

# MKB Republic of Congo (Congo Brazzaville)

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Panoro Energy  
Panoro Fuelax

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# Mark Scarbrough P. E.

## Manager Drilling and Operations – MKB Project

- Registered Engineer with 29 years of upstream oil and gas experience
- Experience in Drilling, Completion, Production, Reservoir, and Integrated Projects
- Operating experience in USA, Latin America, and Western Africa

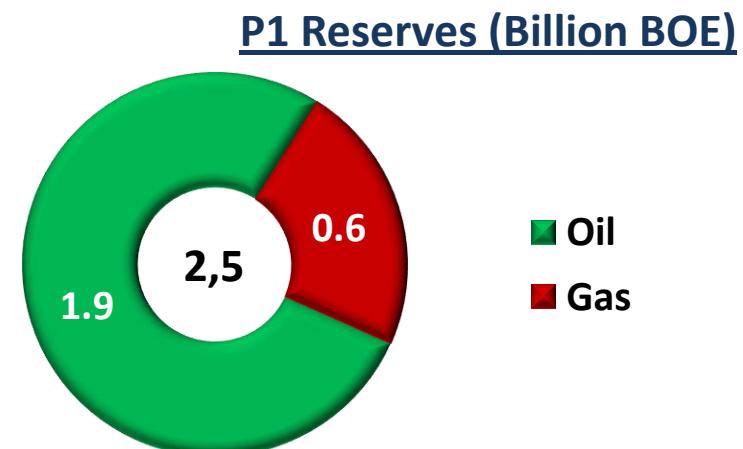
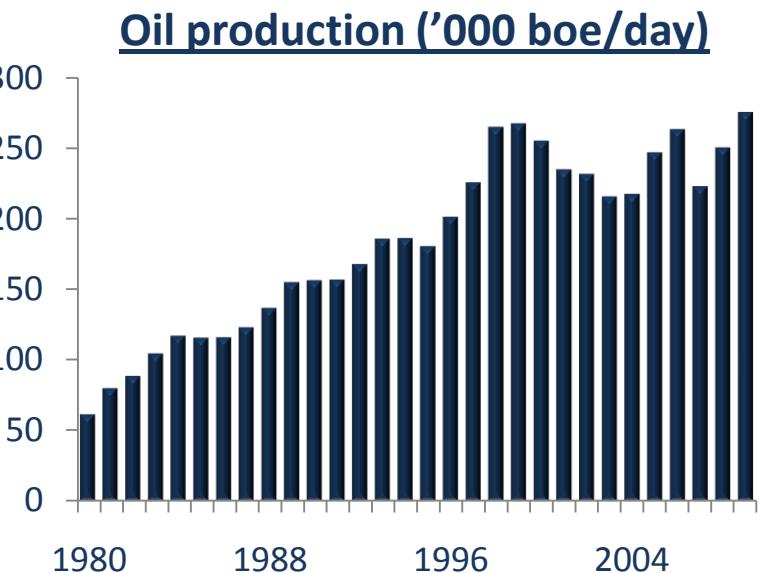


Significant experience in hydraulic fracturing low permeability reservoirs in Mid-Continent USA and South Texas

Held various management positions in multi-cultural multi-lingual environments, including last 7 years in Western Africa

# Republic of Congo (Congo Brazzaville)

- 4.1 million people
- GDP of USD 3,900 per capita, +7.6% in 2009
- Independence from France 1960
- Legal system based on French Law
- Petroleum fiscal regime: Production sharing contract (PSC)
- National oil company: SNPC, holding share in all oil & gas projects
- Major Operators: TOTAL, ENI, Perenco, Murphy, SOCO, Maurel & Prom

