

Austria: IFE Reduces Waste volume, Drilling cost and improves drilling performance

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Well Information	<p>Location: Spud / Completion: Wells/Footage Drilled:</p>	<p>Lower Austria March 2001 –March 2003 43 wells – 3 rigs (1 contractor(only in 2001), 2 operator rigs) 8,823 ft of 17 ½” 71,383 ft of 12 ¼” 179,792 ft of 8 ½” 3,037 ft of 6 1/8” 143,586 ft of total hole drilled Average well depth – 6,508 ft</p>
The Situation	<p>Shallow wells, many rig moves, mob/demob times minimization. Small rig, inefficient and old SC equipment. Increasing disposal and total project costs. Limited waste disposal site capacity and no further allowance for a new waste disposal site. Need for shale inhibition but environmental restriction on chlorides, increasing cost to drill due to fluids and waste disposal. No fluids reuseage.</p>	<p>Drilling sensitive, depleted sand formations, restrictions to mud weight (max. 1.12 S.G.). Drilling performance m/hr was showing a decreasing trend line. Lack of communication. No HSE plan. Corrosion problems due to existing mud system.</p>
The Solution	<p>INTEGRATED FLUIDS ENGINEERING (IFE) approach to address fluids performance and waste disposal volumes. This included a different type mud system and new equipment as well as an on site Solids Control Engineer and a 24 hour mud engineering service. Benchmarking, pay for performance contract.</p>	<p>Sildril / Potassium Carbonate as substituted for KCl polymer drilling fluid (mud system was changed to Potassium Carbonate / Polymer after 10 wells drilled, to lower the fluid related costs – OMV’s decision after a trial showed good results). The Solids control system was upgraded after an IFE Rig evaluation to 2 BEM 300 shakers and upgraded in second half of 2002 to 3 BEM-300 shakers, Swaco Type Desander/Desilter Unit, two variable speed Centrifuges (in noise protected 20ft container), in conjunction with a fully automatic dry-polymer Midcofloc 7 dewatering unit.</p>

The Results

- Reduced wastes: 23,5% in first year of operation, or 4423 mto of waste otherwise discharged into OMV's disposal sites.
- Reduced wastes: 32,83% in year 2002 operations, or 5716 mto of waste otherwise discharged into OMV's disposal sites.
- Disposal Factor reduction (Plan vs. Actual) ranged from 50%-4 %.
- Faster drilling: Increase average drilling rate more than 50%
- Footage costs reduced by 13%.
- Reduced fluids and waste costs: The complete fluids and waste related cost showed 11% savings. This included Fluids, equipment, Engineering and Disposal cost.
- NO fluids disposal; reuse/recycling of all fluids, including spud-mud
- More for Less – Improved drilling performance for less total dollars.
- Other customers interested to implement IFE (MOL, POGO, INA)
- Start of IFE in Hungary, MOL, in first half of 2003

The Details

The driving forces of IFE for OMV have been: make cost savings potential visible, use most efficient SCE, minimize overall waste volume and waste disposal costs, use environmentally friendly drilling fluids system, reuse all fluids, no HSE incidents - no spills, no accidents, reduce time to TD/shorter time to production/increase ROP, lower total project costs, pay for performance, higher production rates, lower costs per unit produced.

For OMV a driving part for a new type of contract was also to show contractor's performance reflected by cost reductions, reduced day rates or rewarding a Bonus. A "pay for performance" Incentive contract was established and benchmarks defined on a well-to-well basis (max. mud weight; hole cleaning efficiency; drilling fluids, engineering and SCE costs; SCE efficiency, amount of waste disposed).

The difficulties of drilling in the Vienna Basin Area are drilling sticky shale formations , where excellent inhibition is needed and also drilling depleted, sensitive sand formations (underhydrostatic – high potential for differential sticking), where max. mud weight is limited to S.G. 1,12 (9,3 lb/gal).

Costs were increasing due to the following reasons: increasing waste disposal costs and waste disposal site costs – dump and dilute was common, due to max. MW of 1,12 S.G. and inefficient SCE, no dewatering, no recycling or reuseage of fluids; everything also directly relates to increasing fluids and logistic (trucking etc.) costs.

3 rigs have been used for the 24 wells drilled until end of February/beginning of March 2002. 2 OMV rigs and 1 contractor rig.

43 wells have been drilled without any HSE incidents (accidents or spills) or downtime of M-I/SWACO equipment. M-I Austria received a Bonus on 42 of 43 wells.

Prior to the IFE process at the end of 2000, the average ROP was 4.2 m/hr. (Drilling rate is based on total project time and total meters drilled). The first six months of 2001 showed an increase to 4.7 m/hr. Final results for 2001 improved the ROP to 4.9 m/hr. Wells drilled in the first half of 2002 had an average of 6.4 m/hr (no records from second half).