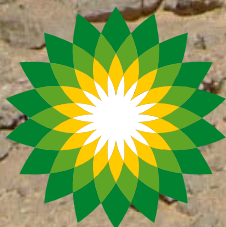




# In Salah Gas

## Proposed CSLF Project: The In Salah Gas CO<sub>2</sub> Storage Assurance Project Algeria



# Presentation Outline



- **The In Salah Gas Project**
- **CO<sub>2</sub> Storage Concept**
- **Joint Industry Project on CO<sub>2</sub> Storage Assurance**
- **Project Status**
- **Conclusions**

# The In Salah Gas Project: Summary



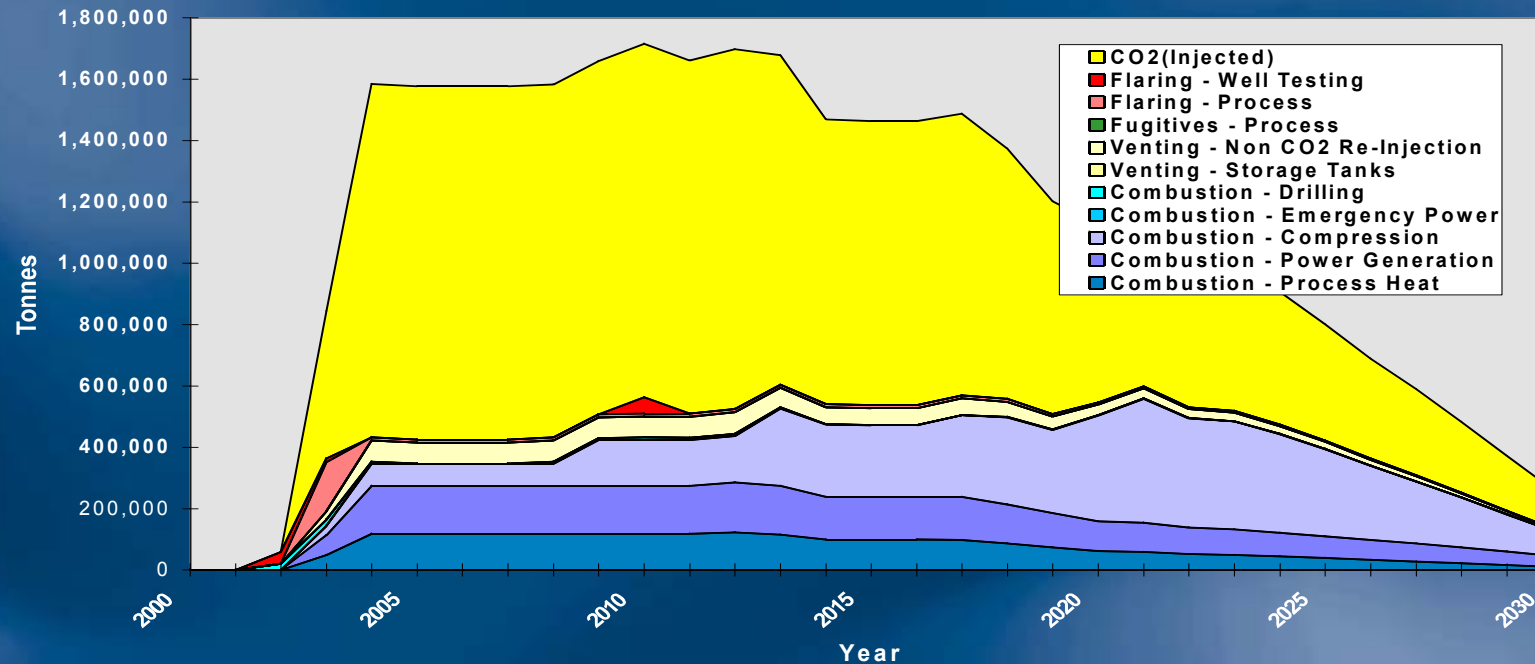
- **JV: Sonatrach / BP / Statoil**
- **Multi-field gas development**
- **5-10% CO<sub>2</sub> in reservoir**



