SCARABEO 5

4TH GENERATION SEMISUBMERSIBLE DRILLING UNIT
MOSS MARITIME ME 4500 DP DESIGN

Scarabeo 5 is one of the best in class unit of its generation. The unit holds the ABS DP3 class notation, and it is fully compliant with Norwegian regulations. The unit can operates also "moored thruster assisted", reducing fuel consumption and environmental impacts. The rig is winterized and has been operating in subarctic environment for more than 20 years; it holds the ABS ICE CLASS IC notation.


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OPERATIONAL FUNCTIONS
Exploration and production drilling in harsh environment, design for easy conversion in early production and extensive well testing unit, template and christmas tree installation. 3,400 tons variable deck load in all conditions, under the most stringent codes.

OPERATIONAL CONDITIONS
Available thrust (8 thrusters x hi speed) = 327 tonnes equivalent to 5 knots current and 38 knots wind.

SURVIVAL CONDITIONS
Wave height 32 m, wind 41 m/s, current 1.6 m/s.

CLASSIFICATIONS
ABS ✠ A1 column stabilized drilling unit with the class notations
✠ AMS, ✠ ACCU, ✠ CDS(N), ✠ DPS3
ICE 1 C. AoC by NPD

MAIN DIMENSIONS
Pontoon length 111 m;
breadth 14.25 m; height 9.50 m
Columns: square 10.80 m
Spacing: longitudinal 35 m,
transversal 58 m
Main hull: length 80.80 m;
breadth 68.80 m; depth 7.30 m
Draft: operating 23.50 m;
survival draft 21.50 m; transit 9 m
Air gap: 13 m
Displacement: operating 42,000 tons;
transit 28,000 tons.
Air conditioned living quarters for 106 people.

RIG STORAGE CAPACITIES
Pipe rack 750 sq.m;
riser rack 710 sq.m;
sacks 100 sq.m; containers 350 sq.m;
covered subsea equipment 204 sq.m;
liquid mud 490 cu.m;
bulk and cement day tanks 160 cu.m
in main hull.
Barite/bentonite bulk tanks 320 cu.m;
cement tanks 320 cu.m; liquid
mud and brine tanks 600 cu.m;
ballast tanks 2,700 cu.m
in the columns.
Drill water tanks 1,500 cu.m;
fuel oil tanks 2,600 cu.m;
potable water 720 cu.m;
ballast water 18,400 cu.m
in the pontoons.

SUBSEA EQUIPMENT
Skidding system:
Saipem-Aker Engineering.
The skidding system is designed to enable easy and safe handling of subsea modules.
It consists of 8 skidding structures having the capacity of 65 tons each that can be parked on open deck or skidded in two positions inside the BOP house for stack up of subsea modules.
Total skidding area: 450 sq.m.
Two pair of portable hydraulic cylinders with separate controls are dedicated for skidding of the units.
Bumpers/guiding system:
Saipem-Aker Engineering.
2 guiding bumpers are installed underneath the double bottom in order to enable easy and safe handling when running/pulling heavy subsea modules or BOP's.

MARINE AND ENGINE
Eight thrusters, each driven by one 2,350 kw electric motor, total thrust 327 tons.
Mooring system up to 900 m w.d., with eight points chain mooring;
anchors 8 x 15 tons; 8 x 76 mm (3") K4 chain, 2,150 m;
four double windlasses
(prepared for 84 mm K4 chain).
Power generation 28,000 kw, produced by 8 units prepared for dual fuel system.

INTEGRATED MANAGEMENT SYSTEM
Totally integrated, thoroughly distributed process control and data acquisition system, based on proven hardware and LAN, with built-in simulation facilities and field configuration tool.
Unprecedented system expandability, up to integration of comprehensive early production system.
Main functions:
- automatic power management
- fluid management, including stability calculation
- rig management such as drilling, logistic and safety
- automatic thruster assistance to mooring, including EMP dual redundant hydro-acoustic reference system; full D.P. class 3.

