Experience from operations in The Barents

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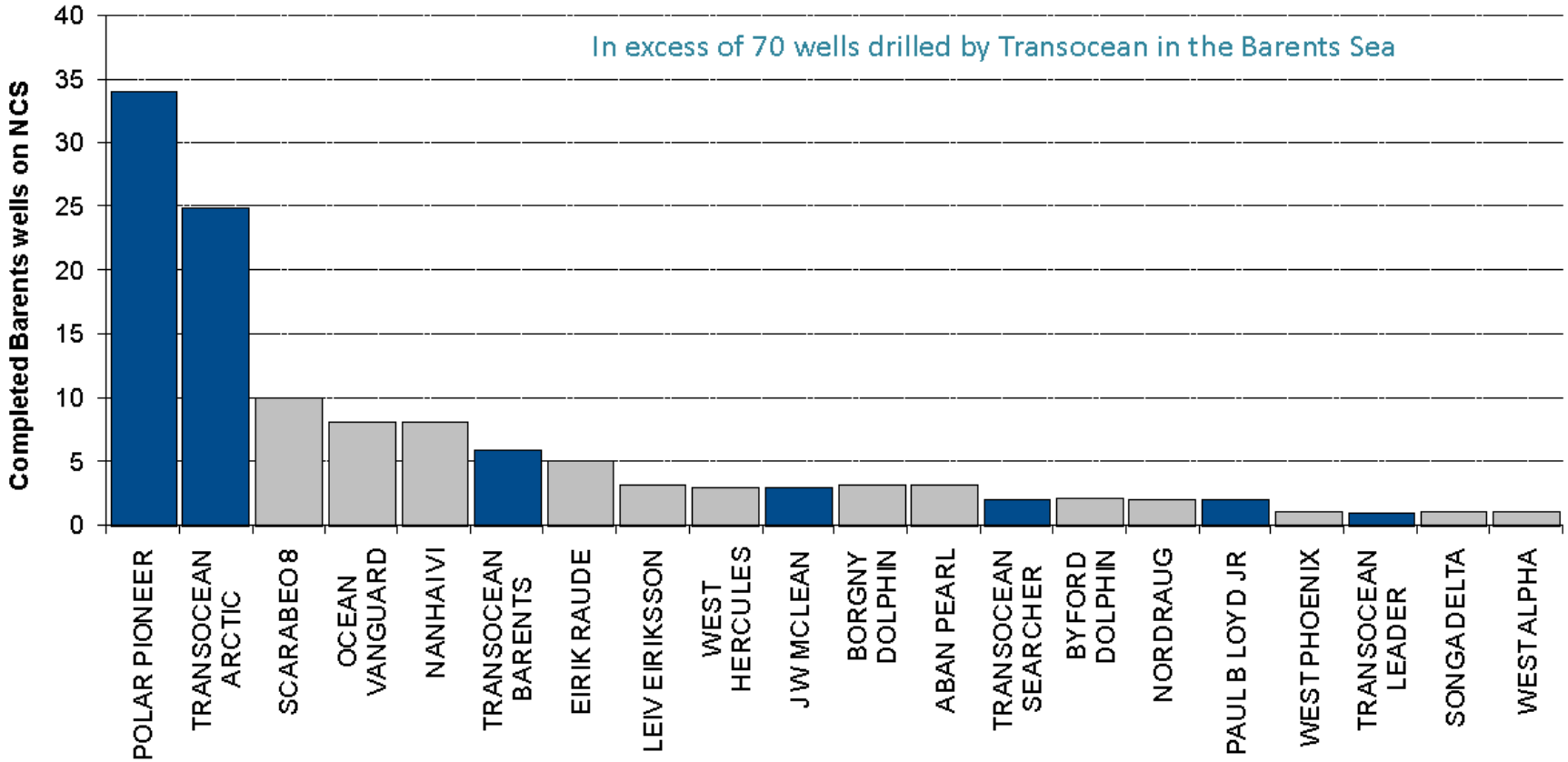
TRANSOCEAN

