PRESS KIT

IVAR AASEN

DET NORSKE OLJESELSKAP ASA

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1. INTRODUCTION

1.1. Purpose of document
This document contains information about the development and operation of the Ivar Aasen project. All content in this press kit are for free use for editorial purpose.

1.2. Det norske oljeselskap
Det norske oljeselskap ASA (DETNOR) is an active company with considerable exploration activity on the Norwegian Continental Shelf. The company’s headquarter is located in Trondheim, Norway, and additional offices are located in Oslo and Harstad, Norway. Det norske is listed on the Oslo Stock Exchange with the ticker “DETNOR”. Read more about Det norske at www.detnor.no.

Det norske oljeselskap is operator for the development and operations of the Ivar Aasen field.

1.3. HSE
Det norske’s operations are to be conducted so that harm to personnel, environment and economical values is avoided. We shall avoid work related illness, secure our installation’s technical integrity and avoid notes from Norwegian authorities.

The company will achieve these goals by integrating the concern for health, safety and environment (HSE) in all of the company's operations, and by being a good employer and principal in contract relations. Concern for HSE and reduction of the risk for major incidents shall be prioritised above all other business matters. In all operations at land as well as at sea, concern for health and security is to be prioritized.

It is the company’s belief that all undesirable incidents can be avoided. It is important to promote decent attitudes and develop a culture of concern for HSE.

2. ABOUT THE IVAR AASEN FIELD

2.1. Background
The Ivar Aasen Field was found in 2008, when Det norske oljeselskap drilled the well[2] 16/1-9 on the formerly Draupne Field. Hanz was discovered in 1997 and West Cable was discovered in 1994, both by Esso.

The plan for development and operation of Ivar Aasen was submitted to the Ministry of Petroleum and Energy in December 2012. It was approved by the Storting on May 21st 2013.

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1 Field: One discovery, or a number of concentrated discoveries, which the licensees have decided to develop and for which the authorities have approved, or granted exemption for, a Plan for Development and Operation (PDO).
2 Operator: The agent who, on behalf of the licensee, is in charge of the day-to-day management of the petroleum activity.
3 Well: A hole drilled to find or delimit a petroleum deposit and/or produce petroleum or water for injection purposes, inject gas, water or another medium, or map or monitor well parameters. A well may consist of one or more well paths and may have one or more terminal points.
The Ivar Aasen Field is the largest development project for a Norwegian company in many years, with the exception of Statoil. Total investments are expected to be NOK 24.7 bn, and the first oil is to be produced in Q4 2016.

### 2.2. Location

The development of the Ivar Aasen field comprises of three discoveries:

- Ivar Aasen (PL 001B)
- Hanz (PL 028B)
- West Cable (PL 001B and PL 242)

The discoveries are located in blocks 16/1 and 25/10 between Sørlige Vikinggraben and Utsirahøyden, in the northern part of the North Sea, approximately 180 km west of Stavanger.
2.3. Facts about the Ivar Aasen field

Ivar Aasen comprises:
- Three independent discoveries
- Three different reservoir properties
- Three different strategies of drainage
- Three different formations (Hugin, Sleipner og Skagerrak)

The Ivar Aasen field is the first large development project for Det norske as an operator, and the production at Ivar Aasen will be a major contribution to the company’s development.

The recoverable reserves in the Ivar Aasen project is estimated to 115,1 millions barrels of oil and 33,3 billions barrels of gas.

Det norske’s interest in the production at Ivar Aasen is 16 000 barrels per day from Q4 2016, and 23 000 barrels per day at peak level in 2019.

The economical life time of the Ivar Aasen field is estimated to be approximately 20 year, depending on the development of oil price and production levels.
2.4. **Schedule Ivar Aasen**

<table>
<thead>
<tr>
<th>When</th>
<th>Where</th>
<th>What</th>
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| **1st half 2013** | Stortinget, London     | Approval of development  
                                 | Detailed design of jacket and topside                                |
| **2nd half 2013** | Sardinia               | Start-up of construction jacket                                      |
| **1st half 2014** | Singapore              | Start-up of construction topside                                     |
| **2nd half 2014** | Stord                  | Start-up of construction living quarters                             |
| **1st half 2015** | The Aasen Field        | Jacket lifted into place                                              |
| **2nd half 2015** | The Aasen Field, The Aasen Field | Mærsk starts drilling og production wells  
                                 | Installation of pipelines                                              |
| **1st half 2016** | Singapore, The Aasen Field, The Aasen Field | Topside to leave shipyard for the North Sea  
                                 | Installation of topside  
                                 | Installation of living quarters                                      |
| **2nd half 2016** | Trondheim, The Aasen Field | Operations centre being prepared  
                                 | Production start-up                                                  |
3. CONTRACTS AND MAIN SUPPLIERS

Ivar Aasen is one of the largest oil discoveries on the Norwegian Continental Shelf in recent years. The contracts for the development of the field are spread all over the world, from Stord in Norway to Singapore.

