

U.S. Patent No. 8,505,332
Claims 1-4, 6-7
Monell 120 Processing Plant
(Sweetwater County, Wyoming)

Claims 1-4, 6-7	Monell 120 Processing Plant (Sweetwater County, Wyoming) Ex. 2070, Monell 120 CO2Flex [®] Plant, Process Flow Diagram, Project No. 14154 (July 31, 2015 – Issued Final)
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 C₃-C₈ hydrocarbons, and wherein the heavy hydrocarbons comprise C₉₊ hydrocarbons;	As do most all Enhanced Oil Recovery (“EOR”) processes, the Monell 120 EOR hydrocarbon feed stream includes carbon dioxide, natural gas liquid (NGL), heavy hydrocarbons, and acid gas. (Ex. 2070, Page 10, Stream Table (showing Stream No. 1 “NGL Fractionator Inlet” having Carbon Dioxide, C3-C8 hydrocarbons, and Hydrogen Sulfide acid gas).) The NGL includes C3-C8 hydrocarbons (Ex. 2070, Page 10, Stream Table (showing Stream No. 1 “NGL Fractionator Inlet” having C3-C8 hydrocarbons); and The heavy hydrocarbons include C9+ hydrocarbons. (Ex. 2071, Monell Plant Extended Hydrocarbon Gas and Liquid Analysis (2016-08-31)

Claims 1-4, 6-7	Monell 120 Processing Plant (Sweetwater County, Wyoming) Ex. 2070, Monell 120 CO2Flex [®] Plant, Process Flow Diagram, Project No. 14154 (July 31, 2015 – Issued Final)
	(showing Crude Blend having C9 (C9 Nonanes) and C10+ hydrocarbons (Decanes+))

[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 C₉₊ hydrocarbons, and wherein the carbon dioxide recycle stream comprises the carbon dioxide, the C₃-C₈ hydrocarbons, and the acid gas;	The Monell 120 EOR separates the “Hydrocarbon Feed Stream” into a “Heavy Hydrocarbon Rich Stream” and a “Carbon Dioxide Recycle Stream.” This initial separation step is performed prior to the Stream No. 1 “Carbon Dioxide Recycle Stream” entering the NGL recovery gas processing plant, so is not shown on the Process Flow Diagrams (“PFDs”) exhibit used for the following steps in the process. The Monell 120 EOR performs this initial separation step using a Three-Phase Separator that separates the “Hydrocarbon Feed Stream” into water, oil, and gaseous components. Water exits the bottom of the Three-Phase Separator, Oil (“Heavy Hydrocarbon Rich Stream” C₉₊ hydrocarbons) out the middle, and gas (“Carbon Dioxide Recycle Stream”) out the top. The “Heavy Hydrocarbon Rich Stream” includes C₉₊ hydrocarbons The “Carbon Dioxide Recycle Stream” includes Carbon Dioxide, C₃-C₈ hydrocarbons, and acid gas Carbon Dioxide Recycle Stream = Stream No. 1, “NGL Fractionator Inlet” (Ex. 2070, Page 1). Stream No. 1 “NGL Fractionator Inlet” composition (Ex. 2070, Page 10) includes:
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Claims 1-4, 6-7	Monell 120 Processing Plant (Sweetwater County, Wyoming) Ex. 2070, Monell 120 CO2Flex [®] Plant, Process Flow Diagram, Project No. 14154 (July 31, 2015 – Issued Final)
	carbon dioxide Carbon Dioxide (Mole Fraction) 89.8212% C3-C8 hydrocarbons: C3 Propane (Mole Fraction) 0.8508% C4 i-Butane (Mole Fraction) 0.2111% n-Butane (Mole Fraction) 0.2954% C5 i-Pentane (Mole Fraction) 0.1339% n-Pentane (Mole Fraction) 0.1139% C6 n-Hexane (Mole Fraction) 0.2999% C7 n-Heptane (Mole Fraction) 0.1921% C8 n-Octane (Mole Fraction) 0.1059% acid gas (H₂S/CO₂) Hydrogen Sulfide (Mole Fraction) 0.0161% which accounts for 92.0403%. Other components are: N₂ (0.1055%), Methane (6.3979%), Ethane (1.4454%), and Water (0.0109%), which accounts for 100.0000%
[1.3] separating the carbon dioxide recycle stream into a sour NGL rich stream and a purified carbon dioxide recycle stream,	The Stream No. 1 “Carbon Dioxide Recycle Stream” flows into the T-203 NGL Fractionator where this [1.3] separating step is performed. (Ex. 2070, Page 3.) The T-203 NGL Fractionator separates the Stream No. 1 “Carbon Dioxide Recycle Stream” into a bottoms “Sour NGL Rich Stream” (Stream No. 8) and an overhead “Purified Carbon Dioxide Recycle Stream” (Stream No. 3). (Ex. 2070, Page 3.)

