

Scope	Comments (including types of resources required to perform activities)	Estimated Cost (USD)
Work Completed to date:	Incurred to Date	\$ 615,000
Feasibility Study	Completed 2019/2020	\$ 245,000
Land Activities	To be completed as part of Cavern Study Scope	\$ 370,000
Secure land options for surface rights for well, pipeline and facilities	Conduct negotiations with landowners and rights holders, obtain survey permissions, etc; requires expertise in title searches and land acquisition	Contributed by Bakken
Secure subsurface storage rights	Conduct negotiations with subsurface rights holders; requires expertise in subsurface rights acquisition	Contributed by Bakken
Requested Cavern Study Scope	To be Completed	\$ 8,340,000
ATCO/Bakken Project Team	Project team to plan and direct the work, oversee consultants and provide technical expertise (Project Management, engineering, regulatory, project controls)	\$ 1,700,000
Geology and Seismic Mapping	Refine location to drill the test well; requires geological and geophysical expertise and access to existing seismic data	\$ 525,000
Drilling & Core Collection	Complete all activities to drill the test well and collect core samples; requires drilling planning expertise, field contractors, and oversight	\$ 4,100,000
Geomechanical Testing	Test the physical salt and rock cores in a lab, refine geomechanical model; requires specific testing equipment and geomechanical expertise	\$ 375,000
Disposal zone testing	Conduct injectivity testing of disposal zones; requires geological expertise, and planning/field resources to complete the injection test	\$ 1,250,000
Source water testing	Drill and test potential groundwater source wells; requires hydrogeology expertise to identify locations, and project expertise to conduct the field-testing program	\$ 125,000
Geomechanical model of salt caverns	Construct computational model of salt cavern to assess stability and potential for development; requires geomechanical expertise	\$ 165,000
Salt Cavern Engineering	Assess potential to develop caverns in the salt formations identified and establish model and cost. Update salt cavern models with site specific information from salt core; requires salt cavern engineering expertise	\$ 200,000
TOTAL	Funding Required	\$ 8,340,000

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Scope	Comments (including types of resources required to perform activities)	Estimated Cost (USD)
Scope of work to be completed if the Geology and Seismic mapping effort does not result in viable storage opportunity.		
Drilling & Core Collection	Complete all activities to drill the test well and collect core samples; requires drilling planning expertise, field contractors, and oversight	\$ 4,100,000
Geomechanical Testing	Test the physical salt and rock cores in a lab, refine geomechanical model; requires specific testing equipment and geomechanical expertise	\$ 375,000
Disposal zone testing	Conduct injectivity testing of disposal zones; requires geological expertise, and planning/field resources to complete the injection test	\$ 1,250,000
Geomechanical model of salt caverns	Construct computational model of salt cavern to assess stability and potential for development; requires geomechanical expertise	\$ 165,000
Salt Cavern Engineering	Assess potential to develop caverns in the salt formations identified and establish model and cost. Update salt cavern models with site specific information from salt core; requires salt cavern engineering expertise	\$ 200,000
TOTAL	Additional Funding Required	\$ 6,090,000