**Topside - SMOE Ltd. in Singapore**
SMOE Ltd. in Singapore will deliver the topside with a process module. The work will start in Q4 2013, and the topside shall be completed and ready for transportation to Norway in Q1 2016. The engineering work will be performed by SMOE’s subcontractor Wood Group Mustang Ltd. in London. The work is expected to be completed in 2016.

**Living quarters - Apply Leirvik**
Apply Leirvik at Stord will build the living quarter for Ivar Aasen. The living quarter is mounted on the topside and has seven floors and a total area of 3 300 square meters. It has 70 cabins, recreational facilities, control room, helideck, and all other necessary facilities. The living quarter is constructed in aluminum.

**Jacket - Saipem Ltd.**
Saipem Ltd. is constructing the jacket for the Ivar Aasen installation at Intermare Fabrication Yard in Arbatax on Sardinia, Italy. The jacket is 138 meters tall and will be installed at a water depth of 112 meters. The total weight is 14 400 tons, including its piles. The engineering work is performed by Saipem’s engineering department in Kingston-upon-Thames west for London. The construction of the jacket started in November 2013. Transportation to Norway is expected in Q1 2015.

**Transportation and installation - Saipem Ltd.**
Saipem Ltd. is also supplier of transporation and installation for jacket and topside modules. Transportation and installation of the topside, jacket and living quarter will be performed with assistance from the crane vessel Saipem S7000.
Production and installation of pipelines – Emas Amc
Emas Amc will construct and install pipelines for the Ivar Aasen field. The company’s head quarter is situated in Oslo, Norway. Emas Amc is responsible for project management, detailed engineering, and procurement, construction and installation for three 10 km pipelines. The delivery includes spools, pipeline, pipeline end termination (PLET), and sea bed intervention. Halsvik spool base in Gulen, Norway will be used as base for the different services and fabrication of welded pipe components. A new base is planned to be in operation from 31st December, 2014. The pipelines will be installed on the sea bed during the summer of 2015.

Power cable – ABB AB
The Ivar Aasen installation will receive its electrical power from the Edvard Grieg installation, which in the future will be connected to land and have an on-shore power supply. ABB AB in Karlskrona, Sweden will produce the power cable to be installed between Ivar Aasen and Edvard Grieg. The cable’s length is 10 km and will be installed at the sea bed by Emas Amc spring 2016.

Wellhead and Christmas tree – FMC Technologies
Wellheads and christmas trees is delivered by FMC Technologies. The contract includes engineering, fabrication and completion of 14 wellheads and Christmas trees, with an option on an additional seven systems. The equipment is partly manufactured in Sens, France and Dunfermline, Scotland, and will be delivered in several turns. First delivery is in Q4 2014.

Drilling rig – Maersk Drilling
Maersk Drilling is responsible for the drilling at Ivar Aasen, and the drilling operations will be performed with a jack up rig. The drilling rig is a CJ-70 XLE. It is built at the Keppel FELS yard in Singapore and will be delivered in Q1 2015. The rig has the capacity to drill at sea depths up to 150 meters in Norwegian waters. The rig is designed in accordance with Norwegian working regulations and the most rigid security concerns. It has a drilling tower that can be moved across the Ivar Aasen installation so that the drilling is performed trough the installation. The rig can be used for exploratory drilling before, during and after drilling at Ivar Aasen and can also be sublet to other licenses.

Control and communication systems – Siemens
Siemens is the supplier of what can be called the installation’s central nervous system. The work with a complete and integrated electro, control and communication system will be performed at Siemens’ own locations, among others in Trondheim and Oslo, Norway. Approximately 100 employees from Siemens will in total be involved in the project. Engineers from Siemens will in addition participate in a so-called integrated team under management by and in cooperation with Det norske.

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3 Pipes and valves mounted on the wellhead
4. ORGANISATION AND STAFFING

4.1 Operations centre
The development of Ivar Aasen represents large values for the Norwegian society and to the owners. The entire development will require several thousands of man-year, from subcontractors all across the world. At the most, 260 persons, including Det norskes own employees and hired personnel, work on the development of the Ivar Aasen field. Many of these will be situated in Trondheim, but also in London, Singapore, Arbatax, Stord and Oslo.

Modern technology will contribute to operating the Ivar Aasen field effectively. The offshore organisation will be closely integrated with the onshore organisation with modern communication systems. Effective access to and exchange of data from all locations is made possible with fibre networks.

Illustration of the operations centre in Trondheim.