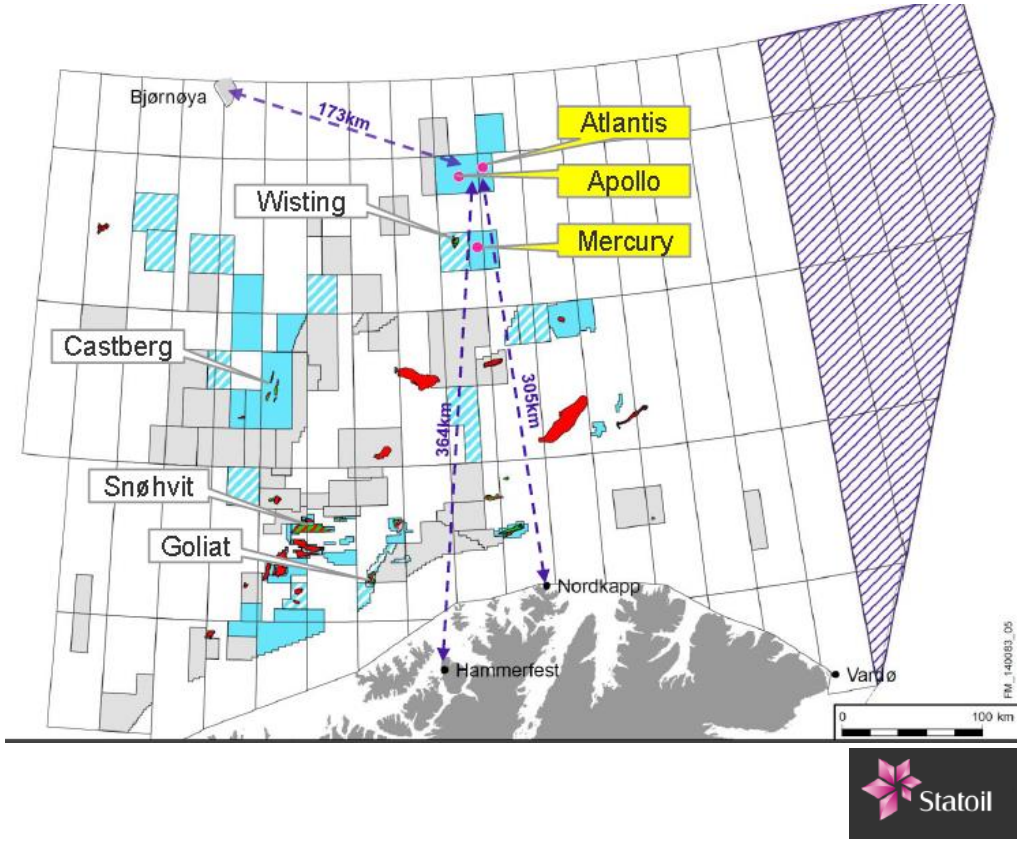
Transocean Overview

- Largest fleet of high spec and midwater floaters
- Operate in diverse markets worldwide
- Significant relationships across customer spectrum

Barents sea experience (Source NPD Oct 2013)



Ongoing and planned operations in the Barents



Statoil

Transocean Barents with campaign during winter 2014.

Transocean Spitsbergen preparing for Drilling campaign on Hoop in 2014.

Polar Pioneer contracted for Drilling campaign in Alaska.

Polar Pioneer experience from 2003 - 2010

Offshore operations

- Operations on Snøhvit, followed by exploration drilling in the same area. Castberg, (Skrugard) most remote well.
- Drilling on behalf of several customers (Statoil, Norske Hydro, ENI).
- Use of heliport in Hammerfest and shorebase in Rypefjord.

Experience and challenges

- High attention to the environment (zero discharge)
- Regularity for air traffic (helicopter and plane)
- Emergency preparedness arrangements (SAR helicopter, stand-by boats)
- Weather and temperature not experienced as extreme.
- Few challenges with icing and snow on the rig.

Zero discharge solutions can create challenges

- Routines for collecting deck drain water will prevent discharge of potentially contaminated water.
- Collected water can create slippery decks
- During winter drain water freeze.

