RUHRPUMPEN

RUHRPUMPEN
Decoking System

Remote Coke Cutting

Coking.com®

More Production - Less Risk!

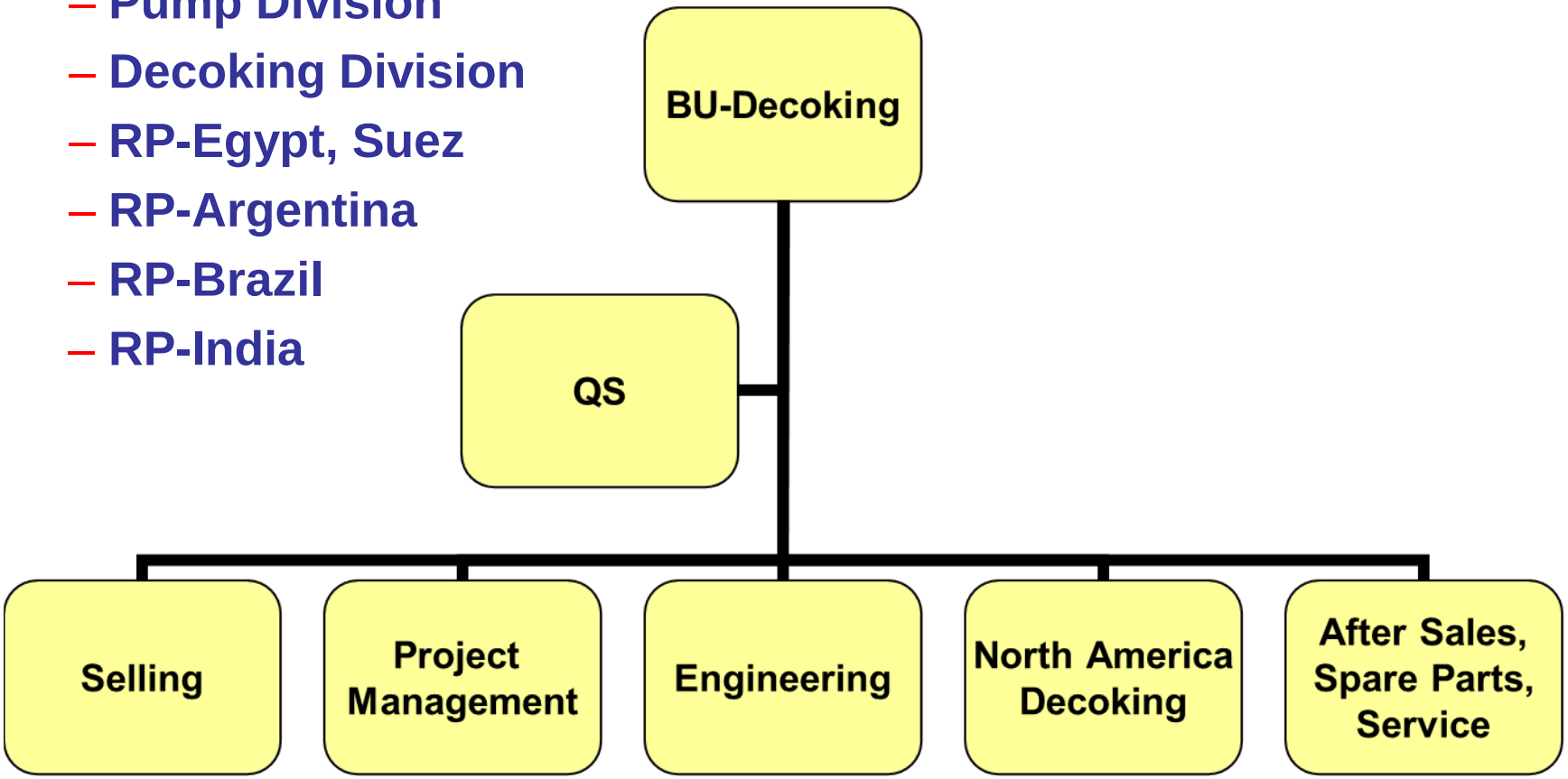
New Delhi, India, October 2013

Dr. Wolfgang Paul

RUHRPUMPEN

Ruhrpumpen - Organisation

- Pump Division
- Decoking Division
- RP-Egypt, Suez
- RP-Argentina
- RP-Brazil
- RP-India



Ruhrpumpen – References, systems

Year	company	drums	scope	type	project
2001	Petrolera Ameriven, Venezuela	4 x 29’	HDS, Hydraulic Decoking System	hyd	new
2002	BP-Gelsenkirchen, Germany	4 x 26’	Cutting system,	elec / autom	revamp
			semi automated top dh	hyd	
			semi automated bottom dh	hyd	
2003	BP – Lingen, Germany	2 x 17’	Cutting system,	hyd	new
			36” top deheading valves	elec	
			semi-automated bottom dh	hyd	
2004	Jinling, China	2 x 31’	Jet Pump and DC-Valve		new
2005	CNRL, Canada	4 x 30’	HDS,	elec/hyd	new
2005	ENERCON, Chile	2 x 29’	HDS,	hyd	new
2005	BP-Lingen, Germany	2 x 17’	Cutting system,	hyd	revamp
			30” top deheading valves	elec	
			semi-automated bottom dh	hyd	
2006	BP Castellon, Spain	2 x 25’	HDS,	hyd	new
			30’ top deheading valves,	elec	
2006	Sinclair Oil, USA	2 x 26’	Cutting system,	hyd	revamp
2006	Sinopec, CNOOC, China	4 x 32’	Jet Pump and DC-valve	new	
2007	suncor, Canada	6 x 32’	HDS,	elec / autom	new
2007	Frontier, CB&I, USA	2 x 26’	HDS,	elec / remote	revamp / new
2007	OMV, Germany	2 x 26’	Jet Pump and DC-Valve		revamp
2007	Rosneft, Komsomolsk, Russia	2 x 26’	HDS,	elec	new
2007	Lukoil, Volgograd, Russia	3 x 18’	HDS,	elec	revamp
2007	Petro Canada, Montreal, Can	2 x 28’	HDS,	elec	new

