Northern Oil ASA

Status Brasil

28th March 2003

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Coral Field Production Events

- Production unit Atlantic Zephyr (SS 11) chartered from Petroserves for 7.5 years – Semi submersible with 24.000 barrels per day processing capacity
- The field to be produced from three wells
- Crude to be stored at MT Avaré chartered for 7.5 years from Transpetro with 180,000 barrels storage capacity

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- Completion work for first production well CRL-3 startet early October 2002, planned completed by end November.
- Completion delayed due to several down hole set-backs, among others cementing problems, leaks in valves and plugs as well as processing unit completion and installation and testing of ROV.

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1. **CRL 3D well clean up 23.01.2003**
    - Well flowed some 20 hrs
    - Production rates increasing steadily with increasing temperature and pressure
    - Well flowed >6000 b/d on 1” choke when shut in

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2. Final well completion

- Production start up was delayed 10 days due to problems setting plugs in X-mas tree

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3. Production period up to 11th February

- Production start 03.02.03
- Well came in at lower rates than expected, Production levels did not stabilise but varied between 1,500 and 3,500 b/d
- High water cut and BSW observed during first hours
- Temperature and pressure at well head remained low
- Heavy residues observed in produced crude
- Leak to annulus later observed but not reported

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4. Production period up to 11th February

- Investigating reasons for anomaleous well performance
- Working to stabilize/adjust production plant
- Working to control injection of ashaltene inhibitor (commonly time consuming to adjust)
- Suspected plugging in production string

Solutions anticipated:

Cycling the well

Coil tubing intervention

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5. Production period after 11th February.

- Production rates declining to around 1,500 b/d, thereafter to increase to around 3,500 b/d by 22.02.
- After 22.02 production rates dropped
- By 03.03.03 decition was taken to shut in the well and start the process to kill it for safety reasons
- Planning work over to repair leak to annulus when CRL 4 on stream.

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6. Possible explanations under discussion

- Initial clean up terminated too early allowing solids to accumulate at the well bottom (plugging?)
- Build up of asphaltenes in production string (plugging?)
- Isolation of producing intervals incomplete? (incomplete cementing? cross flow?)
- well completion not working according to intention? (leaks to annulus or elsewhere?, incompatible fluids used?)
- Combinations of above?

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7. **Remedial actions under discussion**
   - Pulling the CRL 3 completion will improve overall understanding
   - Actual Coral crude now being tested to select proper chemicals to resolve asphaltene situation.
   - To reperforate and restimulate well before production is resumed.

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8. Coral 4

- Well completion initiated 04.02.03
- Some time lost drilling cement and cleaning the well before downhole assembly was run.
- Well equipment installed OK observing lessons learned on CRL 3
- During testing of X-mas tree, two valves were accidentally damaged by the ROV
- To effect repairs required pulling the X-mas tree (and the well completion!)
- Present status: Tree pulled to be sent ashore for repairs. Installing X-mas tree no 3on well head.
- Production within 30 days after X-mas tree installed and tested.

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9. Conclusions

- Provided proper well clean up and control of asphaltene formation, planned production rates are expected reached (i.e. production potential > 6,000 b/d per well)
- CRL 3 work-over should be straight forward provided source of leak to annulus is confirmed as expected and repairs to possible downhole damage can be effected (i.e.through reperforation and stimulation – to be decided)
- Lessons learned on CRL 3 & 4 should improve performance for CRL 5 completion job.
- Unless new info becomes available to the contrary with more production experience, production levels (20,000 barrels peak) and reserve estimates (27 mill barrels) stand

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10. Status SCS-11

- Under drilling 5 km north of SCS-10 as a delineation well
- 9 5/8 ” casing set at 4,200 m 2 weeks ahead of schedule.
- Reservoirs expected at similar depths as SCS-10
- Seismic indicate good potential for presence of hydrocarbons in reservoirs targeted
- If succesful, increase in reserves is foreseen.