Green operations create challenges

Evolution:

- Cuttings skips
- Collection tanks / pumping systems
- Mill cuttings and produce mud
- Collection tanks / pumping systems

- Improved safety and working environment as the solution reduce lifting operations.
- Frequent change of solution and modifications generate down sides as:
  - Complex lifting operations
  - Work requires attention from rig management
  - Higher POB (full rig)
  - Increased pressure on helicopter seats.
- Same experience for temporary well test units.

Air traffic and Emergency Preparedness

- Limited number of Helicopters and SAR helicopters.
- Operational hours during winter months.
- Irregular crew change for personnel created frustration.
- Also challenges for air plane traffic to Hammerfest and Alta
- High attention to Emergency preparedness and rescue capabilities for personnel.

Weather and Temeperature

Some ice challenges during well testing and leak in steam system.

Polar Pioneer design unique for winter- and polar operations.

Sheltered working areas, muster areas and sensitive equipment.

Heat traced pipelines and walkways.

Personnel experience weather more harsh in North sea and Norwegian sea.

Temperature can be lower and the winter will have less daylight.

Polar lows and polar fronts arrive unexpected and quick, they also disappear quickly.

Experience from winter operations on Transocean Barents

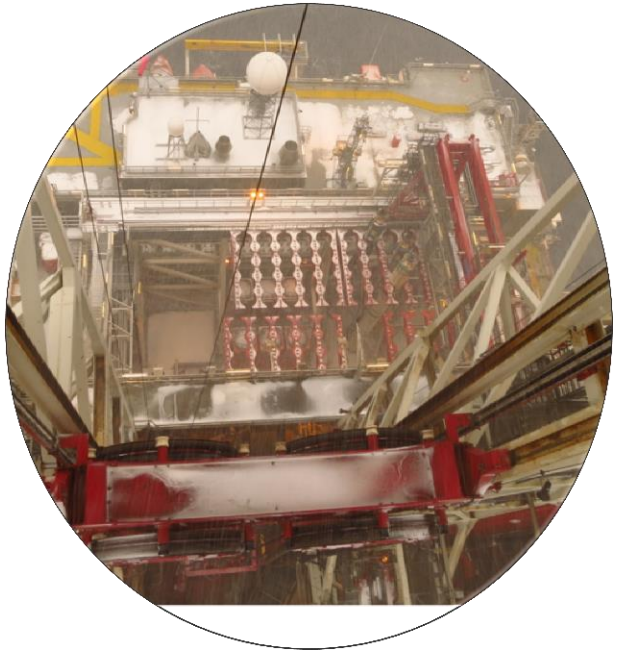
Different design;

- «open» outdoor working areas
- more remote operated equipment
- sheltered controlcabins
- temporary sheltering of equipment
- planning of outdoor operation based on Wind Chill Index (WCI).

In period 2011 – 2013 the rig have operated 261 days in the Barents Sea.

