Exhibit A: Project Description
(Scope of Work, Special Requirements)

Project Title: Increasing Profitability by Improving Efficiency of Montana's Farm and Ranch Lands

Objective 1: Improve income from lands previously fallowed

A. Cropping systems study with pulse crops (pea, lentil) replacing summer fallow (Chen)
B. On farm pea variety protein analysis (Miller)
C. Monitor and use intervention to maintain optimal soil microbial ecology and macronutrient combinations that support crop productivity with an emphasis on pulse growing and diazotrophs (Peters)
D. Cover Crops (Boss)
E. 'Direct-fed microbials' or 'Probiotic development to mitigate nitrate toxicity' from cover crops (Yeoman)

Objective 2: Develop new, improved or quality differentiated products or crops

A. Durum varietal improvement and end product quality testing (Northern Seeds/Giroux)
B. Develop compact spectral imager and spectral imaging methods for mapping weeds in fallow land and identifying and mapping weeks in crops (Shaw)
C. Mitigating herbicide carry-over issues for successful integration of pulse crops in wheat-based dryland rotation under diversified soil and environmental conditions in MT (Jha)
D. Comparing optical sensors for reduced herbicide use and precision weed control in cropland and noncropland (Jha)

Objective 3: Develop On Farm Precision Experimentation (OFPE) research

A. Develop farm management decision support systems based on precision agriculture technologies. The decision support systems will help farmers generate, access and use site-specific data via an automated on-farm precision experimentation (OFPE) framework that will maximize farm profits.

Objective 4: Economic Analysis

A. Create a model representing Montana's crop production industry that can be used to analyze economic effects of market-wide shifts (Bekkerman)

Objective 5: Develop a prototype embedded sensor network that generates measures of agriculture water availability and informs hydro economic models of productivity