



## Badger Explorer Exploration Tool

# OG21 Innovation Seminar

## TTA2 Exploration and Reservoir Characterization

Bergen, 4 March 2009  
CTO Erling A. Woods



## Badger Systems Video

Video demonstrating Badger Explorer concept; please go to:

<http://bxpl.postmann.net/?id=994>



## Industry Statement

*Badger Explorer technologies*

***"We consider the Badger Explorer to be a potential  
"Game Changer"  
in exploring for hydrocarbons.***

***If research efforts and commercial implementation  
are successful, the Badger Explorer should help  
increase the success rate for discovery of oil  
and gas resources while reducing the  
environmental impact of the exploration  
process."***

*Statement from industry partners 2005*

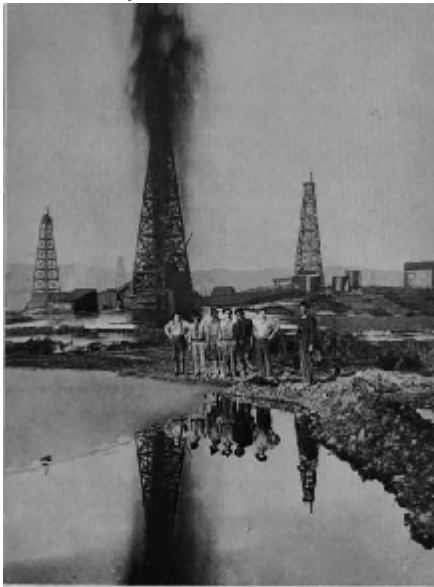
**ExxonMobil**





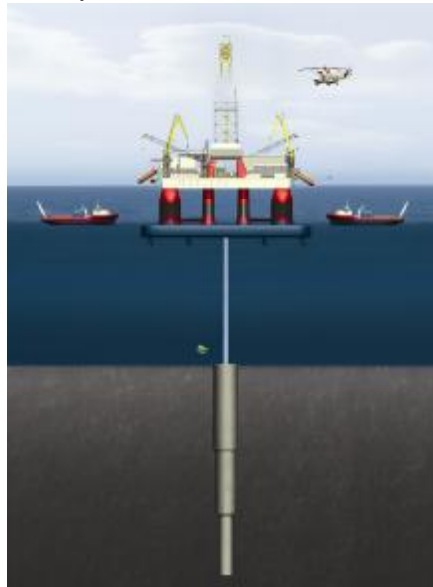
# Badger Explorer – A Game Changer

Yesterday's method



"Blow-out", and proud of it

Today's method



Costly operation to meet required HSE standards

Tomorrow's method



Safe, clean and low impact operation



# The New Exploration Value Chain

*Badger Explorer technologies*

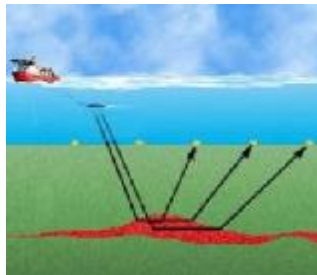
## Seismic

- Used for 100% of prospects
- Only identifies potential traps, unable to identify the presence of hydrocarbons
- Covers large areas at a relatively low cost



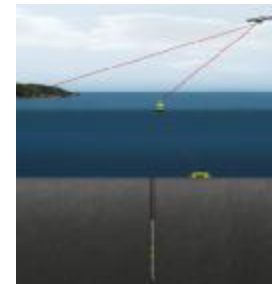
## EM

- Currently low market penetration but expected to grow
- Claimed to be suitable for 70-90% of targets. Problems with resistors such as volcanic stone, coal beds and salt layers
- 90% correct hydrocarbon identification rate claimed



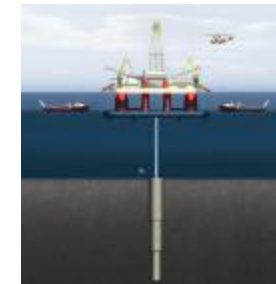
## Badger Explorer

- The most cost efficient comprehensive data collection method
- Suitable for large range of targets (exploration, appraisal + brown fields)
- Complementary to seismic and EM
- Provides detailed formation data and verifies the presence of hydrocarbons



## Conventional drilling

- Currently the only available drilling technology
- Up to USD 700 million rig and 120 man crew required to drill a well
- Tight supply market with all time high day rates
- Exploration wells are rarely used for production
- Most value in development drilling