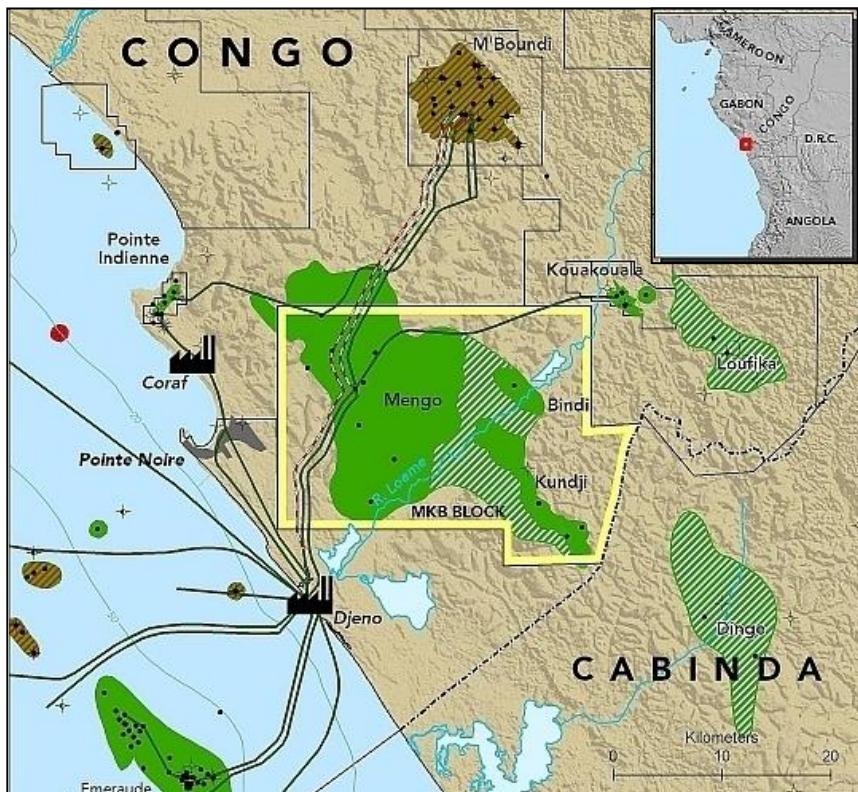


# Mengo-Kundji-Bindi (20%)

Pilot program commenced

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MKB (Congo)	
Operator	SNPC - Congo National Oil Company (60%)
Working Interest	20%
Other Partners	PetroCI (20%)
1st Prod	2010 test production
Current stage	Pilot project commenced



- 17 wells drilled to date within the MKB permit, including the latest 3 wellbores, KUN-4, KUN-4bis and KUN-5 drilled by SNPC
- Seismic coverage is represented by 1673km of 2D data, 1970's and 1980's vintage, reprocessed by Elf in 1990.
- Very large oil in place (>1 billion bbl) volumes with significant STOOIP upside
  - The Mengo sandstones are always oil saturated wherever encountered
  - Potential for large scale onshore development
- A proven producer: 700km<sup>2</sup> licence area includes three fields previously produced by Elf from 1980 to 1992
- Following Elf's exit, license holder's progress was hampered by low oil price, local unrest and other priorities
- Modern hydraulic fracturing technology as well as future possible water injection and artificial lift will result in a step change in production performance
- Additional upside may exist in the deeper exploration play (proven in the giant M'Boundi field nearby)

# Very encouraging test results

- Completed two wells, which were drilled in 2009
- Used hydraulic workover unit to perforate and run completion equipment (packers, nipples, etc)
- Performed hydraulic fracture stimulation treatments
- Cleaned out wells with coiled tubing and nitrogen



- Test production capacity has been around 600 bopd from KUN-4bis and 300 bopd from KUN-5
- Wells expected to decline to stable combined rate of 500-600 bopd after one year of production
- Sufficient permeability (~1 mD)
- Oil quality of 33-36 API with low viscosity (~1 centipoise)
- Good results from fracking
- Oil flow without formation water
- Produced and stored about 16,000 bbls on extended well tests through test facilities

