HEAVY OIL PROJECTS IN COLOMBIA

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1. Introduction

2. Upstream Projects
   - Production
   - Exploration

3. Downstream Projects

4. Achievements
1. Introduction

2. Upstream Projects
   - Production
   - Exploration

3. Downstream Projects

4. Achievements
Agenda

1. Introduction

2. Upstream Projects
   • Production
   • Exploration

3. Downstream Projects

4. Achievements
HEAVY OIL PRODUCTION

Bogotá
Rubiales field
Castilla field
San Fernando Formation
Nare – Teca fields
Heavy oil production represents over 20% of Ecopetrol’s total production.

We have doubled heavy oil production in the past 4 years.

April 2008, 100.6 MBOPD, 72.4 Castilla – San Fernando
17.6 Rubiales, 10.6 Nare - Teca

MBOPD


Goal

Castilla - San Fernando
Nare
Rubiales

HEAVY OIL PROJECTS IN COLOMBIA
HEAVY OIL PRODUCTION – ECOPETROL OPERATION

HEAVY OIL PROJECTS IN COLOMBIA
DIRECT OPERATION OF ECOPETROL

Castilla Field Formations K1-K2

• Production of 70 MBOPD OF 11-13 °API
• Drilling of 117 horizontal, vertical, and multilateral wells.

San Fernando –T2 Formation

• Present in the Castilla, Chichimene, Apiay, Suria, Libertad fields.
• Production of extra heavy crude 7-8 API.
• Estimated production 20 KBOPD for the year 2012, with future increase as per results of tests performed in 2008.
• Evaluation of new deasphalted oil technology (ECOPETROL technology) for pilot plant with 10 KBOPD capacity.
PRODUCTION PROJECTS - LLANOS BASIN

Associated Operation: Ecopetrol 57%; Petrorubiales 43%

Rubiales Field

• Estimated production for the end of 2008 is 50 MBOPD, 12 °API

• In 2008, 45 wells will be drilled and new treatment facilities will be built, with total investment of 400 MMUS$.
PRODUCTION PROJECT – MIDDLE MAGDALENA VALLEY
Associated Operation: Ecopetrol 50%; Mansarovar 50%.

Teca – Nare Contracts

- Cocorna, Nare, Under River, Moriche, Girasol and Jazmin fields, producing 11 - 12 °API crude, with steam cyclic stimulation.

- Estimated production in the year 2012 will amount to 30 MBOPD and it may increase depending on the results of adjacent exploration areas.

- 500 shallow wells will be drilled between years 2008 and 2010.
1. Introduction

2. Upstream Projects
   • Production
   • Exploration

3. Downstream Projects

4. Achievements

Agenda
EXPLORATION ACTIVITIES IN THE LLANOS BASIN

HEAVY OIL PROJECTS IN COLOMBIA
EXPLORATION PROJECTS – LLANOS BASIN

CAÑO SUR BLOCK

Association: Ecopetrol 50% - Shell E & P 50%
Area: 654,000 Hectares
Activity 2008:
• Acquisition of 720 Kms 2D seismic in years 2007 and 2008.
• Hadas 1 Well

QUIFA BLOCK

Association: Ecopetrol 30% - Metapetroleum 70%
Area: 152,000 Hectares
Activity 2008:
• Acquisition of 200 Kms of 2D seismic.
• Drilling of 1 well

HEAVY OIL PROJECTS IN COLOMBIA
HEAVY OIL ROUND IN COLOMBIA
AGENCIA NACIONAL DE HIDROCARBUROS - ANH

EAST ZONE

Date for submitting Proposals:
June 10, 2008

No. of Blocks: 8

Extension:
12,325,546 (Ha)

For additional information consult: www.anh.gov.co
HEAVY OIL ROUND IN COLOMBIA
AGENCIA NACIONAL DE HIDROCARBUROS - ANH

WEST ZONE

Date for submitting Proposals:
September 5, 2008

No. of Blocks: 17

Extension:
2,962,210 (Hectares)

For additional information consult: www.anh.gov.co

Fuente: Agencia Nacional de Hidrocarburos – Colombia
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3. Downstream Projects

4. Achievements
Integrated Project Strategy

Diluted Heavy Oil Production Scheme: (2008 – 2012)

Market

Production-Enhancement Integrated Scheme: (2013 – 2033)

Market
PROJECTS – DOWNSTREAM

HEAVY OIL PROJECTS IN COLOMBIA
HEAVY OIL PROJECTS.

Total Investment of 5752 MMUS$

Preliminary portfolio information for the next five years

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<th>Category</th>
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<td>Production</td>
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<td>Castilla</td>
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<td>San Fernando</td>
<td>400</td>
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<td>Rubiales</td>
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<td>Nare Project (Jazmin, Girasol &amp; Other Field)</td>
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<td>Pipelines</td>
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<td>Refining</td>
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HEAVY OIL PROJECTS IN COLOMBIA
1. Introduction

2. Upstream Projects
   - Exploration
   - Production

3. Downstream Projects

4. Achievements
Achievements in heavy oil projects

Upstream

• Having high potential exploratory blocks, close to the infrastructure of the producing fields that leverage new discoveries.

• We have doubled the production levels of heavy oil in the past 4 years

• Good production results based on design of horizontal and multilateral wells.

• High possibilities to continue increase both, the reserve base and production levels of heavy oils
Achievements in heavy crude project

Downstream

• Having an optimum alternative for transportation of heavy oil through raw naphtha dilution, optimizing the existing pipeline infrastructure.

• Optimizing the feed to the Barrancabermeja refinery through the crude segregation program

• Positioning a new blend in the international market: the Castilla blend.
Refinery

- The project to modernize the Barrancabermeja refinery includes Delayed Coker and Hydrocraker.
- Estimated investment to date 2380 MMUS$.
- Estimated date for operation start-up: December 2012
Heavy crude production represents over 20% of the Company’s total production.

HEAVY OIL PROJECTS IN COLOMBIA
Heavy crude project transport system

<table>
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<th>EXISTING</th>
<th>NEW</th>
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<td>DILUTED CRUDE</td>
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<td>DILUENT</td>
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</table>

Cabotaje Nafta Coveñas-Pozos Colorados

COVEÑAS

24"/30"x 482 Km
8"x 187 Km

Ayacucho

20,16,14,12" x 315 Km
12"x 187 Km

CIB

12" y 16" x 111 Km
30"-36"x828 Km

Sebastopol

Pozos Colorados

CIB

12"x 187 Km
12, 12 y 16" x 111 Km

Sebastopol

12" x 187 Km

Tocancipá

16 y 20" x 257 Km
12"x 180 Km

PORVENIR

20"x 128 Km
24"x 235 Km

CASTILLA

APIAY

RUBIALES
DOWNSTREAM PROJECTS

Apiay – Porvenir Pipeline
Length: 128 Km
Diameter: 20”
Capacity: 160,000 BOPD
Operation start-up: December 30, 2008

Rubiales – Monterrey Pipeline
Length: 234 Km
Diameter: 24”
Capacity: 160,000 BOPD
Operation start-up: November 1, 2009

Tocancipa – Castilla Multi-product Pipeline
Length: 170 Km
Diameter: 12”
Capacity: 100,000 BOPD
Operation start-up: September 30, 2009