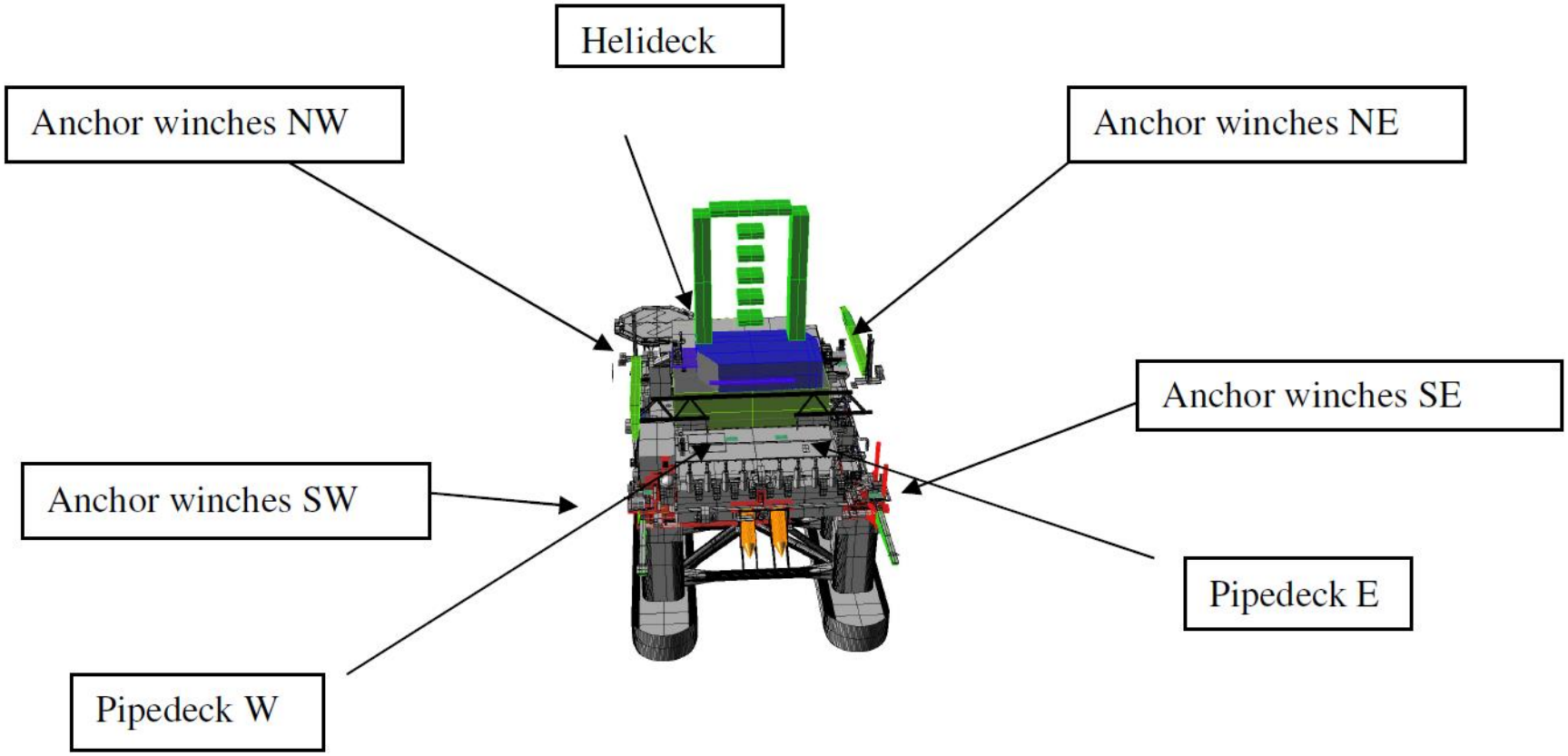
- 125 days with temp below 0 C
- Lowest measured temp -11 C
- 55 days with snow
- Highest measured wind at 10 m = 47kn

Open work areas



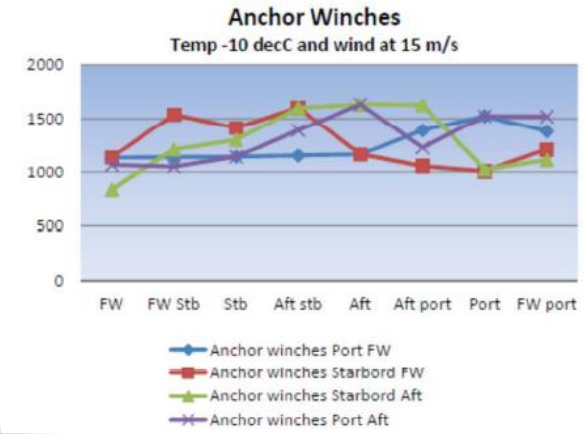
- Control of area and duration for outdoor work
- Use of remote operated equipment from control cabin
- Rest and heat cabins

