Risk Assessment Table

		Likelihood		Severity								
				Safety		Environmental		Financial				
				40%		40%		20%				
Section	Risk (Feature, Event, or Process)	1-Remote, 5-Almost Certain		1-Very Low, 5-Very High								
		Assigned	Reason	Assigned	Reason	Assigned	Reason	Assigned	Reason	Estimated Costs	Total Score	Risked Costs
1	**Water Quality Contamination**									**$11,500,000**	**2.0**	**$1,150,000**
1.1	Leakage of CO2 outside permitted interval and into freshwater aquifer.	1	Likelihood minimized by detailed geologic and plume model. The well mechanical integrity design ensures containment and isolation of CO2 from the USDW. Continuous monitoring of injection rate, pressure and temperature downhole provide additional insight into wellbore integrity. Plume and critical pressure front models will periodically be updated to make sure no artificial penetrations create a leakage path. Old wells which pose a risk will be remediated.	1	Contamination of the USDW due to leakage of brine/injectate into the USDW could negatively impact the safety of fresh water.	2	Contamination of the USDW due to leakage of fluid could affect the fresh water quality due to brine/injectate contamination and negatively affect the local habitat, but can be remediated.	3	Fines, clean up and repair costs	**$3,500,000**	**1.8**	**$350,000**
1.2	Leakage of drilling fluid contaminates potable water aquifer.	1	Freshwater-based drilling mud will be used while drilling the surface-hole. All USDW's will be protected from contamination from the mud. Industry best practices will minimize the probability of an incident. Drilling is a short term event in the project lifecycle.	1	Contamination of the USDW due to loss of drilling fluid could impact the safety of fresh water use, but the impact will likely be very localized.	2	Contamination of the USDW due to loss of drilling fluid could negatively affect the local habitat, but the impact will likely be very localized, and can be remediated.	2	Fines, clean up and repair costs	**$1,000,000**	**1.6**	**$100,000**
1.3	Water-CO2-Formation (i.e. geochemistry) interaction contaminates potable water by carryover of dissolved contaminants via leakage.	1	Site characterization has determined that the upper confinement will prevent carryover. No geochemistry has been identified that would yield a hazardous material with the CO2.	2	Contamination of the USDW due to leakage of brine/injectate into the USDW could negatively impact the safety of fresh water.	3	Contamination of the USDW due to leakage of fluid could affect the fresh water quality due to brine/injectate contamination and negatively affect the local habitat,	3	Fines, clean up and repair costs	**$3,500,000**	**2.6**	**$350,000**
1.4	Seismic event [induced or natural] occurs in project area resulting in plume leakage into USDW	1	Seismically quiet area. Sufficient distance from nearby shallow faults that could act as a conduit .	1	Contamination of the USDW due to leakage of brine/injectate into the USDW could negatively impact the safety of fresh water.	2	Contamination of the USDW due to leakage of fluid could affect the fresh water quality due to brine/injectate contamination and negatively affect the local habitat,	3	Fines, clean up and repair costs	**$3,500,000**	**1.8**	**$350,000**
2	**CO2 Release to or at the Surface**									**$80,000,000**	**3.9**	**$12,750,000**
2.1	Overpressurization (i.e. induced).	1	Injection rate and pressure will be monitored at the surface and downhole. Continuous surface equipment controls will prevent overpressure.	3	A release would fill the surrounding low atmosphere with injectate. Possibly dangerous for inhalation. Safety systems will minimize impact, and result in a localized event.	2	A release would fill the surrounding low elevation atmosphere with injectate. The CO2 is expected to dissipate quickly and have limited impact on the environment.	3	Fines, clean up and repair costs	**$10,000,000**	**2.6**	**$1,000,000**
2.2	Caprock/reservoir failure (e.g. Plume migrates along fault line/fissure to surface).	1	Injection rate and pressure will be monitored at the surface and downhole. Continuous surface equipment controls will prevent overpressure. Faults are not present in the subsurface close to the injection locations, where the overpressure will be highest.	3	A release would fill the surrounding low atmosphere with injectate. Possibly dangerous for inhalation. Safety systems will minimize impact.	2	A release would fill the surrounding low elevation atmosphere with injectate. The CO2 is expected to dissipate quickly and have limited impact on the environment.	3	Fines, clean up and repair costs	**$10,000,000**	**2.6**	**$1,000,000**
2.3	Well blowout during drilling operations or loss of mechanical integrity of the well pressure equipment.	1	Unlikely with proper equipment selection and proven operating practices.	3	A release would fill the surrounding low atmosphere with injectate. Possibly dangerous for inhalation. Safety systems will minimize impact, and result in a localized event.	1	A release would fill the surrounding low elevation atmosphere with injectate. The CO2 is expected to dissipate quickly and have limited impact on the environment.	4	Fines, clean up and repair costs	**$20,000,000**	**2.4**	**$2,000,000**
2.5	Well failure/leak.	1	Injectate stream can potentially be very corrosive. Measures taken to ensure that the injectate stream conditions are minimally corrosive (prevent free water) and appropriate metallurgies have been used in the construction of the well.	3	A release would fill the surrounding low atmosphere with injectate. Possibly dangerous for inhalation. Safety systems will minimize impact, and result in a localized event.	2	A release would fill the surrounding low elevation atmosphere with injectate. The CO2 is expected to dissipate quickly and have limited impact on the environment.	4	Fines, clean up and repair costs	**$10,000,000**	**2.8**	**$1,000,000**
2.6	Major mechanical failure of flowlines or distribution system	1	Closely monitored facility with competent management of operations. Controls in place to prevent overpressure and minimize any potential release, via automated shut-in procedures.	3	A release would fill the surrounding low atmosphere with injectate. Possibly dangerous for inhalation. Safety systems will minimize impact.	2	A release would fill the surrounding low elevation atmosphere with injectate. The CO2 is expected to dissipate quickly and have limited impact on the environment.	3	Clean up and repair costs	**$5,000,000**	**2.6**	**$500,000**