Claims 1-4, 6-7	Monell 120 Processing Plant (Sweetwater County, Wyoming) Ex. 2070, Monell 120 CO2Flex® Plant, Process Flow Diagram, Project No. 14154 (July 31, 2015 – Issued Final)																														
wherein the sour NGL rich stream comprises the C ₃ -C ₈ hydrocarbons and the acid gas, and	Stream No. 4 exits the bottom of the T-203 NGL Fractionator and flows to the E-207 NGL Reboiler, exiting as the “Sour NGL Rich Stream” (Stream No. 8). (Ex. 2070, Page 3.) Stream No. 8 “Sour NGL Rich Stream” composition (Ex. 2070, Page 10) includes C3-C8 hydrocarbons and acid gas: C3-C8 hydrocarbons: <table><tr><td>C3</td><td>Propane (Mole Fraction)</td><td>9.0246%</td></tr><tr><td>C4</td><td>iC4 (Mole Fraction)</td><td>6.7871%</td></tr><tr><td></td><td>n-Butane (Mole Fraction)</td><td>13.6026%</td></tr><tr><td>C5</td><td>i-Pentane (Mole Fraction)</td><td>8.2446%</td></tr><tr><td></td><td>n-Pentane (Mole Fraction)</td><td>7.0861%</td></tr><tr><td>C6</td><td>n-Hexane (Mole Fraction)</td><td>18.7126%</td></tr><tr><td>C7</td><td>n-Heptane (Mole Fraction)</td><td>11.9857%</td></tr><tr><td>C8</td><td>n-Octane (Mole Fraction)</td><td>6.6089%</td></tr></table> acid gas (H2S/CO2): <table><tr><td>H2S</td><td>Hydrogen Sulfide (Mole Fraction)</td><td>0.0460%</td></tr><tr><td>CO2</td><td>Carbon Dioxide (Mole Fraction)</td><td>16.9962%</td></tr></table> which accounts for 99.0944%. Other components are: Methane (0.0001%), Ethane (0.2286%) and Water (0.6769%), which accounts for 100.0000%	C3	Propane (Mole Fraction)	9.0246%	C4	iC4 (Mole Fraction)	6.7871%		n-Butane (Mole Fraction)	13.6026%	C5	i-Pentane (Mole Fraction)	8.2446%		n-Pentane (Mole Fraction)	7.0861%	C6	n-Hexane (Mole Fraction)	18.7126%	C7	n-Heptane (Mole Fraction)	11.9857%	C8	n-Octane (Mole Fraction)	6.6089%	H2S	Hydrogen Sulfide (Mole Fraction)	0.0460%	CO2	Carbon Dioxide (Mole Fraction)	16.9962%
C3	Propane (Mole Fraction)	9.0246%																													
C4	iC4 (Mole Fraction)	6.7871%																													
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H2S	Hydrogen Sulfide (Mole Fraction)	0.0460%																													
CO2	Carbon Dioxide (Mole Fraction)	16.9962%																													