Ruhrpumpen – References, systems

Year	company	drums	scope	type	project
2008	*Petro Canada, Fort Hills, Can*	*4+2x32'*	*HDS,*	*elec*	*new, cancelled*
2008	Hunt Ref., USA	2 x 28'	Cutting system,	elec / remote	extension
2008	C-Chem, Japan	2 x 21"	Cutting system,	elec	extension,
2008	HMEL, India	4 x 30'	HDS,	elec	new
2009	Statoil, Norway	2 x 26'	Cutting System,	elec	revamp
2009	SHELL CAPSA, Argentina	2 x 17'	Cutting System,	elec / remote	revamp
2009	HMEL, GGSRL, India	4 x 30'	HDS	elec	new
2010	NOCL, India	2 x 28'	HDS	elec	new
2009	MRPL, India	4 x 30'	HDS	hyd	new
2010	Lukoil, Volgograd, Russia	2 x 30'	HDS	elec	new
2010	IOCL, Paradip, India	4 x 32'	HDS	hyd	new
2011	Naftan, FW Ib, Belorussia	2 x 28'	HDS	elec	new
2011	PetroChina, China	2 x 31'	Jet Pump and DC-Valve	elec	new
2011	NCRA, KS-USA	2 x 26'	HDS	elec, remote	new
2013	Lukoil, Perm	4 x 25'	HDS	elec, remote, auto	new
2013	ERC-GS, Egypt	2 x 31'	HDS	elec, remote	new
2013	Tatneft (LOI), Russia	4 x 25'	HDS	elec, remote	new
2013	Antipinsk, Russia	2 x 23'	HDS	elec, remote	new
2013	CPCL, India	2 x 32'	HDS		new
2013	Pavlodar, Kz	4 x 18'	Jet Pump and DC Valve	elec	revamp

Petroleras Ameriven

Hamaca

Venezuela

Licencor: FW

Contractor: Fluor Inelectra

Order: 2001-04

Start up: 2004-10

BP-Gelsenkirchen

BP-Gelsenkirchen, Germany

Licencor: FW

Scope

- **Cutting system**
- **Bottom deheading, semi-auto**
- **Top deheading, semi-auto**

Order: 2003-06
Start up: 2004-05

RUHRPUMPEN

Frontier-Oil

Frontier, Kansas, USA

Licensor: Lummus

EPC: CBI

Scope:

–Cutting system,

–1 pumps, 2 drums

–Order: 2007

–Start up: 2008

– remote cutting system

EIL for GGSR

HMEL, India

Licensor: Lummus

Contractor: EIL, India

PMC EIL

Scope:

–Cutting system, 2 pumps, 4 drums

–Order: 2008-10

–Start up: 2012-02

RUHRPUMPEN

PLL for MRPL

MRPL, India

Licensor: Lummus technology

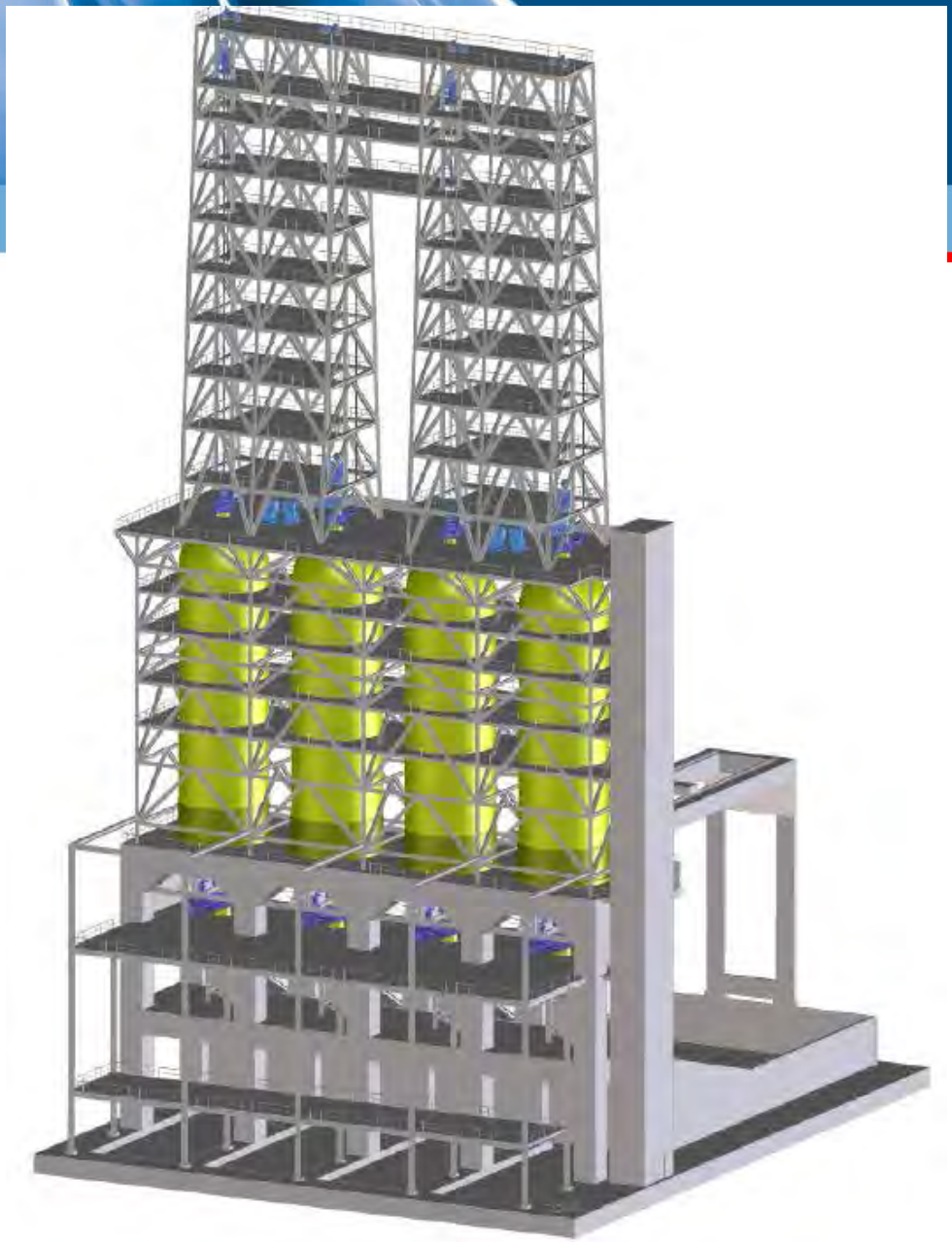
Contractor: PLL, India

Scope:

- **Cutting system, 2 pumps, 4 drums**

- **Order: 2009-10**
- **Start up: 2012-xx**

IOCL-Paradip



DCU

Licensor: Foster Wheeler

PMC: JACOBS, India

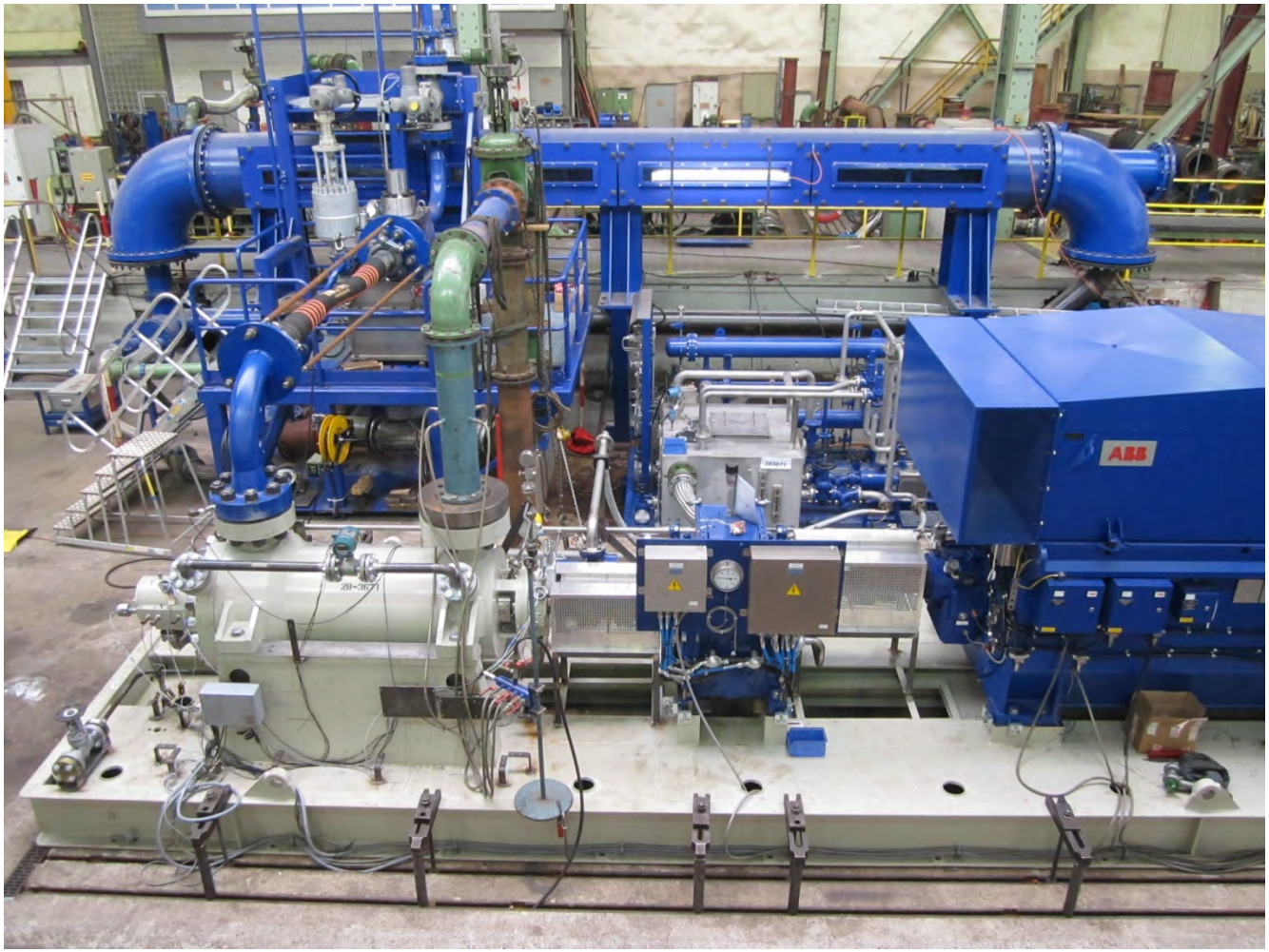
Drums

- 4 drums, D = 9,80 m
- height, FF = 45,00 m
- .