# The In Salah Gas Project: CO<sub>2</sub> Production Profile



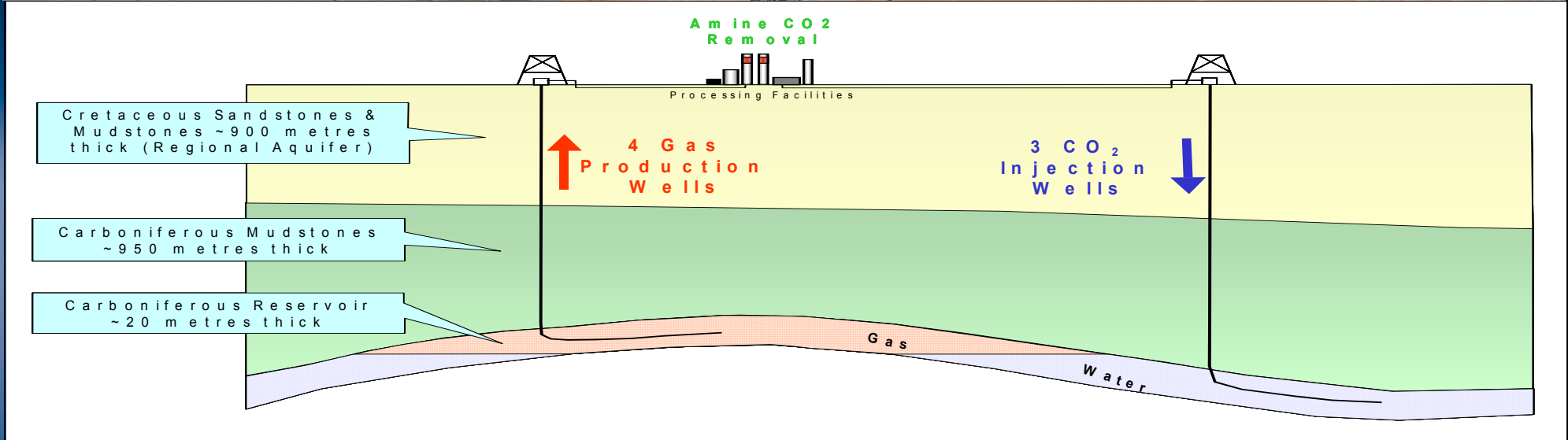
CO<sub>2</sub> Emissions by Source



- Only the separated CO<sub>2</sub> (yellow) will be re-injected
- ~1 million tonnes of CO<sub>2</sub> per year (60 mmscf/d) re-injected
- ~17 million tonnes of CO<sub>2</sub> to be stored over project life
- CO<sub>2</sub> from combustion sources will be vented