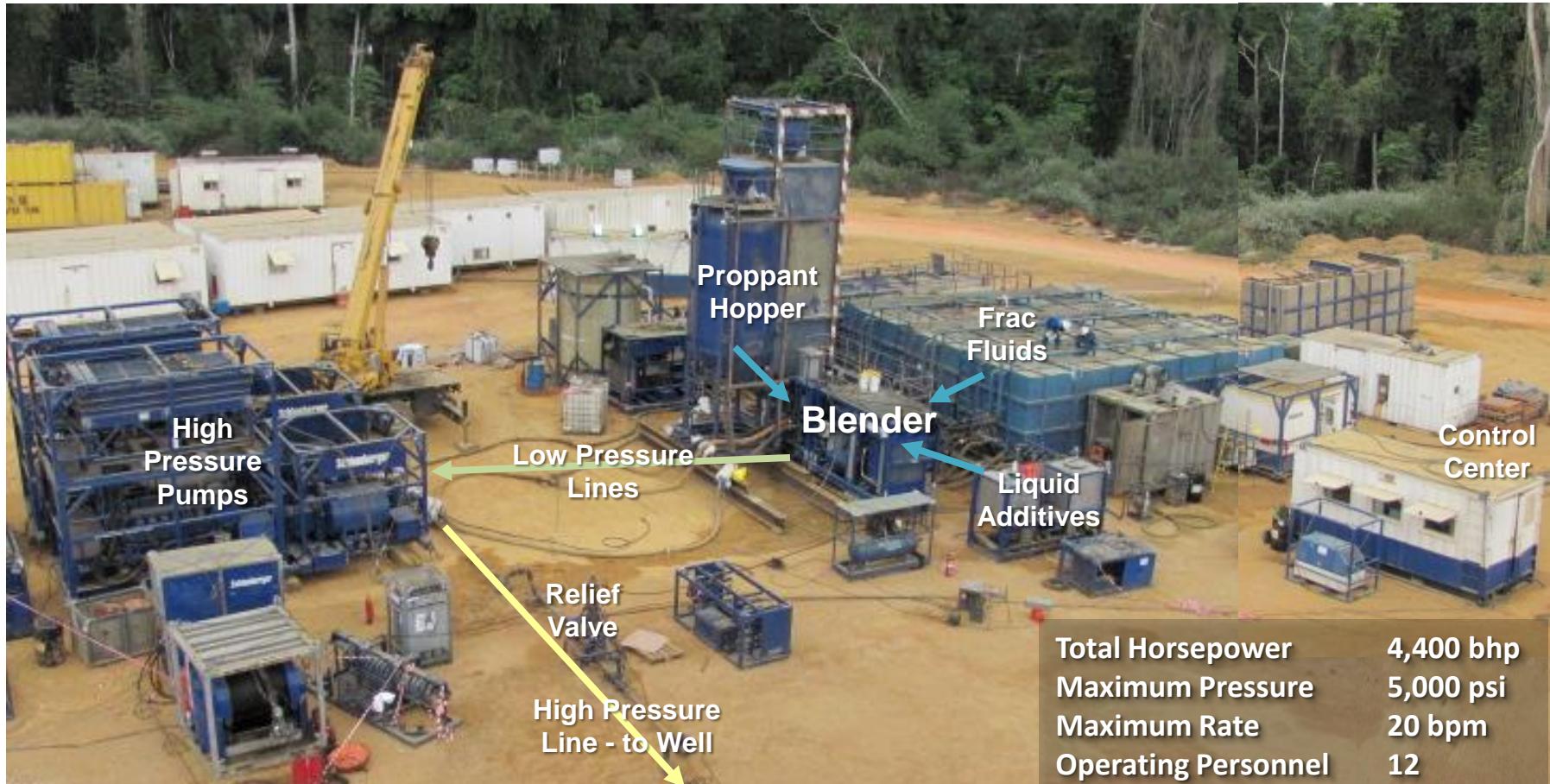


Kundji Completions Jul-Aug 2010

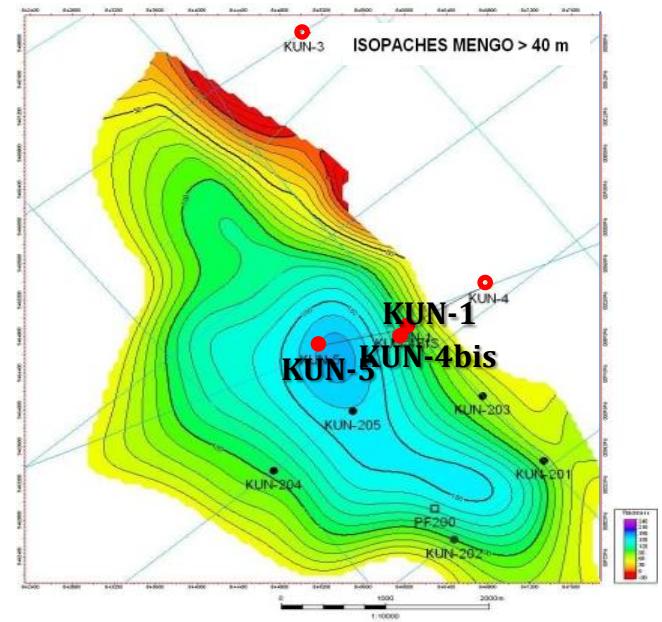