DRAWWORKS
Cont. EMSCO C-3
3,000 hp, disk brake hydraulically operated

SLUSH PUMPS
Cont. EMSCO FB-1600
Three triplex 1,600 hp each

ROTARY TABLE
Cont. EMSCO T-4950
Size 49 ½"

TOP DRIVE
Varco TDS-4
650 API T. electric,
with PH 85 pipe handler

TRAVELLING BLOCK
Cont. EMSCO RA-750
750 API T

TRAVELLING BLOCK CONTROL SYSTEM
SENSE
Emergency stop system
Ton-Miles indicator
Twin stop. Travelling speed controller

HOOK
BJ5750
750 API T

SWIVEL
Cont. EMSCO LB-650
650 API T

SUBSTRUCTURE
Max. casing capacity: 650 tons
Setback capacity: 350 tons

DERRICK
Dreco
Derrick base 40 x 40 ft; height 170 ft
Dynamic hookload 650 tons

PIPE HANDLING
Hydralift/NOV
Lower racking arm 10 t SWL
mod. T2004 - D1158
Upper racking arm 3 ½" - 9 ½"
mod. T2005 - D1141
Synchronic system in/out with manual possibilities

FINGERBOARD
Hydralift/NOV
143 stands 5 ⅞" drill pipe aft.
88 stands 5 ⅞" drill pipe forward
14 stands 9 ½" drill collar forward

CEMENTING UNIT
Halliburton 2008
A zone 2 HCS-25E.
Advantage with 2 off Caterpillar 3406B engines driving 2 HT-400 triplex pumps. The pump 4" fluid ends are suitable for 15,000 psi maximum working pressure

MOTION COMP.
NL Shaffer CM-25-600 DA
Compensed load (max.) 270 tons
Static load (max.) 750 tons
Stroke 7.62 m

ACTIVE HEAVE COMPENSATOR
Maritime Hydraulic
A.H.C. Dynacraft


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INSTRUMENTATION
ABB-SENSE
Analogue instrumentation
for standard drilling parameters
Computerized drilling instrumentation
and display system

RISERS TENSIONERS
NL Shaffer 120 K TWIN
Eight 55 tons double units, 15.2 m
line travel (tot. pull = 880 tons)

GUIDELINE TENSIONERS
NL Shaffer 16 K
Six 7.5 tons each

BULK SYSTEM
Ulstein
Barite and bentonite storage tanks
capacity 4 x 80 cu.m
Daytanks 2 x 40 cu.m
Cement storage tanks
capacity 4 x 80 cu.m
Daytanks 2 x 40 cu.m

SHALE SHAKER
Derrick
5 x mod. FLC-513 VE

DEGASSER
Burgess MAGNA-VAC
One, 1,000 g.p.m.

DEGASSER
NOV PB
Water Jet type, with 10" vent line
to top of derrick and 5.95 m mud seal

CUTTING CLEANING SYS.
Drexel
8 tons/h capacity

CHOKE MANIFOLD
Cameron
3" 15,000 psi H2S trim

DIVERTER SYSTEM
Vetco Gray CSO
49 ½" diverter housing
with two 18" lines

B.O.P. STACK
Cameron
183/4" 15,000 psi guideline/
guidelineless w/Vetco H4-HD conn.

RISER
Cameron RF
21" x 63 ft joint, 55 ft stroke S.J.

B.O.P CONTROL SYSTEM
Cameron
Latest Cameron Multiplex system with
Simrad acoustic back-up complete with
event logging
Pod recovering feature in guidelineless

FLARE BOOM
Italog
Two, 80 ft long, equipped with
production test lines

B.O.P. HANDLING
Maritime Hydraulics
280 tons

B.O.P. OVERH. CRANE
Maritime Hydraulics
2 x 40 tons

BASE PLATE TROLLEY
Maritime Hydraulics
90 tons

X-TREE OVERH. CRANE
Maritime Hydraulics
2 x 10 tons

MARINE CRANES
Hagglund OP 6016
Twin: main hoist 60 tons 16 m
15 tons 46 m
whip hoist 15 tons 49 m

MUD PIT
Scoomi Oil Tool
The rig is equipped with
environmentally automatic
mud pit cleaning system

OPERATIONAL FUNCTIONS
The Scarabeo 5, based on Maritime Engineering design, is built as a column stabilized semisubmersible drilling vessel for world-wide operations and for harsh environments.
The main operational functions of the vessel are:

1. Exploratory drilling:
   thruster assisted mooring from 75 to 900 m w.d. dynamic positioned mode up to 2,000 m w.d.

2. Production drilling as per 1 above.

3. Designed for an easy conversion into an early production and extensive well testing unit (as per 1 above).

Scarabeo 5 has been conceived to cope with all main foreseeable future drilling/ production tasks.
Very costly options, such as complete winterisation, have not been incorporated, but the necessary structural provisions have been made to convert the unit, if required.