2.7	Well seal failure of adjacent well(s), (e.g. P&A wells, monitor wells, orphan wells).	2	Proper Corrective Action and review of existing wells and plugging will minimize the likelihood.	1	Possibly have injectate to surface or brine. Injectate could pose a safety risk in sufficient quantities.	2	Possibly have injectate to surface or brine. Brine could pose an environmental risk to surrounding soils.	4	Clean up and repair costs	**$5,000,000**	**4.0**	**$1,250,000**
2.9	Sabotage/Terrorist attack (e.g. on surface infrastructure)	1	Facility is not of strategic or cultural importance, therefore very low risk.	1	A release would fill the surrounding low atmosphere with injectate. Possibly dangerous for inhalation. Safety systems will minimize impact, and result in a localized event.	2	A release would fill the surrounding low elevation atmosphere with injectate. The CO2 is expected to dissipate quickly and have limited impact on the environment.	4	Clean up and repair costs	**$10,000,000**	**2.0**	**$1,000,000**
2.10	Act of God (Hurricane)	5	The most likely scenario is that the surface structure could be impacted due to a major storm or wildfire. Safety shut down systems will minimize impact.	3	Would fill the surrounding low atmosphere with injectate. Possibly dangerous for inhalation. Safety systems will minimize impact.	1	A release would fill the surrounding low elevation atmosphere with injectate. The CO2 is expected to dissipate quickly and have limited impact on the environment.	3	Clean up and repair costs	**$10,000,000**	**11.0**	**$5,000,000**
3	**Entrained Contaminant (Non-CO2) In Injection Stream**									**$20,000,000**	**2.0**	**$2,000,000**
3.1	Change in CO2 composition/properties from its source (e.g. concentration of contaminate in CO2 supply increases).	1	Injection stream will be regularly monitored for contaminants/changes in composition. CO2 will be delivered via common carrier CO2 line with composition controls that eliminate/limit contaminant possibility. Asset integrity controls will provide early det	2	If composition changes causes a leak, the new composition would possibly be dangerous for inhalation. Safety systems will minimize impact.	1	Minimal affect on environment	4	Clean up and repair costs	**$10,000,000**	**2.0**	**$1,000,000**
3.2	Microbial activity initiated by injection process or composition. Allows for possible production of H2S gas in the subsurface, impacting dissolution, geochemical reactions	1	Injection stream will be regularly monitored for contaminants/changes in composition. CO2 will be delivered via common carrier CO2 line with composition controls that eliminate/limit contaminant possibility. Asset integrity controls will provide early detection.	2	If microbial activity causes leak, the composition could also be dangerous to safety.	1	Minimal affect on environment	4	Clean up and repair costs	**$10,000,000**	**2.0**	**$1,000,000**

APPENDICES I-2 TO I-4 ARE

PROPRIETARY BUSINESS INFORMATION

THIS DATA HAS BEEN REDACTED.