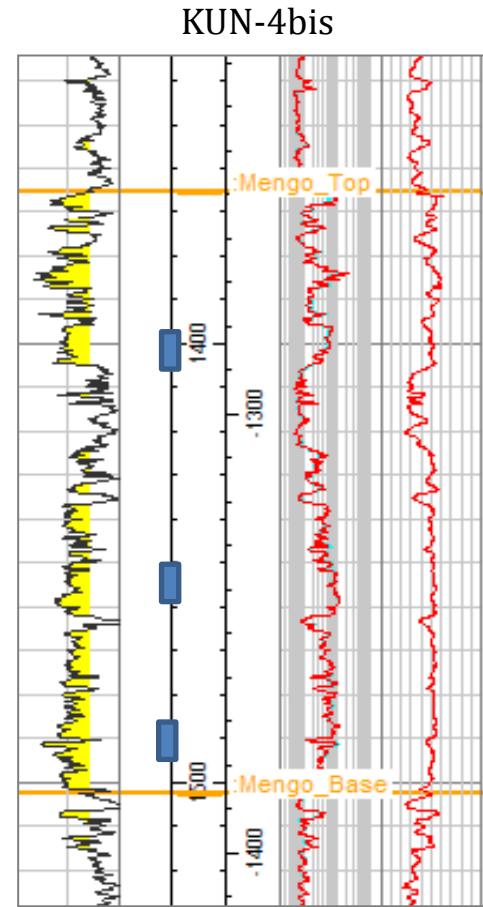
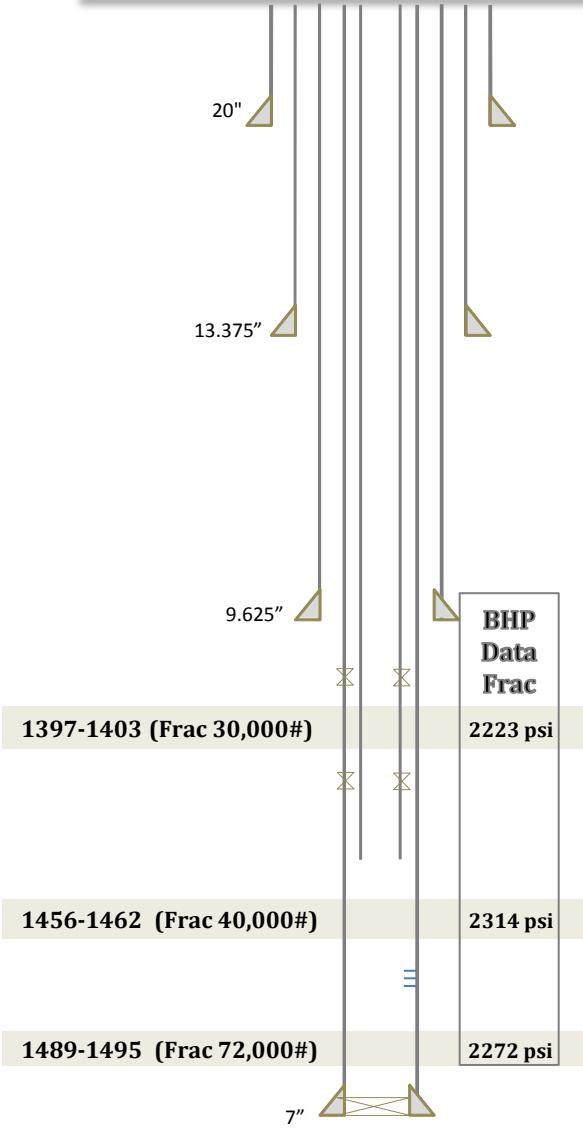
# Hydraulic Fracturing Layout

