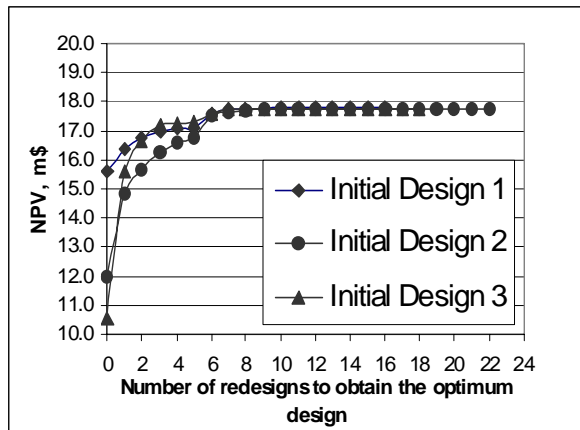
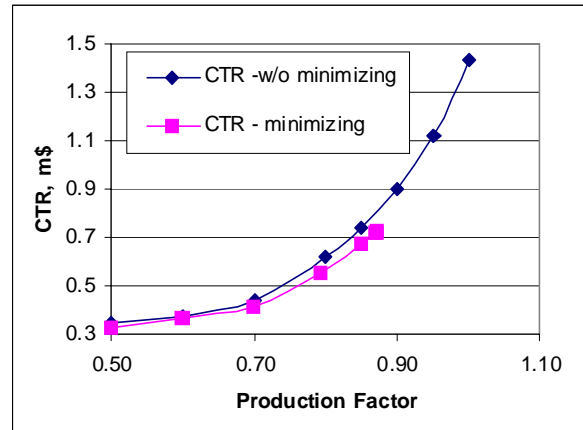


Hydraulic fracture treatment optimisation

For given reservoir conditions, the designer is required to decide values for treatment parameters: fracturing fluid type, fracturing fluid viscosity, injection rate, injection time, proppant type, proppant concentration, etc. These parameters significantly influence the hydraulic-fracturing-induced formation damage, the required equipment capacity to execute a treatment program and the productivity/profitability of a proposed treatment program. This project aims to integrate field information, an appropriate fracture model, formation compatibility requirements, operational requirements, reservoir production pattern, investment-return economics and a versatile optimisation model for real-world engineering problems to determine not only a mathematically optimum but also an operationally effective treatment through adequate trade-offs among conflicting objectives.



Fracture treatment optimisation offers significantly increased NPV/Production.



Optimum treatment based on trade-offs between treatment cost and production.

Selected Publications:

- Rahman, M.M., Rahman, M.K. and Rahman, S.S., 'Multicriteria hydraulic fracturing optimization for reservoir stimulation', *Journal of Petroleum Science & Technology*, Vol.21, Nos. 11 & 12, pp.1721-1758, 2003.
- Rahman, M.M., Rahman, M.K. and Rahman, S.S., 'Optimizing Treatment Parameters for Enhanced Hydrocarbon Production by Hydraulic Fracturing', *Journal of Canadian Petroleum Technology*, Vol. 42, No. 6, pp.38-46, June 2003.
- Rahman, M.M., Rahman, M.K. and Rahman, S.S., 'An Integrated Model for Multi-objective Design Optimization of Hydraulic Fracturing', *Journal of Petroleum Science and Engineering*, Vol. 31, No. 1, pp.41-62, 2001.
- Valencia, K.L., Chen, Z., Rahman, M.K. and Rahman, S.S., 'An Integrated Model for the Design and Evaluation of Multiwell Hydraulic Fracture Treatments for Gas-Condensate Reservoirs', paper SPE 84860, *SPE International Improved Oil Recovery Conference in Asia Pacific*, Kuala Lumpur, Malaysia, Oct.20-21, 2003.
- Rahman, M.M., Rahman, M.K. and Rahman, S.S., 'Control of Hydraulic-Fracturing-Induced Formation Damage by Optimizing Treatments With Constraints', paper SPE 73754, *2002 SPE International Symposium and Exhibition on Formation Damage Control*, Lafayette, Louisiana, Feb. 20-21, 2002.