Pumps

- 2 x ADC 6x10
- Flow 318 m³/h
- Head 3585 m

Testbed of Decoking Jet Pump



Jet Pump

Performance test

(RP-test field)
Full speed

Functional test:
(50 Hz)
Jet Pump
-Motor
-Lube oil system
-Decoking Control valve
-Cutting Tool

Capacity	272	m³/h
Head	2850	m
Speed	2900	rpm
Temperature	70	°C
Medium	Water	

Decoking Jet Pump

Jet Pump India

- Jet Pump unit
- LOU
- Decoking Control valve

Capacity	295	m^3/h
	1300	gpm
Head	3158	m
	4492	psi
Speed	3923	rpm
Temperature	65	°C
Medium	Water with coke fines	

Cutting system: Hoist and DSD

Electrical system

- **Features**
  - 1 VFD set for hoists
    - 1 running, 1 stand by
  - 1 VFD set for DSDs
    - 1 running, 1 stand by
  - VFDs, 1 set per coker,
    - Installed in safe area, or
    - Cutting deck
  - Redundant installation

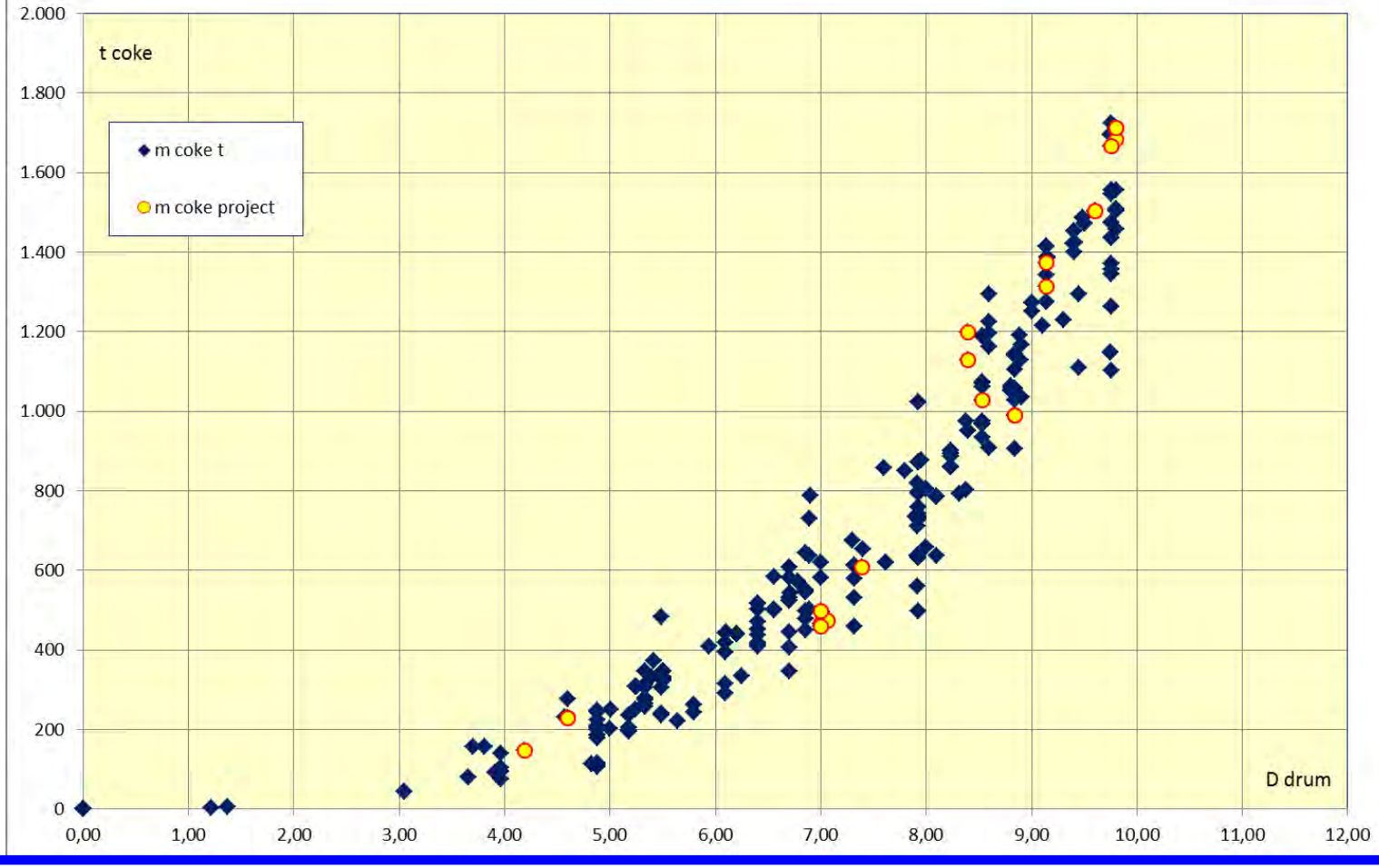
Hydraulic system

- **Features**
  - Hydraulic power unit
  - 1 hyd. hoist/DSD per drum
  - 1 Operator panel per drum pair
  - Control electric/electronic
  - Integrated in PLC system
  - Measurement of force, tension

