Attachment F - Project Manager Qualifications and Organization Description

*Integrated Small-Scale Ammonia Synthesis –*

*This team is experienced in previous work funded by LCCMR, the State, UMN and the US Department of Energy on projects to assist ammonia production with no greenhouse gas emission in a distributed, small-scale fashion - needed both*

* *for the farm {both fertilizer and energy/hydrogen storage at the farm/coop level}, and*
* *for renewable energy installations {energy/hydrogen storage and transport, balancing periods of stranded energy}.*

Alon McCormick will serve as project director. He is Professor in Department of Chemical Engineering and Material Science (College of Science and Engineering), one of the most highly ranked departments at the University of Minnesota - Twin Cities. McCormick has previously served as as project director on an LCCMR project, and as principal investigator on related projects funded by US Department of Energy ARPA-E and by the University of Minnesota, with co-PI's Cussler Daoutidis and Dauenhauer.

**Some of our previous collaborative work is featured at this webpage, with a listing of our publications and presentations at the “Resources” tab found there:**

**https://wcroc.cfans.umn.edu/research-programs/renewable-energy/ammonia**

McCormick will work in close collaboration with Eric Buchanan at WCROC in Morris, keeping the focus of the project on current and future implementation at the renewable ammonia facility in Morris. For the past fifteen years, the renewable energy program at Morris has pioneered research and demonstration projects including wind energy, biomass gasification, renewable hydrogen and ammonia, and solar energy systems.

McCormick will also draw on the expertise of co-PI’s in his department: Ed Cussler, Paul Dauenhauer and Prodromos Daoutidis, who are widely recognized as international leaders in the fields (respectively) of chemical transport and separations; of reaction kinetics and equilibrium and reactor engineering; and of process optimization, control and systems engineering of renewable and sustainable systems.

Serving essential roles as senior personnel in the project will be very experienced engineers, Cory Marquart at WCROC and Jeff Schott at UMN-TC; both have participated in the earlier ARPA-E sponsored work, Marquart also central to earlier LCCMR, university, and state-funded work. They will assist in supervising research assistants (postdoctoral associates or graduate students, with educational internship opportunities for undergraduate students).

Experiments on new technologies will be performed at the UMN Twin Cities, but the WCROC, located near Morris, will serve as the location for long-term testing of the new technologies. The WCROC is a century-old 1,100-acre agricultural experiment station that focuses on applied research. It has several relevant program areas including renewable energy, swine and dairy production, and conventional and organic crop production. The Renewable Hydrogen and Ammonia Pilot Plan facility at WCROC constitutes one of the most innovative experimental assets of the state in the field of sustainable nitrogen fertilizer produced from renewable wind energy.