4.2 Emergency organization
Det norske has contingency plans which describes responsibilities and authority in emergency situations, and also what procedures, reporting and communication lines that are to be followed in the case of an incident. The purpose of the plans is that Det norske shall manage emergency situations in a secure and effective way so that harm on life, health, environment and values are avoided.
4.3 Staffing

- The personnel on the installation will have the responsibility for operation of all offshore activities
- The core staffing will consist of own employees performing day-to-day operations, critical maintenance activities and emergency preparedness tasks
- Catering will be taken care of by hired personnel
- Noncritical maintenance will be planned and carried out by designated teams
- A separate maintenance and modification contract is established
- The estimated core staffing during start-up is 23 persons, and this will be reduced when in normal operation
4.4 Onshore organization

- The onshore organisation is managed by an asset manager which is responsible for maintaining secure, effective and reliable operation of the Ivar Aasen field. See Figure 2.
- The reservoir and production management team (Petek) is responsible for optimum drainage of the field.
- The drilling and well team plans and follows up all drilling and well maintenance activities.
- The operational support team, managed by an operations manager, is responsible for day-to-day operational support to the platform.
- To achieve optimum operation and relieve the personnel onboard the platform, tasks that may be performed onshore shall be performed onshore.
5. DEVELOPMENT AND INSTALLATION

5.1 Development in two phases

The development of the three discoveries will be integrated in a coordinated development with two phases. Ivar Aasen and West Cable will be developed in phase one, and Hanz in phase two.

The fields will be developed so that a manned platform is positioned above the Ivar Aasen reservoir. Hanz will be developed with a subsea installation which is connected to the Ivar Aasen platform.

5.2 The installation

The Ivar Aasen platform is positioned above the Ivar Aasen reservoir. The platform will be tied to the seabed. The platform will have a living quarter with 70 cabins. Maximal staffing is 70 persons.
Fifteen wells
The plan for The Ivar Aasen field is to develop 15 wells. Eight of these are production wells⁴ and seven are water injection wells⁵. The wells will be drilled with a contracted jack up rig. Drilling will commence in 2015 after the installation of the jacket, with a pause for the installation of the topside in the summer of 2016. Minimum three wells is planned to be drilled after the jacket is installed and before installation of the topside.

Connection to the Edvard Grieg installation
The production wells at Ivar Aasen and West Cable will be drilled from the platform while the two wells at Hanz is connected to the platform with a 14 km pipeline. The Ivar Aasen platform has a one-stage process for separation of oil, gas and water. The development of the Aasen field is coordinated with the development of the Edvard Grieg field, which is located 10 km southeast, and the export solutions for the fields are coordinated as well. The gas will be exported via the UK Continental Shelf while the oil from the fields will be exported in a new pipeline from the Edvard Grieg field to the Grane pipeline and then to the Stureterminal.

The Aasen platform will be supplied with power from the Grieg platform. Together with other licensee groups, it will be evaluated whether Ivar Aasen, Edvard Grieg, Gina Krog and Johan Sverdrup possibly may be supplied with power from onshore in the future.

KEY DATA

- **Total reserves: 143 mill. barrels**
  - Ivar Aasen: 114 mill. barrels
  - West Cable: 12 mill. barrels
  - Hanz: 19 mill. barrels

- **Total no. of wells: 15**
  - Ivar Aasen: 6 production, 6 injection
  - West Cable: 1 production
  - Hanz: 1 production og 1 injection

- **Platform capacity**
  - 9 000 standard cubic meters
  - Total liquid production 21 000 standard square meters
  - Water injection 28 000 standard square meters
  - Water production 20 000 standard square meters
  - Seawater for injection 20 000 standard square meters
  - Gas production 3 millioner standard square meters

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⁴ A well drilled specifically to drain a petroleum reservoir as effectively as possible as opposed to the drilling of an exploration well.

⁵ A well where for example water is pumped into the reservoir to add pressure so the oil and/or gas enters the production wells.
5.3 **Well design**

The wells will be constructed in accordance with the facilities regulation\(^6\) (ch. VIII), the activities regulation\(^7\) (ch. XV) and NORSOK D-010\(^8\).

- Four casing strings
  - Diameter from 7 to 30 inches
  - Lengths of each string from 600 - 6000 m
  - Designed for pressures up to 345 bar and 110 degrees Celsius
- The drilling can be compared to dental drilling at cell level with regard to accuracy.

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5.4 **Design production tubing**

- Designed to transport oil from the reservoir to the platform deck for 25 years
- Measures real-time pressure and temperature several kilometres downhole
- Possibility of fibre-optics for monitoring of well stream and well integrity

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\(^6\) Interpretation of the facilities regulation about designing and equipping installations in the petroleum industry

\(^7\) Interpretation of the activities regulation about activities in the petroleum industry

\(^8\) Well integrity in drilling and well operations