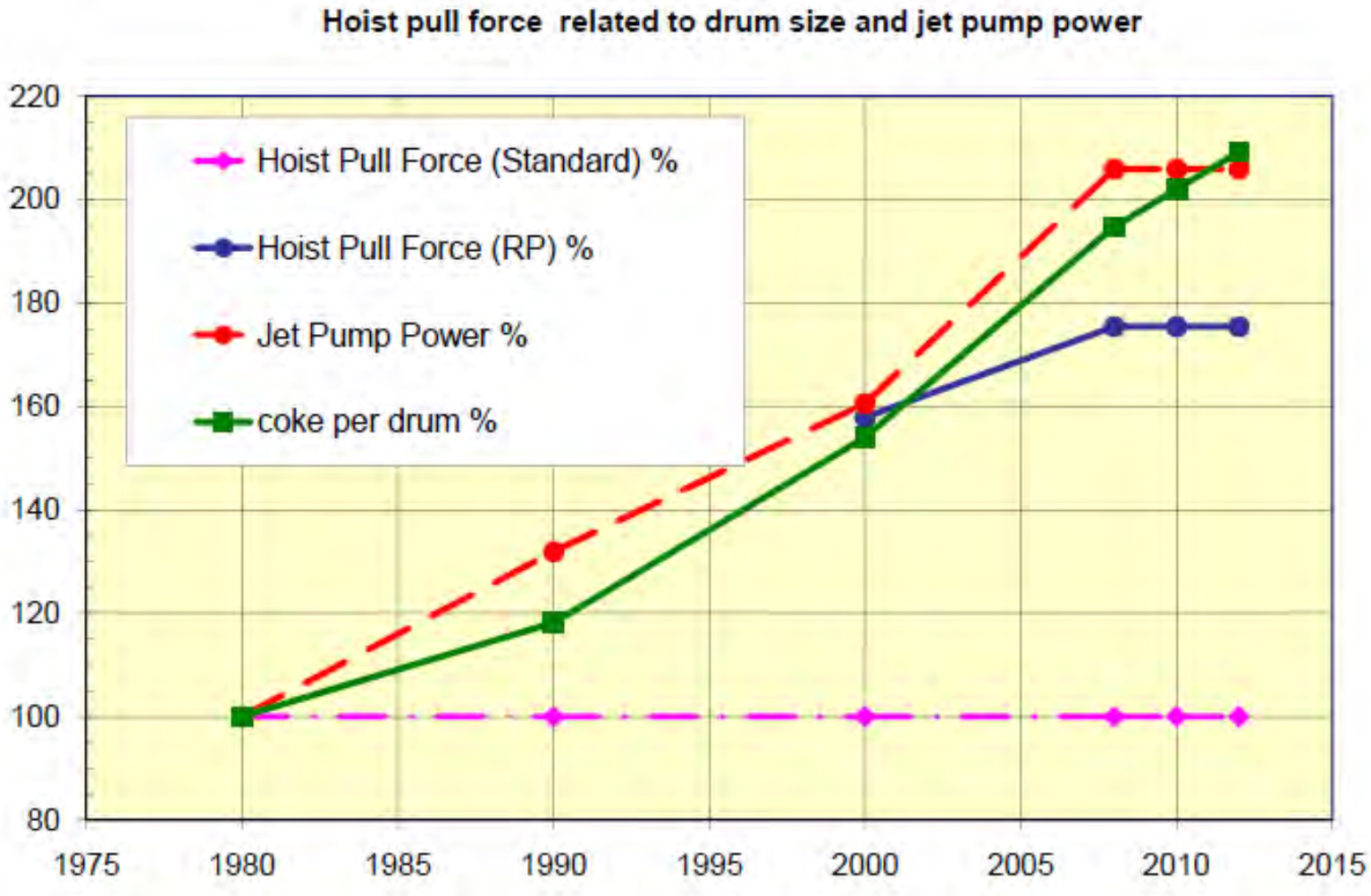
Pneumatic system

- **Not recommended**
  - Un- sufficient power,
  - Oil polluted air
  - High noise level
  - Remote / automatic control
    - Not reliable