Claims 1-4, 6-7	Monell 120 Processing Plant (Sweetwater County, Wyoming) Ex. 2070, Monell 120 CO2Flex® Plant, Process Flow Diagram, Project No. 14154 (July 31, 2015 – Issued Final)			
wherein the purified carbon dioxide recycle stream comprises the carbon dioxide; and	Stream No. 2 exits the top of the T-203 NGL Fractionator as the overhead stream and enters the E-204 Reflux Condenser, exiting as a non-numbered stream, which enters the V-205 NGL Reflux Accumulator, exiting as the cooled “Purified Carbon Dioxide Recycle Stream” (non-numbered stream), which enters the E-209 Refrigerant Subcooler, exiting as the “Purified Carbon Dioxide Recycle Stream” (Stream No. 3), which flows to the “3rd Stage Suction.” (Ex. 2070, Page 3 (flows to compression and re-injection (Ex. 2070, Page 2).) Stream No. 3 “Purified Carbon Dioxide Recycle Stream” composition (Ex. 2070, Page 10) includes carbon dioxide: <table><tr><td>CO2</td><td>Carbon Dioxide (Mole Fraction)</td><td>91.0073%</td></tr></table> other components are: Methane (6.5021 %), Ethane (1.4652 %), and Propane (0.7177 %), which accounts for 99.6923%, and C4 (0.104 % & 0.0786 %), N2 (0.1072 %), H2S (0.0156 %), and a miniscule amount of C5, to account for 100%.	CO2	Carbon Dioxide (Mole Fraction)	91.0073%
CO2	Carbon Dioxide (Mole Fraction)	91.0073%		

[1.4] separating the sour NGL rich stream into a sweet NGL rich stream and an acid gas stream,	The Stream No. 8 “Sour NGL Rich Stream” flows through the AC-208 Sour NGL Cooler, exiting as the Stream No. 9 cooled “Sour NGL Rich Stream,” which flows through a throttling valve, exiting as the Stream No. 10 low pressure “Sour NGL Rich Stream.” Stream No. 10 low pressure “Sour NGL Rich Stream” flows to the T-501 Amine Contactor, (Ex.2070, Page 3), and enters the T-501 Amine Contactor. (Ex. 2070, Page 5.) The Stream No. 10 low pressure “Sour NGL Rich Stream” is separated into a “Sweet NGL Rich Stream” (Stream No. 49) and an “Acid Gas Stream” (Stream No. 38) by the T-501 Liquid-Liquid Amine Contactor. (Ex. 2070, Page 5.) The non-numbered overhead stream of the T-501 Liquid-Liquid Amine Contactor enters the F-500 Liquid Product Coalescer, exiting as Stream No. 48, then flows through a PCV valve, exiting as the Stream No. 49 “Sweet NGL Rich Stream” (Ex. 2070, Page 5), which flows to the T-401 Product Stabilizer (Ex. 2070, Page 7).																					
wherein the sweet NGL rich stream comprises the C₃-C₈ hydrocarbons, and	Stream No. 49 “Sweet NGL Rich Stream” composition (Ex. 2070, Page 10) includes C3-C8 hydrocarbons: <table><tr><td colspan="3">C3-C8 hydrocarbons:</td></tr><tr><td>C3</td><td>Propane (Mole Fraction)</td><td>10.9506%</td></tr><tr><td>C4</td><td>i-Butane (Mole Fraction)</td><td>8.2357%</td></tr><tr><td></td><td>n-Butane (Mole Fraction)</td><td>16.5058%</td></tr><tr><td>C5</td><td>i-Pentane (Mole Fraction)</td><td>10.0042%</td></tr><tr><td></td><td>n-Pentane (Mole Fraction)</td><td>8.5985%</td></tr><tr><td>C6</td><td>n-Hexane (Mole Fraction)</td><td>22.7064%</td></tr></table>	C3-C8 hydrocarbons:			C3	Propane (Mole Fraction)	10.9506%	C4	i-Butane (Mole Fraction)	8.2357%		n-Butane (Mole Fraction)	16.5058%	C5	i-Pentane (Mole Fraction)	10.0042%		n-Pentane (Mole Fraction)	8.5985%	C6	n-Hexane (Mole Fraction)	22.7064%
C3-C8 hydrocarbons:																						
C3	Propane (Mole Fraction)	10.9506%																				
C4	i-Butane (Mole Fraction)	8.2357%																				
	n-Butane (Mole Fraction)	16.5058%																				
C5	i-Pentane (Mole Fraction)	10.0042%																				
	n-Pentane (Mole Fraction)	8.5985%																				
C6	n-Hexane (Mole Fraction)	22.7064%																				