RULES AND REGULATIONS
The Scarabeo 5 complies with all the latest rules and regulations.
The unit is registered in Italy and, in addition to the Italian regulations, complies also with: Norwegian, Canadian, British and U.S. regulations.

HULL AND STRUCTURE
A simple basic structure, with minimum wind and current resistance and smooth surfaces of the upper hull to prevent build-up of ice, no vertical bracings to avoid icing and to facilitate possible entrance of barges betvween the columns to bring in heavy templates to be installed on the-seabed by the rig itself.

No single main strength member, so that the reduction in strength of one single member will not be critical to the whole rig. All these features are intended to enhance the reliability and efficiency of the unit.

SYSTEM
The rig systems are made with a high degree of redundancy.
Systems have power supplies from redundant subsystems and may be controlled from alternative control stations.
This arrangement reduces the possibility of total blackout and improves operability under emergency.

All piping, such as cooling water, fuel oil, ballast, service air are, as far as possible, routed clear of hazardous areas.
Quality Assurance/Quality Control has been implemented throughout the design and the construction phases.


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ACCOMMODATION
The accommodation module is made with structural fire protection according to the rules for units involved in oil production.
This module has been designed as a "safe haven", well protected from main risk areas and with sheltered escape ways to the meeting points for abandonment.

POSITION KEEPING
The platform is kept in position by eight anchors and eight thrusters.

The dynamic positioning control system simulates continuously possible failures in the anchor/thruster systems in order to display the consequences of any failure to the position of the rig and the remedial options available.

8 THRUSTERS, FULL POWER:
2.5 m/s sea current & 19 m/s wind
(5 knots & 38 knots)
2.25 m/s sea current & 27 m/s wind
(4.5 knots & 54 knots)
2.0 m/s sea current & 32 m/s wind
(4 knots & 64 knots)

CASE 2 (LOSING OF 1 CORNER):
2.25 m/s sea current & 10 m/s wind
(4.5 knots & 20 knots)
2.0 m/s sea current & 20 m/s wind
(4 knots & 40 knots)

CASE 5 (WORST FAILURE CASE):
2.0 m/s sea current & 10 m/s wind
(4 knots & 20 knots)
1.5 m/s sea current & 26 m/s wind
(3 knots & 52 knots)

AUTOMATION AND RIG MANAGEMENT
The automation, control and management system is an integrated system based on computers.

The system is connected to over 6,000 points in order to perform the following main functions:

- Automatic power management
- Fluid management, including stability calculation and ballast control
- Rig management, drilling, logistics and safety
- Environmental data monitoring
- Communication via data highways.

BALLAST SYSTEM
A failure mode and effect analysis and a combination of a fault tree analysis have been performed for the ballast system in order to:

- clarify all possible failures for combination of failures that may put the ballast system out of operation
- prove that no single failure will put the system out
- identify the most critical failure events (events chains)
- present a summary of the critical events.

The ballast system is designed to upright the rig within 2 hours in the event of major damage.
There are 8 self-priming ballast pumps installed in 8 watertight compartments.