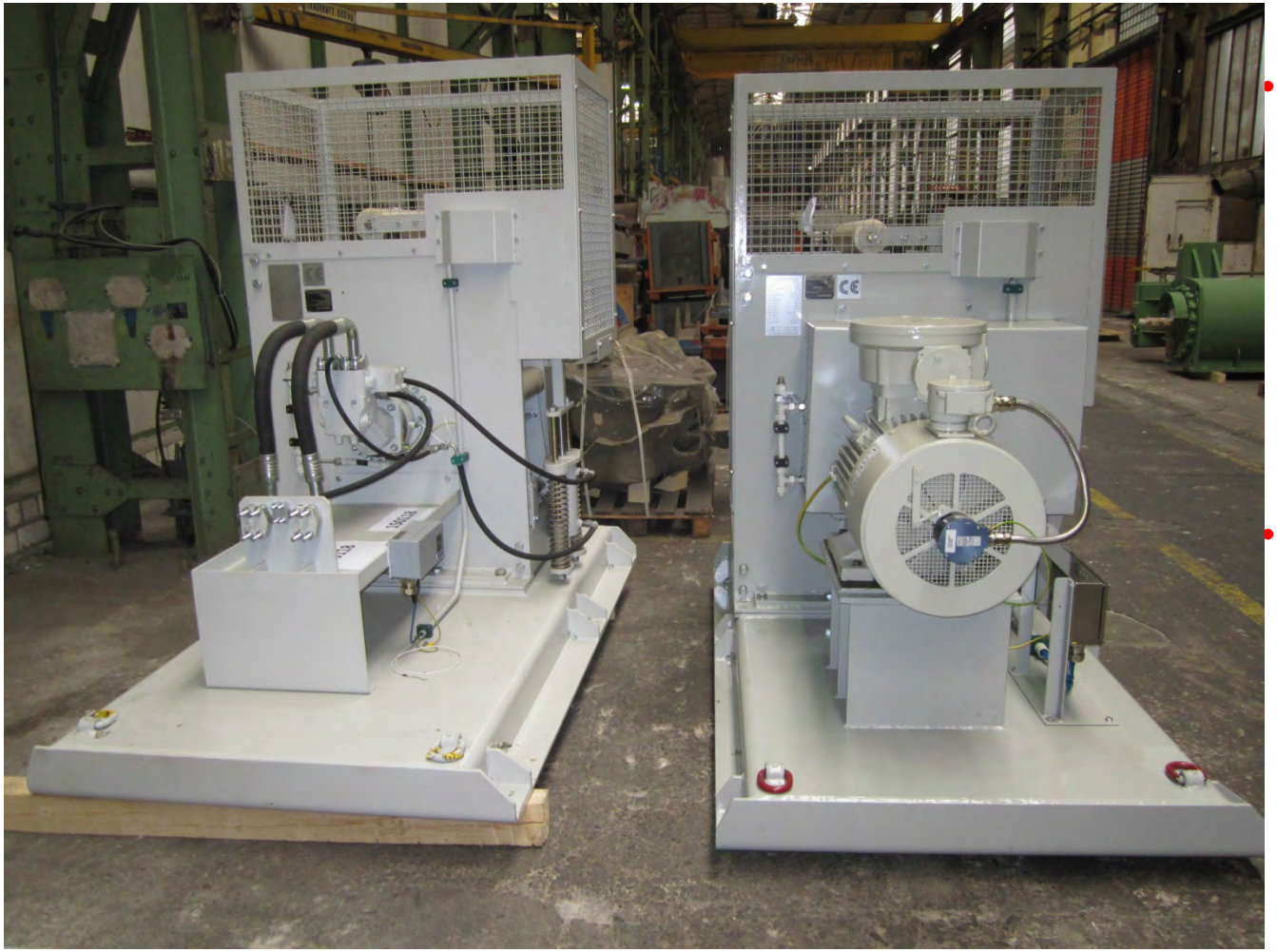
Weight of Coke



History


Hoist pull force related to drum size and jet pump power
Hoist Pull Force (Standard) %
Hoist Pull Force (RP) %
Jet Pump Power %
coke per drum %
220
200
180
160
140
120
100
80
1975
1980
1985
1990
1995
2000
2005
2010
2015

Hoist and Rope

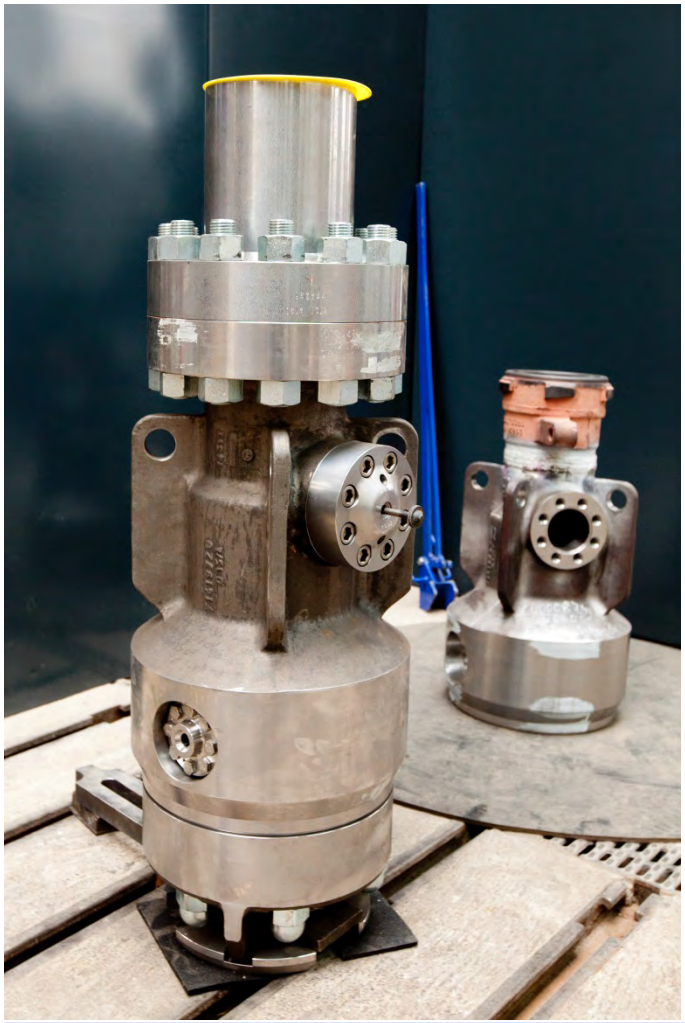


- **Hoist with integral cartridge gear**
  - drum with grooves
  - Pull force 5 t
  - slack rope indicator
    - locks the hoist
- **Rope**
  - measurement of tension in the rope
  - indication at the operator panel
  - avoiding of overload

Drill Stem Drive

- **Drill Stem Drive**
  - Electric motor
  - High load bearing
  - Grease lubrication
  - Cartridge packing
  - Swivel
  - Standard version
    (down to -20°C)
- **Varible Frequency Converter VFC**
  - At Cutting deck, or
  - At safe area