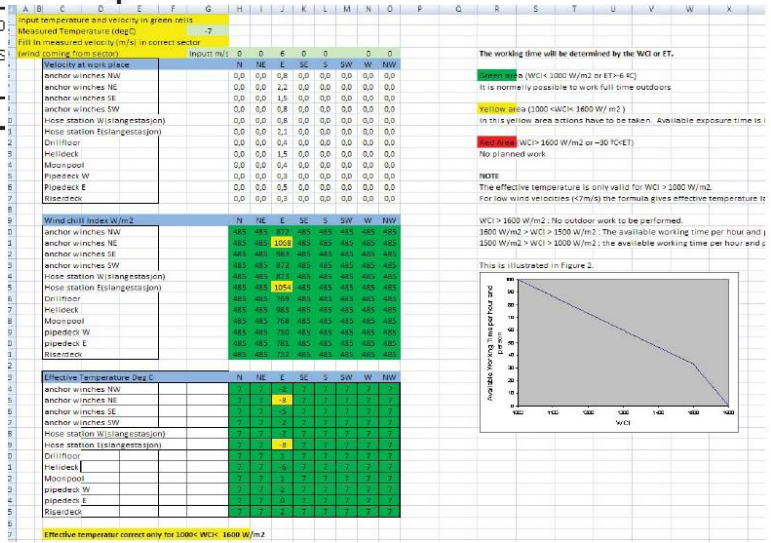
Analysis of outdoor working areas



Use of wind chill index to control duration of outdoor work

	Wind Chill Index (WCI) W/m2	Equivalent Temperature (ET)	Consequence - Action
	WCI > 1600	Below -30oC	No outdoor work to be performed unless deemed critical from a safety or operational perspective, and a PTW and SJA have been performed and compensating measures found acceptable.
	WCI > 14001)	Below -21oC	Working areas shall be carefully shielded by wind walls or located indoors as the available outdoor working time is below 50 % of a working hour.
	WCI > 12001)	Below -12oC	Shielding of working areas shall be carefully considered based on operational requirements and acceptable downtime as the available outdoor working time is below 75 % of a working hour. Weather protection shall as a minimum be supplied for manned 2) outdoor workplaces when WCI > 1200 for more than 2 % of a month.
	WCI > 1000	Below -6 oC	Protection shielding and reduction in available wo shall be considered for workplaces where there is work with duration of 10 minutes or more.
	WCI < 1000	Above -6 oC	Normally 100 % available working time.





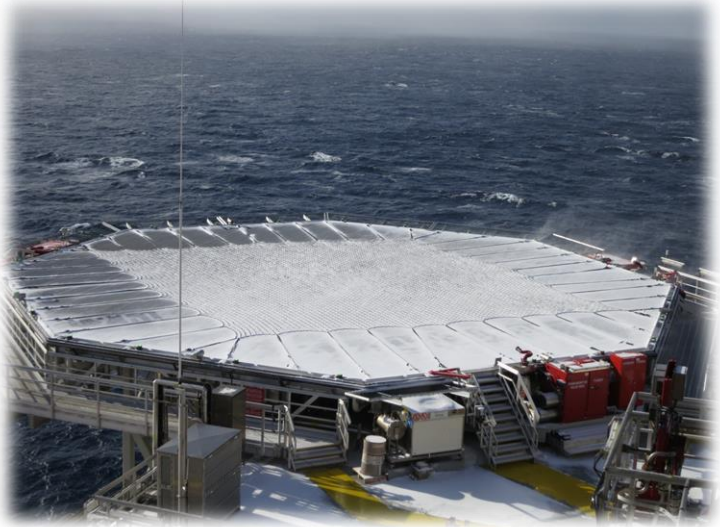
Temporary sheltering

Use of «koco-verk» and habitate to give heat and shelter for equipment and personnel.

Emergency preparedness

- Muster areas
- Escape routes
- Evacuation means / Resque boat

Awailability of helideck during winter



- No heat tracing on pad.
- No experience with ice on helideck.
- Some snow but usually blown off by wind or pressurized air.
- Escape routes to helideck is sheltered and / or heat traced.

Lifeboat and Fast Resque Craft

No heat tracing installed.

Manual removal of snow.

Life raft and LSA

Sheltered muster area

Sheltered storage area

Transocean Barents experiences

- Irregular air traffic creates frustration amongst personnel
- Active use of weather forcast and WCI for planning of outdoor work
- Escape routes open due to heat traced walkways
- Sheltered muster areas.
- Helideck open (snow will blow away)
- Use of temporary sheltering helpful.
- Winterization manual in active use, review after each winterseason.
- Emergency preparedness bridging documents on various templates, should be tailor made for Arctic operations.