KUN-4bis and KUN-5

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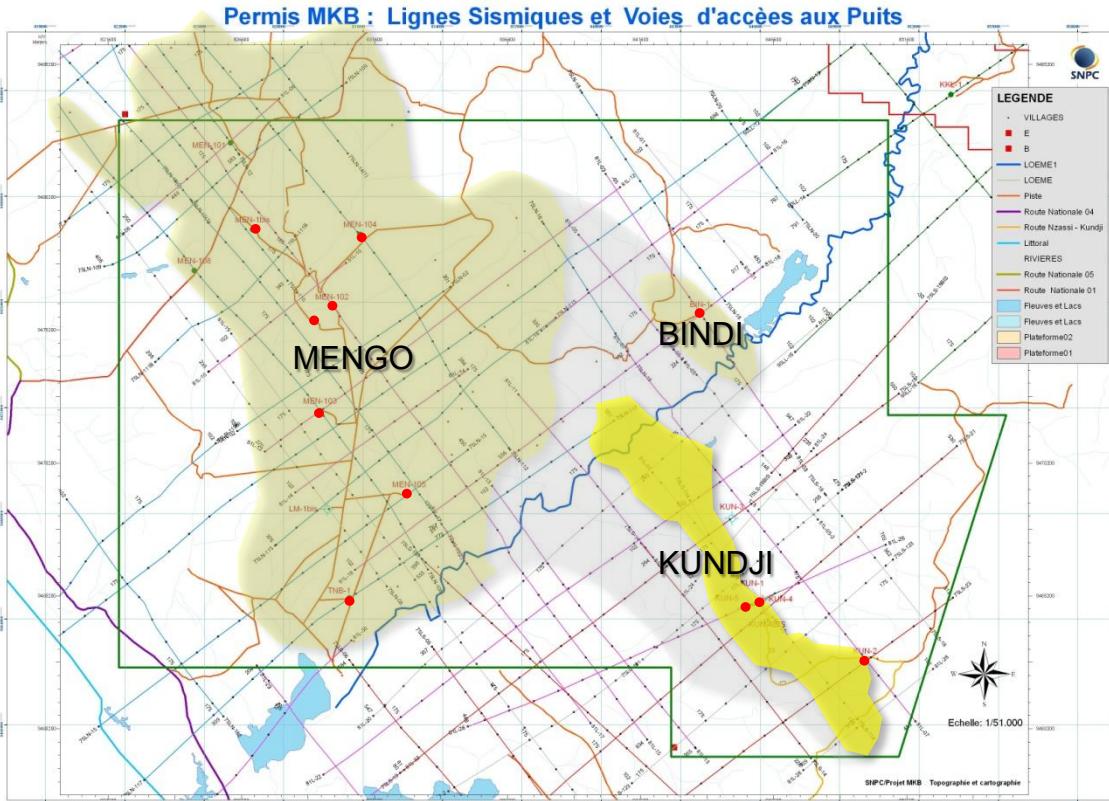


# KUN-4bis fracture design and results



# MKB production history

When operated by Elf (1980-1992)



