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R E G I O N A L F O R U M



Middle East & North Africa Forum on Flaring Reduction & Gas Utilization

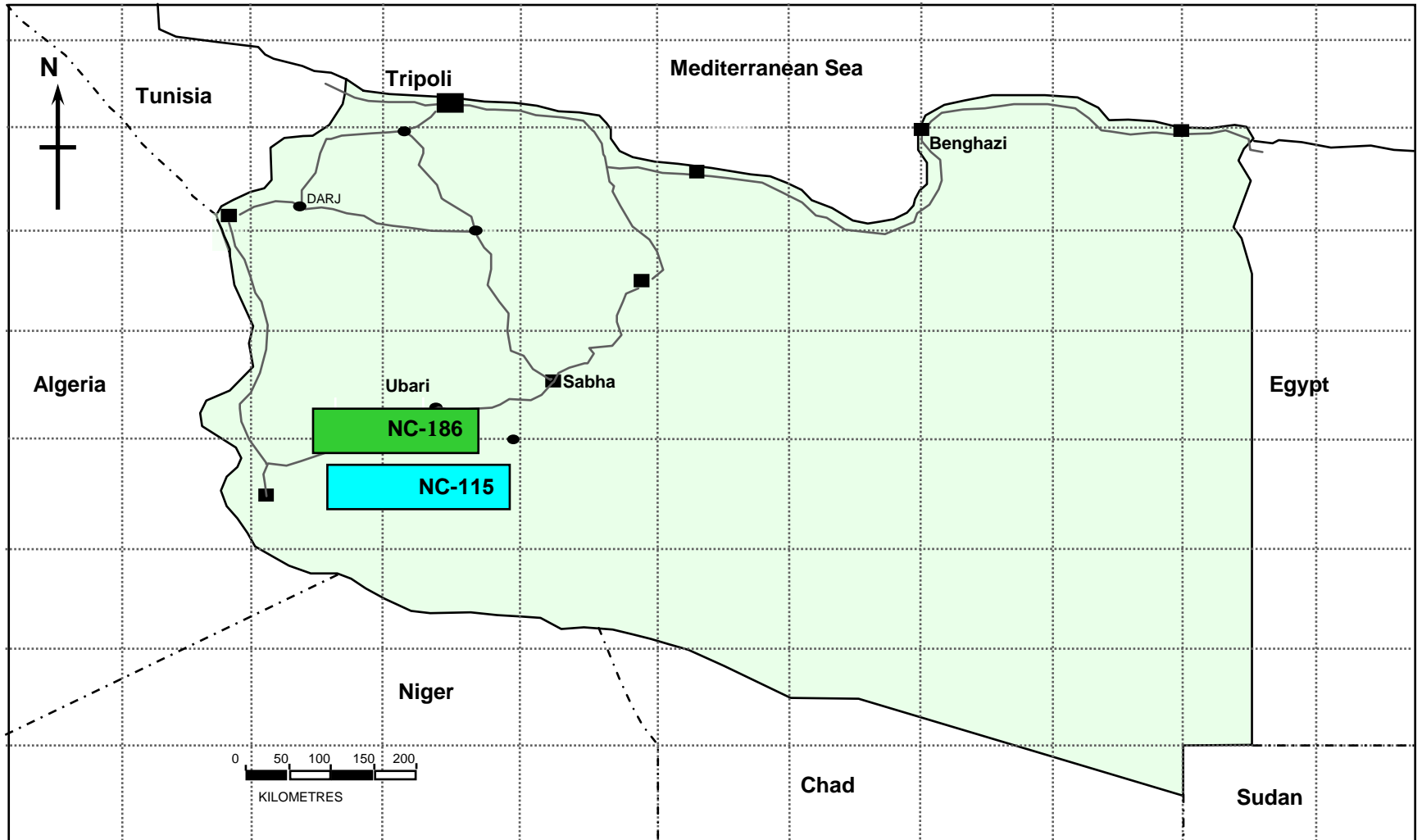
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AKAKUS OIL OPERATIONS- LIBYA

Gas Utilization & Flare Emission Reduction Project

Project Location



Main Activities:

- Exploration, drilling and oil production from two main concessions:
- NC-115 (8 fields and three main GOSP's) total production 230,000 bbl/day.
- NC-186 (6 fields and one GOSP) total production 130,000 bbl/day.

Production history:

- December 1996 the early production started with 50,000 bbl/day (EPF).
- December 1997 the main GOSP in NC-115 A was Commissioned.
- October 1998, the 2.7 MMbbls capacity storage terminal including the 720 KM transmission pipeline were put in operation.
- End of 1999 the first gas compression package was put in operation for feeding two power generation units with fuel gas
- During 2001,02& 03 all satellite fields were connected to the main GOSP's @ NC115
- The early production started @ NC186 in 2004 (EPF), the power demand had increased and accordingly the power units were increased to 4 units with two units operating on gas and other two units operating on treated crude oil.
- During 2005 all satellite fields were connected to the main GOSP A NC-186.

INITIATIVE FOR REDUCTION IN GAS FLARING

- In Jan 2005 AOO achieved ISO 14001 certification with the requirement to gradually minimize the gas flaring. Accordingly several options were explored to achieve the optimum process scenario in terms of utilizing the produced gases for power generation and hydrocarbon recovery.
- In 2006 the Gas Utilization feasibility study was finalized with a recommendation to implement the project in two phases:
- **Phase I:**
 - In this phase the VRU packages were introduced to treat the low pressure tank gas. This was the first installation in Libya, which was focused on the reduction of Tank vapor/ gas by recovering the condensate and diverting the remaining gas to the main plant compression system. The Project was completed in late 2008 .
 - By installing the VRU and splitting the existing compression systems into two independent trains the fuel gas had increased to allow four power generation units to operate on Gas and maximizing the condensate recovery thereby reducing flaring.

Tank Gas- Vapor Recovery Units

Location	Processed Tank Gas MMSCFD	VRU Recovered Condensate	Additional recovered condensate
NC-115	4	1200 blls/day@ 60 psig	1750 blls /day @ 150 psig
NC-186	2	275 blls/day@ 60 psig	1121 blls/day @ 250 psig

Location	No of VRU	Pay back Period	Co2 emission reduction
NC-115	3	3 months	866 tons/day
NC-186	2	8 months	406 tons/day

Tank Gas Composition

	<u>NC-186 % mole</u>	<u>NC-115 % mole</u>
• Nitrogen	0.04	0.04
• CO ₂	0.66	0.90
• C1 Methane	1.16	0.97
• C2 Ethane	6.33	5.10
• C3 Propane	22.94	19.22
• C4 Butanes	25.84	32.50
• C5 Pentanes	14.45	20.00
• C6 Hexane	5.31	5.40
• C7 Heptanes	3.50	2.82
• C7+	3.98	6.15
• H ₂ O	16.38	6.90

- Phase II:

- In this phase we will be able to utilize all high pressure gases produced at NC-115 and NC-186, by implementing two compression trains at NC-186, and the compressed gas from this concession will be transferred to NC-115 location via 30 km pipeline that will enhance our capability for power generation and supply fuel gas to other operators in the region.
- The overall completion is scheduled by the end of 2010.
- From the forecast analysis, we expect to achieve reduction in flaring of hydrocarbon gases to approximately 2.5 MMSCFD which will be an overall reduction of 83% compared with the gas that is being currently flared.

Gas Production & Utilization