RUHRPUMPEN - Combination Tool



Basic design

- Slim tool, OD 13″
- Low lift force
- Low torque

- **Switching devices**
  - Manual / Automated
  - At the top of the tool

- **Valves**
  - Ballshape valves
  - No seals
  - Pressure operated

- **Nozzles, cutting**
  - 0°
  - 10° up both cutting nozzles

- **Nozzles, drilling**
  - 1 strong centre nozzle
  - 3 periphery nozzles

Control system, Manuel Operation

- **Main Control panel, safe area**
  - PLC,
  - Condition Monitoring System
- **Pump Control panel, pump area**
  - Start, stop of pump unit,
  - Remote/Local operation of Lube oil system
  - Remote/Local operation of DC valve
- **Operator panel, operator deck**
  - Installed in Operator shelter, Class I Div.II,
  - Centre panel and 2 drum panel for each pair of drums

Control system

Main Control Panel,

Pump area

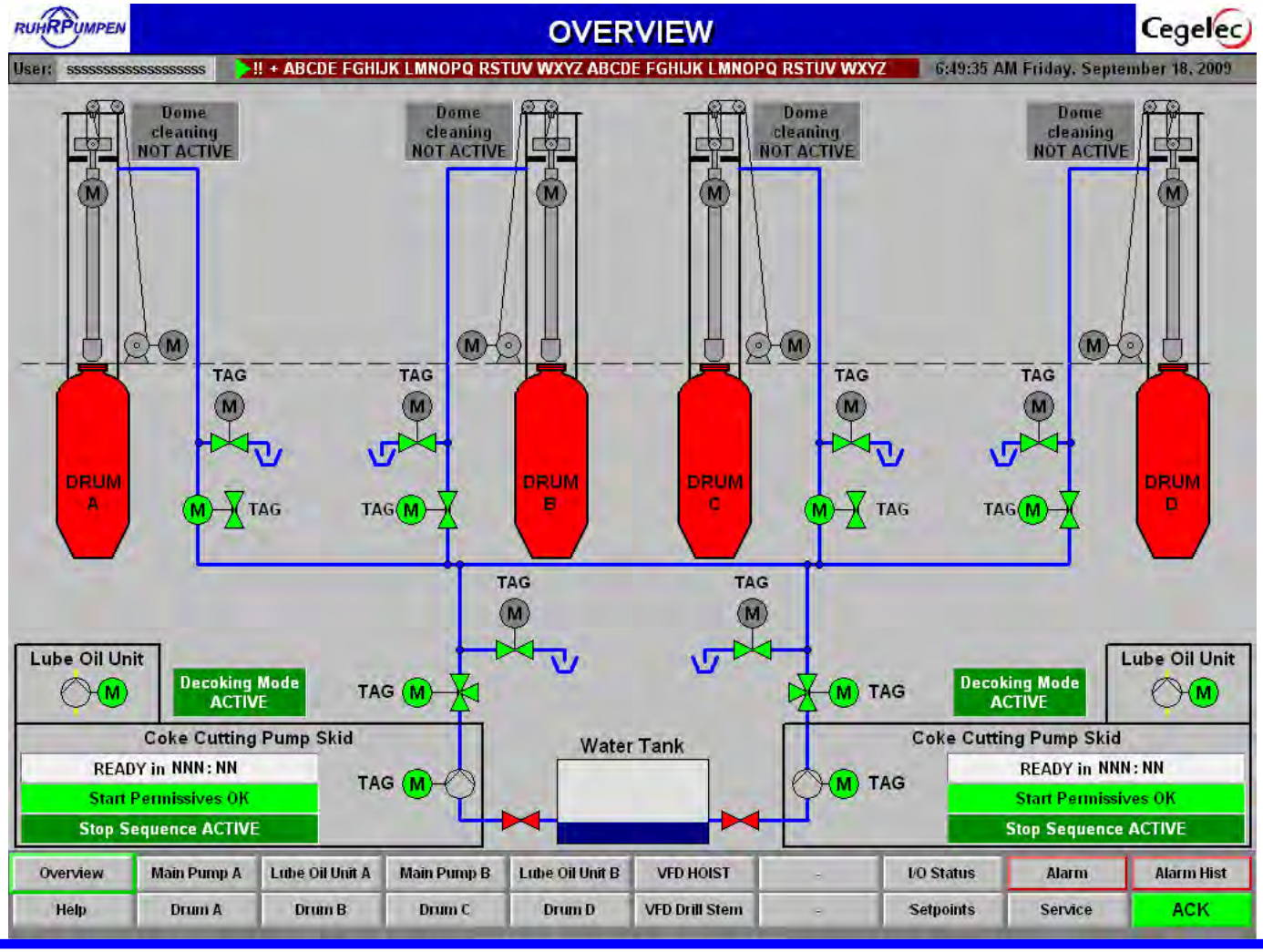
- Operation of pump unit,
- Lube oil unit

- Panelview
- Condition monitoring
- Maintenance provision
- Status indication by lmps

Operator Shelter with Panel

- **Local Operator panel**
  - Operation of
    - Decoking valve
    - Isolation valve
    - Hoist
    - Drill stem drive
  - Interactive P&ID

Control and process visualisation



Remote and automatic Coke Cutting

Why remote and automatic coke cutting ?
Advantage, Benefits

1. Safety

- Increased Safety
- “No Men in the structure during Coke Cutting”

2. Operation / Process

- Increased Stable process
  - More Data and information to the operator — remote
  - More Data and information to Control Room — remote/automatic