## The Overall Concept

*Badger Explorer technologies*

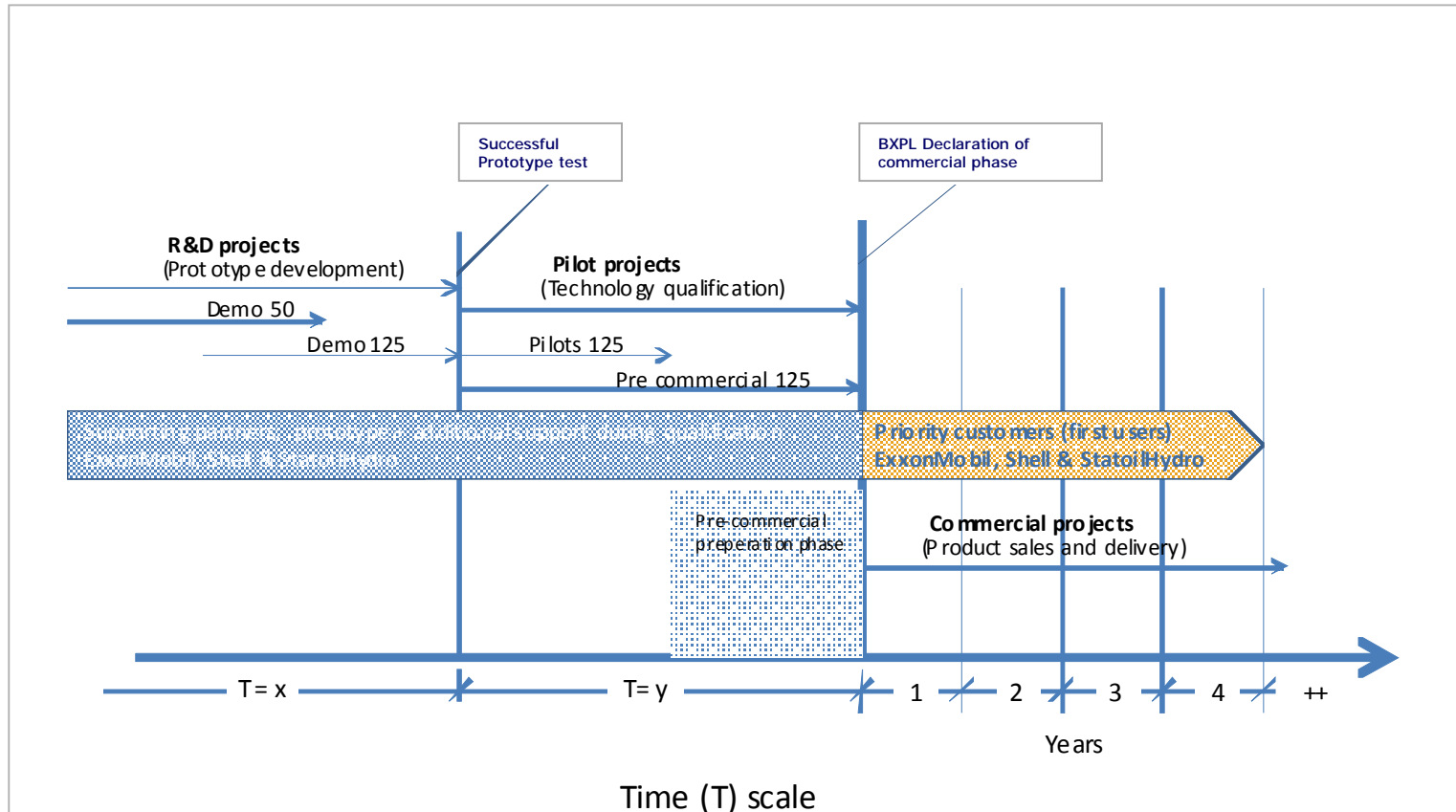
### **Badger Explorer;**

- A non-reusable exploration tool that remains in the underground
- All functions are either driven by electro-mechanical or hydraulic solutions.
  
- **Consists of the following main functions;**
  - Drilling module utilizing electrical motor.
  - Cutting transport, separation, deposition, compression and fracture injection device
  - Spooled cable, through which power is supplied to the tool and data transferred to surface
  - Carries sensors, which continuously records data
  
- **Development aims at utilizing proven technology where applicable and proprietary solutions where required.**





# Master Plan Badger Explorer Development





## Badger Explorer Field Test

Field tests in Denmark  
June & October 2008

- ü Drilling
- ü Circulation to cool bit and remove cuttings
- ü Anchor function while compacting
- ü Separation tests.
- ü Gained considerable operational experience: (logistics, permissions, legislation contractors etc.)
- ü Currently evaluating other relevant test sites (different types of formations).





## Nature of the game: Be prepared for the unexpected



The Hanklit thrust sheet. Here a thrust sheet 30 m thick was translated over the foreland consisting the same glacial-fluvial formation as the one carried on the back of the thrust sheet





## Network Approach to Development

