21st February 2006

- Exploration & Production Overview

- Marathon’s Operations in Ireland
  (Description & Brief History)

- Security of Gas Supply
  (The Longer Term Role of Marathon’s Kinsale Infrastructure)
Exploration & Production Overview

- Fossil Fuels are world’s primary source of energy supply
- E&P business is concerned with finding and producing hydrocarbons
- Worldwide Oil Demand 70mmb/day
- Worldwide Gas Demand 40mmboe/day (Ireland 0.07mmboe/day)
- Worldwide gas demand growing at faster rate than oil demand
- Oil market is global, oil is a true commodity
- Gas markets are regional, transport limitations govern
Oil and Gas Exploration and Production

3 Separate Phases:

1) Exploration:
   - High Risk Activity
   - Medium Levels of Negative Cash Flows
   - Key Issues - Where to Explore
   - Technical Capabilities

2) Development:
   - Medium Risk Activity
   - High Levels of Negative Cash Flows
   - Key Issues - Technical Development Scenarios
   - Environmental / Safety Impacts
   - Schedule and Capital Expenditure

3) Production:
   - Low Risk Activity
   - High Levels of Positive Cash Flows
   - Key Issues - Reservoir / Facilities Management
   - Environmental / Safety Impacts
   - Cost Control
   - Reserves and Prices

Risk, in this instance, refers only to the loss of MONEY
Exploration – Technical Issues

- Oil/Gas deposits are contained in “traps” in sedimentary basins

- For successful oil/gas reservoir you need:
  1. Source: Deeper rocks where oil/gas generated
  2. Reservoir: Porous and permeable rocks into which oil/gas migrates
  3. Structure/Seal: Characteristics of reservoir and cap rock that ensure oil/gas remains trapped
SW Kinsale Greensands
West to East Schematic Cross Section
Exploration – Geology & Geophysics

- **Geology**: Science used to determine likely source and reservoir rocks

- **Geophysics**: Science used to determine likely structures/seals, involves gathering seismic imaging information

- **Exploration drilling**: Method used to establish whether oil/gas actually present in commercial quantities

- **Cost of 1 well offshore exploration programme**:
  - Geologic/Geophysical Phase: €1-5 million
  - Drilling Phase: €5-30 million
Development: Engineering

- Once commercial discovery made, need to determine and implement scheme to bring oil/gas to market

- Every development involves: drilling wells into the reservoir, processing the reservoir fluids, transporting oil/gas to market

- Typical offshore development schemes:

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<th>Transport</th>
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Kinsale Area Infrastructure
DRIVEN MAIN PILE

DRILLED & GROUTED INSERT PILE

Cork County Hall

211 feet

440 feet

50 FT

115 FT

DRIVEN MAIN PILE

DRILLED & GROUTED INSERT PILE
Cork City

Old Head of Kinsale

Inch Terminal

Celtic Sea Gas Fields

Platform Alpha

Platform Bravo

Ballycotton Gas Field

Southwest Kinsale Gas Field

Kinsale Head Gas Field

Seven Heads Gas Field
Ballycotton Subsea Completion

Platform Bravo

New 12" Inter-Platform Pipeline

Platform Alpha

Southwest Kinsale Subsea Completion

12" Pipeline, 7 km

12" Pipeline, 1½ km

Umbilical Extension

Two additional Wells

SWK Re-profiling

Kinsale Area

Cork City
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- **Security of Gas Supply**
  (The Longer Term Role of Marathon’s Kinsale Infrastructure)
Ireland – Long Term Sources of Gas Supply
Liquefied Natural Gas (LNG)

- LNG most economic method to move gas over long distances, involves:
  1. Liquefaction plant to convert gas from gaseous to liquid form
  2. Tankers to transport the LNG to market
  3. LNG storage and gasification plant connected to pipeline network
LNG Liquefaction Plant

Arzew Algeria
Polar Eagle loading at Kenai LNG Plant
Traditional LNG Regas terminal
All facilities located onshore
(this photo is of Elba Island Georgia facility where Marathon has the capability to receive LNG / Gas)
Ireland – Security of Gas Supply
Southwest Kinsale Storage
Ireland

Kinsale Area Infrastructure

Storage of Gas – Reverse Flow from Shore
Ireland – Security of Gas Supply
Indigenous Production
Kinsale Area Infrastructure

Combined Operation

IRELAND
Developments in the Irish Gas Industry
An Irish Producer’s Perspective

IEI evening lecture
February 21, 2006