# CO<sub>2</sub> Storage Concept: Injection at Krechba

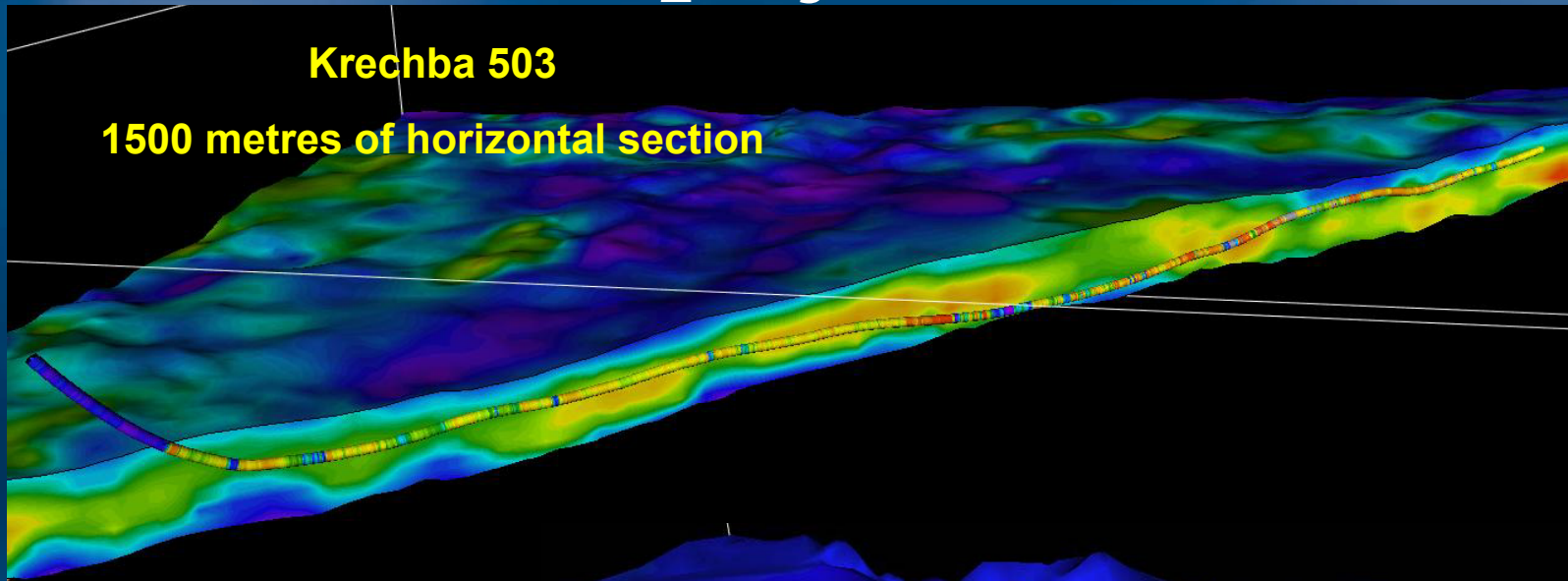


# CO<sub>2</sub> Storage Concept



Kb-501 CO<sub>2</sub> injection Well

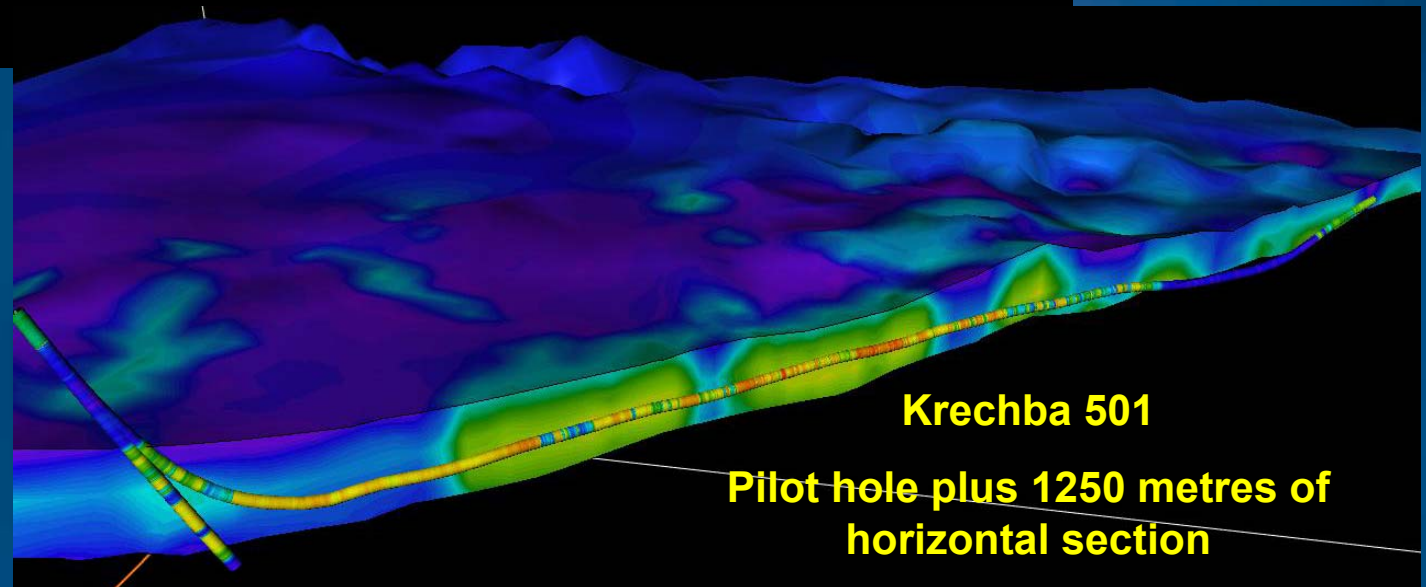
# CO<sub>2</sub> Storage Concept: Horizontal CO<sub>2</sub> Injection Wells