3. More through put => more money

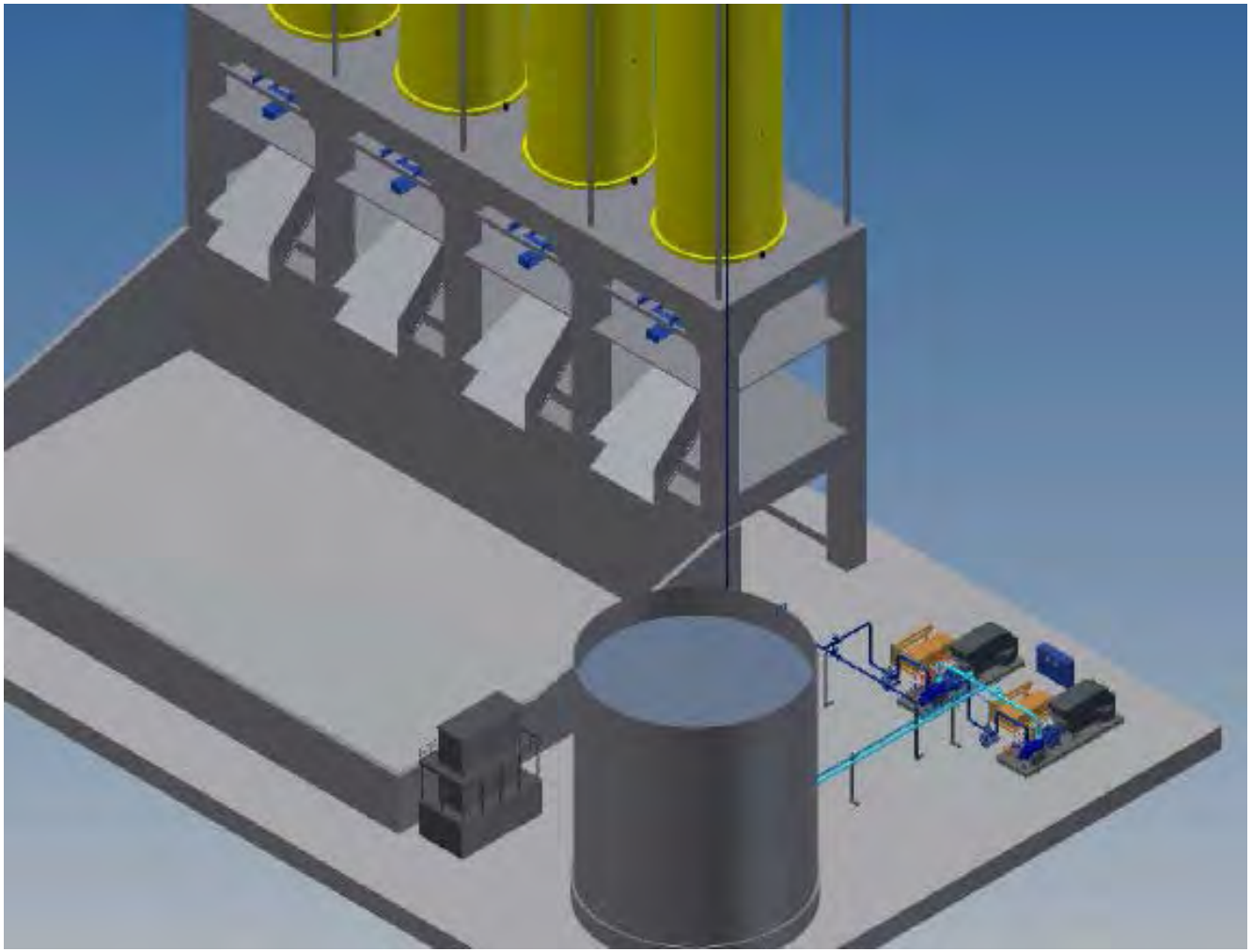
- Stable process, more through put
- Reduced failure rate, reduced downtime, reduced maintenance
- Minimizing of “human factor” with automatic coke cutting

Remote Coke Cutting system

Requirements for Remote Coke Cutting

- **Coke Cutting System**
  - Lifting System with enough Power for remote coke cutting
    - Hydraulic or electric driven Hoists and Drill Stem Drives
    - 5000 kg pull force lifting system
- **Control System**
  - Signal channelling from Cutting System thru PLC
  - Operator Panel with all Signals through PLC
- **Drum Vibration Monitoring System**
    - Vibration Probes at drum for remote coke cutting
- **Automatic Coke Cutting Tool**
    - Automatic switching from Drilling to Cutting while Jet Pump in Bypass

Basic design



Operation

remote

Hunt Refining

Hunt, AL, USA

Licensor: Lummus

EPC: Commonwealth Eng.

Scope:

–Cutting system,

–2 drums, revamped coker

–Electrical cutting system

–Order: 2009

–Start up: 2010

– remote cutting system

Hunt Refining

Hunt, AL, USA

Scope:

- Cutting system,
- 2 drums, revamped coker
- Electrical cutting system

- Order: 2009
- Start up: 2010

- remote cutting system

Hunt Refining

Hunt, AL, USA

Scope:

- –Cutting system,
- –2 drums, revamped coker
- –Electrical cutting system

- –Order: 2009
- –Start up: 2010

– remote cutting system

References, running for several years

Germany,	2006	BP	remote, automatic
USA,	2009	Frontier	remote, manual
Argentina,	2010	Shell	remote, manual
USA,	2010	Hunt refining	remote, manual

RP has actual

2 orders for remote coke cutting system

3 orders for remote / automatic system

THANKS FOR YOUR

ATTENTION