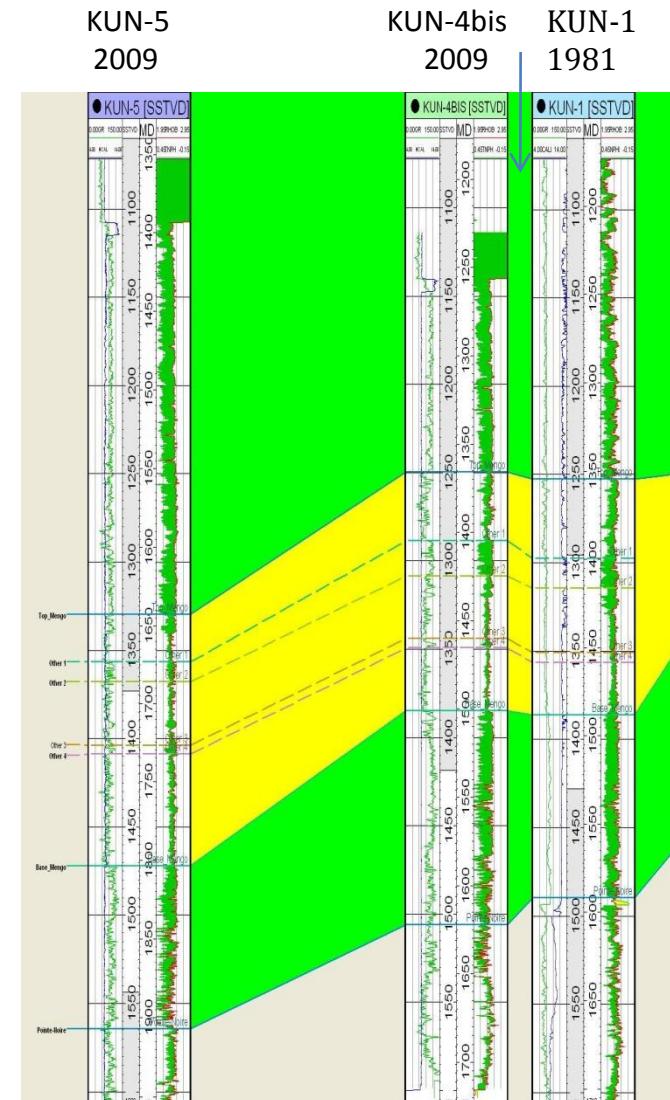
- Cumulative prod. ca .1.5MMbbls
- Kundji Produced 670,000 bbls from two wells producing for 12 yrs
  - Kundji-1 produced 516,000 bbls
  - Kundji-2 produced 154,000 bbls
- Mengo Produced 700,000 bbls  
Three wells producing for 12 years
  - Men-102: produced 400,000 bbls
  - Men-101: produced 200,000 bbls
  - Men-105: produced 100,000 bbls
- Bindi Produced 175,000 bbls