**Krechba 503**

**1500 metres of horizontal section**

Wells geo-steered through 20m thick reservoir unit to maximise the penetration of high porosity sandstones



**Krechba 501**

**Pilot hole plus 1250 metres of horizontal section**



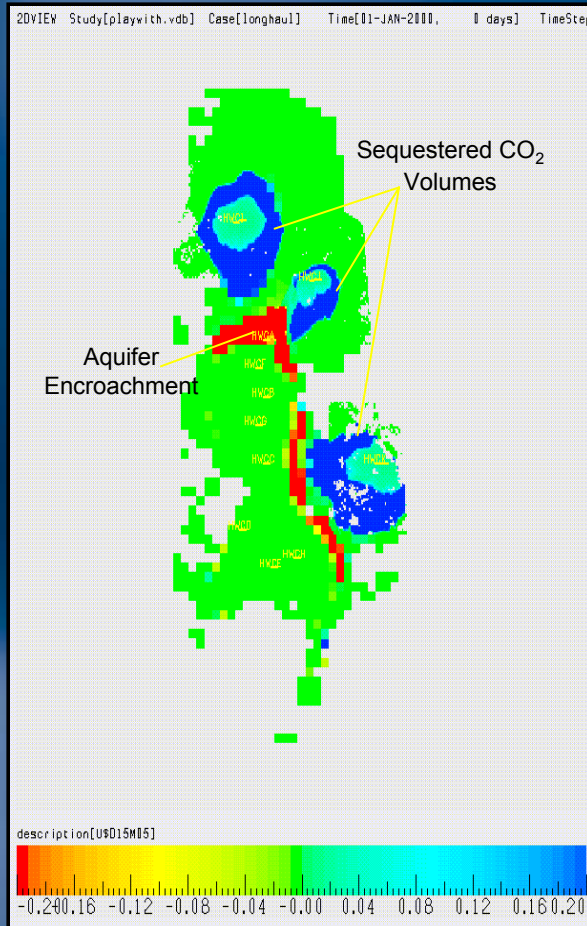
# CO<sub>2</sub> Storage Concept: Simulation Models



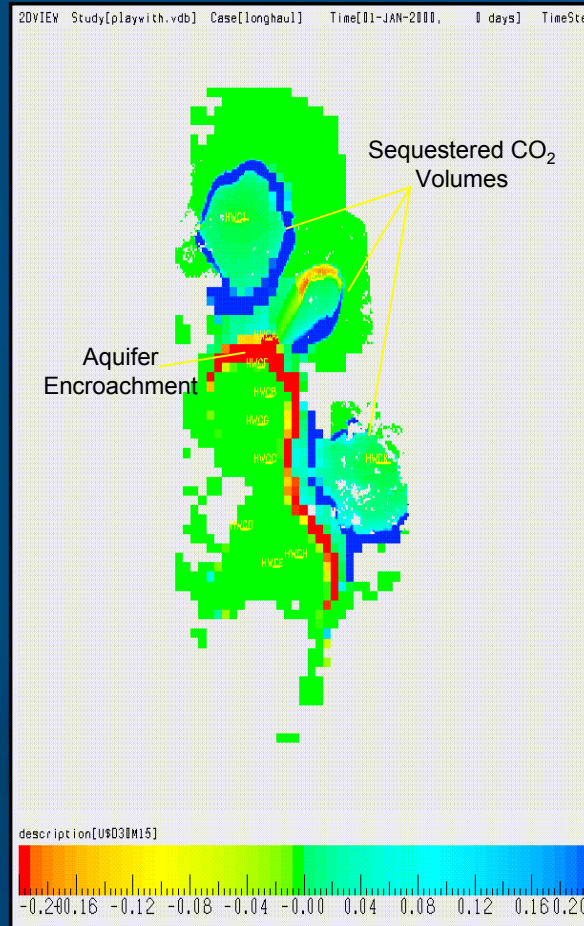
- **Well Model**
- **Sector Model**
- **Full Field Model**
- **Geological Model**



