MEMORANDUM

To: Enhanced Oil Recovery Commission

From: David Mohrbacher, P.E., Director, Enhanced Oil Recovery Institute

Re: Summary of Enhanced Oil Recovery Institute (EORI) Work on Deadman Creek Chemical Flood

This memo provides a summary of work completed by EORI for Merit Energy (Merit) regarding the Deadman Creek Minnelusa Reservoir. Note that EORI has been working with Merit since 2010 to develop an optimal blend for alkaline, surfactant, polymer (ASP) flooding. EORI intends to assist Merit with design and implementation a field demonstration of the optimal ASP system. The ASP system may then be used to recover stranded oil from legacy fields in other, analogous Minnelusa reservoirs located in the Powder River Basin in northeast Wyoming.

Merit may use this memo and attachments to document technical work completed by the Merit/EORI team to develop effective ASP flood designs for Minnelusa reservoirs in the Powder River Basin. The EORI’s ASP flood design may be used by Merit and by other Wyoming operators.

We have attached several documents written by Prof. Vladimir Alvarado and his staff regarding our Deadman Creek work. These documents include:


I also had a telephone conversation with Luke Ech, who works with the Wyoming Department of Environmental Quality from the Wyoming Attorney General Office, on October 18, 2012. Mr. Ech called me. Mr. Ech works with WDEQ to complete hearings through the Wyoming Environmental Quality Commission. I provided the following information:
The ASP system designed by EORI for Merit Energy is based on the water composition of the local supply of groundwater from the Fox Hills formation. Merit Energy currently uses Fox Hills water to waterflood the Minnelusa formation in the Deadman Creek field.

Other sources of water may be evaluated for use as an alternative water supply, if the Fox Hills aquifer is not available for use. Surface water in the vicinity of the Deadman Creek Field has been suggested as a substitute for Fox Hills water. EORI’s initial evaluation of the compatibility of this surface water with fluids in the Deadman Creek Minnelusa reservoir indicates that it will not be compatible without substantial treatment. The surface water contains dissolved oxygen and high alkalinity, both of which would require treatment, if it was to be considered for use in the existing waterflood or the planned ASP flood. A substantial amount of additional work would be required to complete a feasibility study to determine if this alternative source of water might be appropriate for ASP flooding. Project economics would likely be adversely impacted by additional treatment costs for use of surface water in an ASP flood.

EORI has invested approximately $500K over the past three years to support work being completed by Prof. Alvarado and his staff. Equivalent work that might be completed by commercial EOR consultants would cost approximately 6 to 7 times (or approximately $2.5 million) more than the investment made by EORI. Commercial firms don’t typically complete research of the type being completed by EORI.

Benefits to the state of Wyoming through increased taxes will be substantial with successful implementation of new ASP technology in Wyoming’s Minnelusa reservoirs. EORI estimates that between 100 million and 300 million barrels of stranded oil could be produced from legacy fields in Wyoming with application of effective chemical floods including use of ASP systems. The life of Minnelusa reservoirs in the Powder River Basin can be extended by 20 to 30 years with successful development of chemical flooding.

Please contact me or Professor Alvarado if you have additional questions regarding our work at Deadman Creek.