

U.S. Patent No. 8,505,332
Claims 1-4, 6-7
Summary

Claims 1-4, 6-7	Monell 20	Goldsmith	Weyburn	Wellman	Monell 120	Monell 160
Claim 1 [1.P] A method comprising: [1.1] receiving a hydrocarbon feed stream, wherein the hydrocarbon feed stream comprises carbon dioxide, natural gas liquid (NGL), heavy hydrocarbons, and acid gas, wherein the NGL comprises C ₃ -C ₈ hydrocarbons, and wherein the heavy hydrocarbons comprise C ₉₊ hydrocarbons;	✓	✓	✓	✓	✓	✓

Claims 1-4, 6-7	Monell 20	Goldsmith	Weyburn	Wellman	Monell 120	Monell 160
[1.2] separating the hydrocarbon feed stream into a heavy hydrocarbon rich stream and a carbon dioxide recycle stream, wherein the heavy hydrocarbon rich stream comprises the C ₉₊ hydrocarbons, and wherein the carbon dioxide recycle stream comprises the carbon dioxide, the C ₃ -C ₈ hydrocarbons, and the acid gas;	✓	✓	✓	✓	✓	✓
[1.3] separating the carbon dioxide recycle stream into a sour NGL rich stream and a purified carbon dioxide recycle stream, wherein the sour NGL rich stream comprises the C ₃ -C ₈ hydrocarbons and the acid gas, and wherein the purified carbon dioxide recycle stream comprises the carbon dioxide; and	✓	✓	✓	✓	✓	✓

Claims 1-4, 6-7	Monell 20	Goldsmith	Weyburn	Wellman	Monell 120	Monell 160
[1.4] separating the sour NGL rich stream into a sweet NGL rich stream and an acid gas stream, wherein the sweet NGL rich stream comprises the C ₃ -C ₈ hydrocarbons, and wherein the acid gas stream comprises the acid gas,	✓	✓	✓	✓	✓	✓
[1.5] wherein the carbon dioxide is not removed from the hydrocarbon feed stream and is not removed from the carbon dioxide recycle stream prior to separating the carbon dioxide recycle stream into the sour NGL rich stream and the purified carbon dioxide recycle stream, and	✓	✓	✓	✓	✓	✓

Claims 1-4, 6-7	Monell 20	Goldsmith	Weyburn	Wellman	Monell 120	Monell 160
[1.6] wherein the hydrocarbon feed stream, the carbon dioxide recycle stream, and the sour NGL rich stream are not subjected to cryogenic conditions, membranes, and carbon dioxide recovery solvents between being received and being separated into the heavy hydrocarbon rich stream, the purified carbon dioxide recycle stream, the sweet NGL rich stream, and the acid gas stream.	✓	✓	✓	✓	✓	✓

Claims 1-4, 6-7	Monell 20	Goldsmith	Weyburn	Wellman	Monell 120	Monell 160
Claim 2 [2.1] The method of claim 1, further comprising: compressing the carbon dioxide recycle stream prior to separating the carbon dioxide recycle stream;	✓	✓	✓	✓	✓	✓
[2.2] dehydrating at least part of the carbon dioxide recycle stream using a dehydration solvent prior to separating the carbon dioxide recycle stream;	✓	✓	✗ Reg. Gas Scrubber/ Mole Sieve Dehydrati on. Not solvents.	✓	✓	✓
[2.3] combining a carbon dioxide makeup stream external to the method with the purified carbon dioxide recycle stream; and	✓	✓	✓	✓	✓	✓

Claims 1-4, 6-7	Monell 20	Goldsmith	Weyburn	Wellman	Monell 120	Monell 160
[2.4] injecting the combined carbon dioxide makeup stream and the purified carbon dioxide recycle stream into a subterranean formation.	✓	✓	✓	✓	✓	✓
Claim 3 [3] The method of claim 1, further comprising cooling the carbon dioxide recycle stream with the purified carbon dioxide recycle stream.	✓	✓	✓	✗ no Inlet Exchanger to cool the CO2 recycle stream with the purified CO2 recycle stream	✗ no Inlet Exchanger to cool the CO2 recycle stream with the purified CO2 recycle stream	✓

Claims 1-4, 6-7	Monell 20	Goldsmith	Weyburn	Wellman	Monell 120	Monell 160
Claim 4 [4] The method of claim 3, wherein the sweet NGL rich stream comprises no more than 1 molar percent methane, no more than 1 molar percent ethane, and no more than 1 molar percent acid gases.	✓	✓	✗ slightly more than 1 molar percent Ethane	✓	✓	✓
Claim 6 [6.1] The method of claim 1, wherein separating the carbon dioxide recycle stream into the sour NGL rich stream and the purified carbon dioxide recycle stream comprises: refluxing part of the purified carbon dioxide recycle stream;	✓	✓	✓	✓	✓	✓
[6.2] reboiling part of the sour NGL rich stream; and	✓	✓	✓	✓	✓	✓

Claims 1-4, 6-7	Monell 20	Goldsmith	Weyburn	Wellman	Monell 120	Monell 160
[6.3] cooling and throttling the sour NGL rich stream.	✓	✓	✓	✓	✓	✓
Claim 7 [7] The method of claim 6, wherein the sour NGL rich stream comprises no more than 5 molar percent carbon dioxide, no more than 1 molar percent methane, and no more than 5 molar percent ethane, and wherein the sweet NGL rich stream is substantially free of carbon dioxide.	✓ ✓	✓ ✓	✗ more than 5 molar percent carbon dioxide ✓	✗ more than 5 molar percent carbon dioxide ✓	✗ more than 5 molar percent carbon dioxide ✓	✗ more than 5 molar percent carbon dioxide ✓