Waterflooding is by far the most successful and widely applied method of improved recovery. Laboratory testing at UW showed that the composition of injection water could have significant effect on waterflood displacement efficiency. Low salinity flooding, in particular, has gained recognition as the lowest cost improved recovery process for both secondary (starting at low initial water saturation) and tertiary (starting at residual oil) recovery modes. Work has progressed from the laboratory to pilot testing and has now moved to field wide application. However, no consistent mechanistic explanation has emerged as to when and why low salinity response is observed. Necessary conditions have been identified from laboratory studies but the sufficient conditions for recovery are still not understood. Results for reservoir versus outcrop sandstones and carbonates will be summarized. During the course of investigation of the reproducibility of waterfloods, it was found that large sequential reductions in residual oil could be achieved merely by re-injection of oil and re-waterflooding without change in brine composition. Sequential flooding provides a novel low-cost and readily testable method of enhanced oil recovery. Field testing of brown fields (flooded out) and green fields (natural deposits of residual oil) is justified. An approach to definitive “oil-in-the-tank” pilot testing of sequential waterflooding will be proposed.

Prof. Morrow holds B.Sc. and Ph.D. degrees from the University of Leeds. He has worked on numerous topics, many related to oil and gas recovery and has over 180 publications. In 2001 he was elected to the National Academy of Engineering.