Entry Accept
Authorized Person

... NORM decontamination plant designated by a warning sign

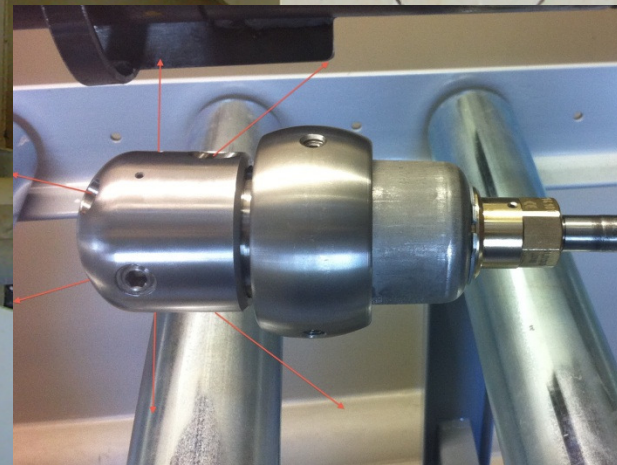
... A tubular enters the decontamination unit





... „ Travelling trolley“- outside cleaning

... Inside cleaning





.... Cleaned tubular moves to the buffer area

... Radioactivity measurements post to decontamination, quality check





... Handling secondary waste - Water

... Handling secondary waste - Scale





... Soild waste dewatered and carefully collected into suitable waste drums

NORM Decontamination Plant

Key Features



- Mobile plant which can be quickly deployed to any location, whether it is onshore or offshore.
- Autarkic plant, which has been engineered to the highest standards.
- Achieve best decontamination results and cost effectiveness.
- Proven technology- ultra high pressure water jetting.
- Low generation of secondary waste thanks to an integrated separation and filtration system.
- The plant can be adjusted to handle other equipment, used in the oil and gas industry, such as valves, Christmas trees, cables, heaters, spools, separators and pumps.
- According to the client's wish and the condition of equipment, cleaned equipment could be either returned to client for future use, or disposed of as scrap metal



**Thank You for your audience!
We are happy to answer any of
your questions**