Total Area: 700 km<sup>2</sup>

30 Year PSC Development License, Granted in 2007

# KUN-1 (Elf) vs KUN-4bis

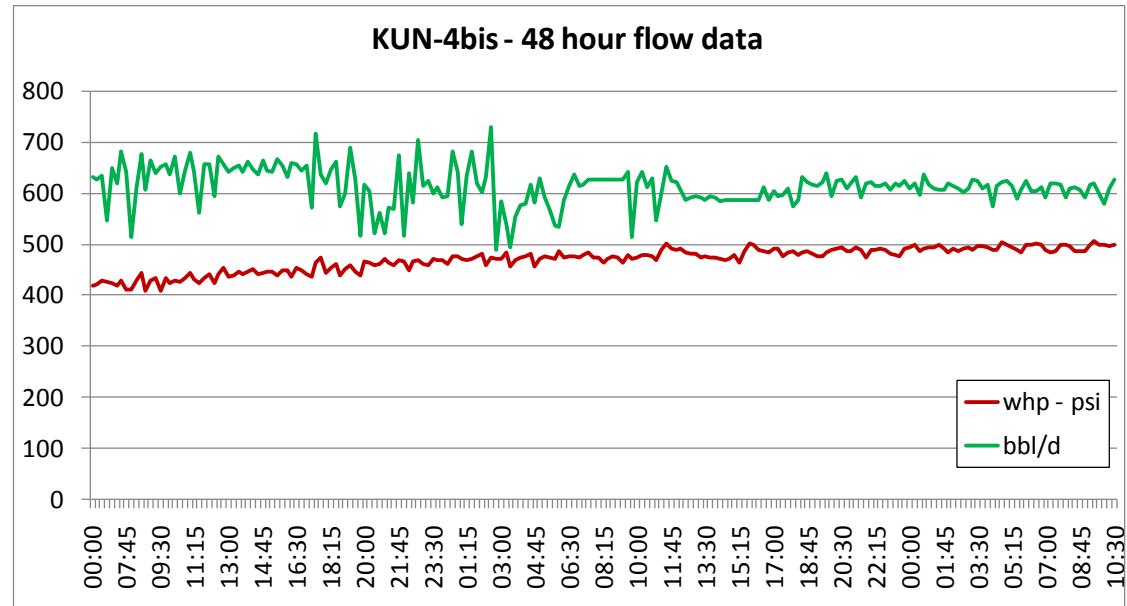
- KUN-1 Produced 516,000 bbls from 1980-1992, making it the largest cumulative producer in the entire concession area
- KUN-4bis was drilled in 2009 to a reservoir location only 80 meters from the KUN-1, and was completed in mid-2010 using modern techniques
- It was seen as a risk that the area might have been “drained” by the KUN-1
- Reservoir pressures suggest that the reservoir pressure is equal to the original pressure in the KUN-1, indicating good mobility and recharge



# KUN-1 (Elf) vs KUN-4bis (con't)

- The KUN-4bis was hydraulically fractured in three zones, which are correlative to the zones fractured in the KUN-1
- Production rates from the KUN-4bis are more than twice the peak rates observed in the KUN-1
- KUN-4bis is expected to decline, but ultimately produce more oil than KUN-1

Well	Lbs. of proppant	Maximum proppant ppg	Production bopd
KUN-1	57,000	3	280
KUN-4bis	142,000	6-8	600



## Overall

- Goal is to reach economies of scale in a larger project
- Proceeding cautiously, while defining optimum development plan

## Sub-surface

- Additional seismic activity (acquisition and processing)
- Integrated study to determine optimum well paths and completions
- Integrated study to determine effectiveness of water flooding

## Drilling

- Preparing to start 6-well drilling program in 1Q 2011
- Drilling rig is onsite, inspection and acceptance process from 1 Jan 2011

## Production

- Installing temporary production equipment to allow early production
- 5,000 bopd third-party production facility contract in final stages of FEED, for installation in 3Q 2011 - including operational procedures and training of personnel
- Studies currently underway to study export pipeline options

## Logistics

- Push to use more efficient, truck-mounted drilling & completion equipment
- Establish effective sourcing, procurement and contracting procedures

## Organization

- Build sustainable organization, structures and procedures
- Adding more expatriates in key positions, starting in December 2010

# MKB Project Organization

Managed by Project Team coordinated by Mr. Ciry Mikolo

Panoro is represented by participation in key leadership roles, including mentoring and training of local staff

## Key staff:

- Drilling and Operations Manager
- Logistics Manager
- Drilling Superintendent
- Drilling Engineer (Dec 2011)
- Subsurface Manager (Jan 2011)
- Reservoir Engineer (Jan 2011)
- Production Superintendent (prop.)
- Finance Consultant (prop.)



# Why MKB will be successful

- Very large STOOIP
- Confimed that modern frac technology is more effective than methods used in the 80's, making it possible to achieve economic rates
- Cost reduction opportunities
  - Simplified completion
  - Economies of scale
- Operator open to expand project team with experienced expatriates