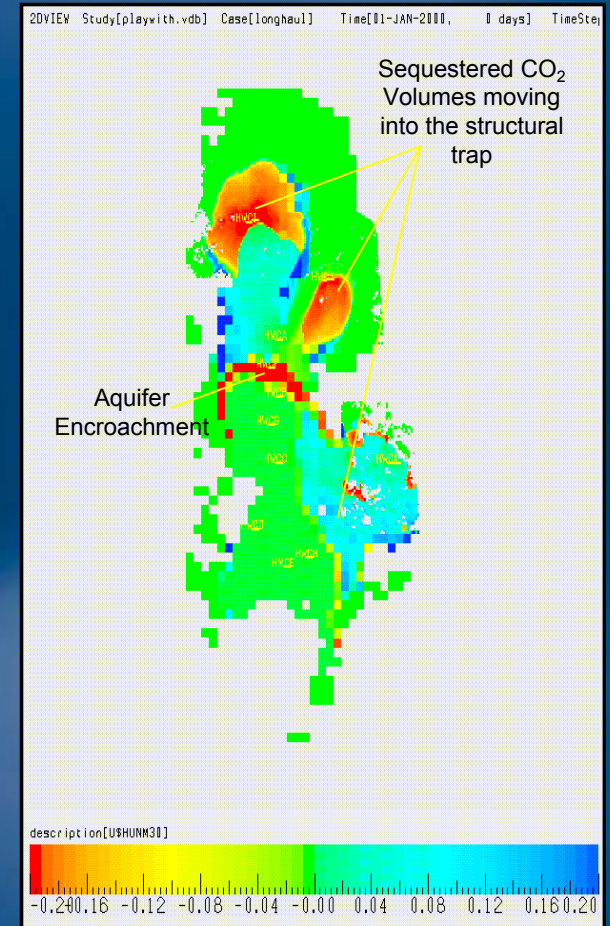
# CO<sub>2</sub> Storage Concept: Simulation Results



5-15 years



15-30 years



30-100 years

# Joint Industry Project on CO<sub>2</sub> Storage Assurance



**5 year R&D project (2004-2009)**

**Total cost US\$30 million**

## **Objectives:**

- Provide assurance that secure geological storage of CO<sub>2</sub> can be cost-effectively verified and that long-term assurance can be provided by short-term monitoring.
- Demonstrate to stakeholders that industrial-scale geological storage of CO<sub>2</sub> is a viable GHG mitigation option.
- Set precedents for the regulation and verification of the geological storage of CO<sub>2</sub>, allowing eligibility for GHG credits.

# Joint Industry Project on CO<sub>2</sub> Storage Assurance



- Sample analysis of water, gas and solids
- Noble gas tracers will be injected with the CO<sub>2</sub>
- Pressure surveys, surface and down-hole (static and interference)
- Electric logs (production, SP and tomography)
- Gravity baseline, soil-gas survey, micro-seismic and tilt-meters
- Meteorology and microbiology
- 4D Seismic
- Aquifer monitoring well with oriented cap-rock core and cuttings analysis
- Down-hole gravity and geo-mechanical monitoring
- Surface eddy flux co-variance data



# Project Status



- **Krechba facilities now commissioned**
- **Producing gas**
- **Injecting CO<sub>2</sub>**
- **Two CO<sub>2</sub> injection wells complete (third will be ready soon)**
- **Full production and injection: September 2004**
- **Storage assurance program commencing**
- **Storage assurance JIP being formed**



# Conclusions



- In Salah will be a world-class CO<sub>2</sub> geological storage project.
- Storing 1 million tonnes of CO<sub>2</sub> per year in the water leg of a producing gas field.
- Partners willing to make project available as a research field trial of CO<sub>2</sub> storage assurance.
- A Joint Industry Project is being set up.
- Seeking recognition as a CSLF Project.