POWER DISTRIBUTION

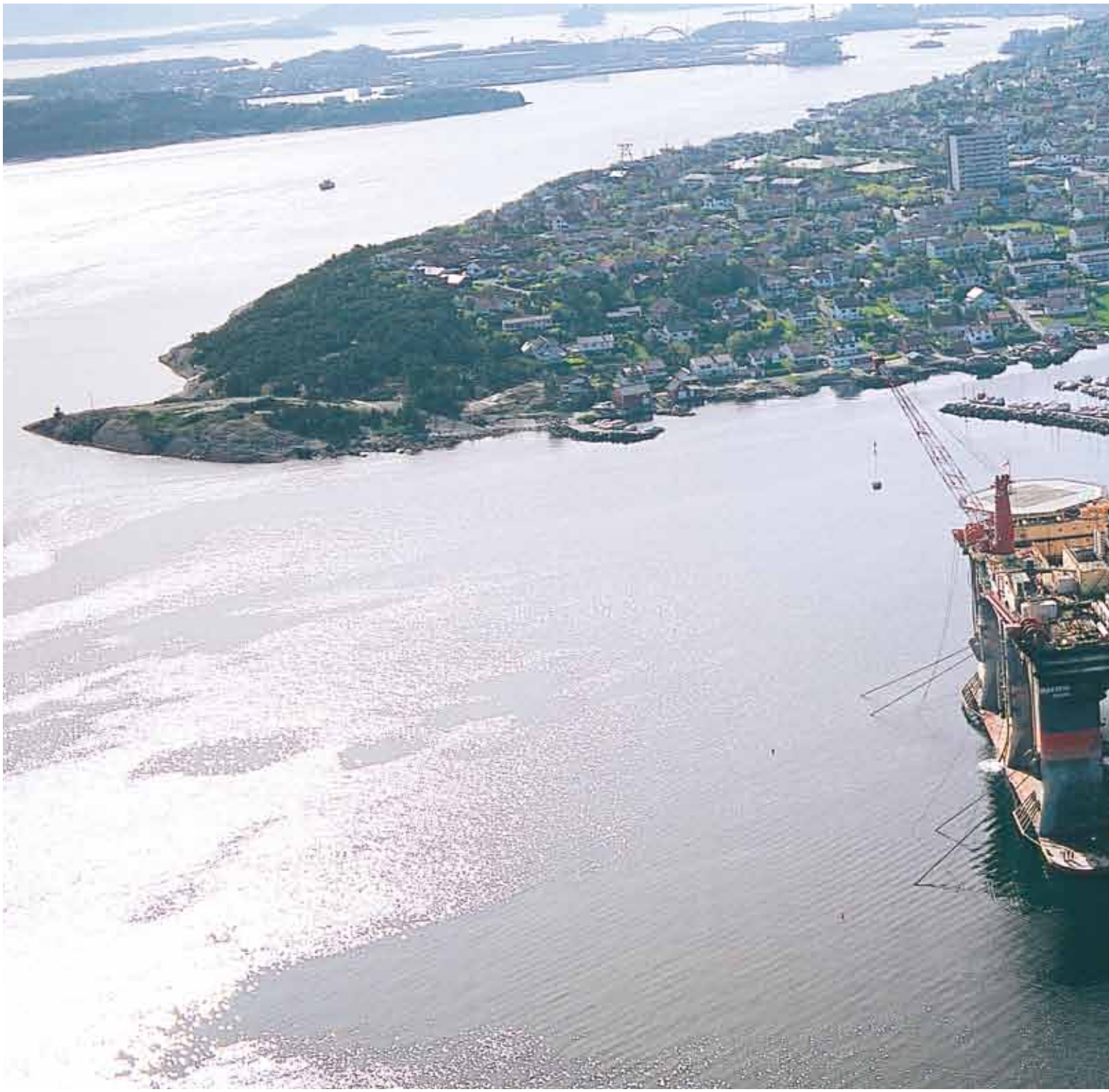
The main electrical system is built as a dual radial system, with four different voltage levels. "Dual system" means that it may be regarded as two completely independent systems, each powering 50% of the total capacity. The electrical main system is powered by 8 dieseldriven generators having a capacity of 4,800 KVA, 6,000 V, 60 Hz. each.

DRILLING

The drilling design-criteria enable the rig to drill up to 9,000 m in water depth up to 2,000 m.
The drilling equipment is the latest state-of-the-art with semi-automatic drill pipe and casing handling.
The large pipe rack area is suitable for storage and handling of 63 ft long riser joints.

SAFETY

The rig is designed for maximum efficiency and safety. All the latest requirements have been taken into account. The unit is able to work with the loss of anyone of the bracings and have sufficient stability to withstand loss of anyone of the columns or 2 damaged compartments. The design of the main hull has been made in such a way that escape ways



within the working area and living quarters will not be affected.
The Scarabeo 5 is made to incorporate all experiences gained from previous semisubmersible designs and the unit is developed to meet the most stringent requirements for world-wide drilling operations. The "functional availability" has been the leading basic design criterion so that all components, system and subsystems (electrical, mechanical, hydraulic) are considered and integrated in view of their specific, minimum vital contributions to any and all critical functions "available" to the unit. In other terms it is useless, and at times hazardous, to have, as in many P.C.D.A. applications, a hypertrophy of the computer components not matched by a comparable fault-tolerance of power, mechanical and hydraulic systems, equally essential to perform any action under computer control especially in emergency.