Claims 1-4, 6-7	Monell 120 Processing Plant (Sweetwater County, Wyoming) Ex. 2070, Monell 120 CO2Flex® Plant, Process Flow Diagram, Project No. 14154 (July 31, 2015 – Issued Final)		
wherein the acid gas stream comprises the acid gas,	C7	n-Heptane (Mole Fraction)	14.5438%
	C8	n-Octane (Mole Fraction)	8.0195%
	which accounts for 99.5645% other components are: Methane (0.0001%), Ethane (0.2774%), and Water (0.1580%), to account for 100%.		
	Stream No. 32 exits the bottom of the T-501 Liquid-Liquid-Amine Contactor and flows through V-502, F-504, F-503, E-505, T-507, AC-509, and V-508, exiting as the “Acid Gas Stream” (Stream No. 38) to C-550 (Ex. 2070, Page 5) (Ex. 2070, Page 6, Acid Gas Compression (showing Stream No. 38 flowing from V-508 through V-560 to C-550 Acid Gas Compressor)).		
	Stream No. 38 “Acid Gas Stream” composition (Ex. 2070, Page 10) includes the acid gas CO2 and H2S:		
CO2	Carbon Dioxide (Mole Fraction)	91.6445%	
H2S	Hydrogen Sulfide (Mole Fraction)	0.2456%	
	other components are: water (7.7902%), which accounts for 99.6803%, and miniscule amounts of C2+, to account for 100%.		

Claims 1-4, 6-7	Monell 120 Processing Plant (Sweetwater County, Wyoming) Ex. 2070, Monell 120 CO2Flex[®] Plant, Process Flow Diagram, Project No. 14154 (July 31, 2015 – Issued Final)
[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	(CO₂ is not removed from the hydrocarbon feed stream and CO₂ 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 The only CO₂ removal steps are the [1.3] separation of the carbon dioxide recycle stream into the sour NGL rich stream and the purified carbon dioxide recycle stream, and <u>after</u> that step [1.3] separation, removal of the CO₂/H₂S acid gas from the sour NGL rich stream.
[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.	There are no cryogenic conditions in this process. The coldest temperatures in the process are Stream Nos. 22 (30.38°F) and 23 (33.38°F), which are the refrigerant streams entering and exiting the V-218 Suction Scrubber for the overhead Stream No. 22 from the E-204 Reflux Condenser for the overhead stream from the T-203 NGL Fractionator, and Stream No. 2 (42.75°F), which is the overhead stream from the T-203 NGL Fractionator. (Ex. 2070, Pages 3, 4, 10.) There are no membranes in this process. There are no “carbon dioxide recovery solvents” in this process.

Claims 1-4, 6-7	Monell 120 Processing Plant (Sweetwater County, Wyoming) Ex. 2070, Monell 120 CO2Flex [®] Plant, Process Flow Diagram, Project No. 14154 (July 31, 2015 – Issued Final)
	The only solvents in the process are the dehydration solvents (TEG) in the dehydration step, and the amine solvents (DEA) in the sweetening step, neither of which is a solvent used for recovery of carbon dioxide. The dehydration solvents are used to remove water from the carbon dioxide recycle stream, not to recover carbon dioxide. The amine solvents are used in the sweetening step to remove acid gas (CO₂/H₂S) from the “Sour NGL Rich Stream,” not to recover carbon dioxide.

Claims 1-4, 6-7	Monell 120 Processing Plant (Sweetwater County, Wyoming) Ex. 2070, Monell 120 CO2Flex[®] Plant, Process Flow Diagram, Project No. 14154 (July 31, 2015 – Issued Final)
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;	The Stream No. 1 “Carbon Dioxide Recycle Stream” is compressed by Compressors C1-C6, then flows through the F-100 Inlet Coalescer (Ex. 2070, Page 2), to the T-203 NGL Fractionator for separating the “Carbon Dioxide Recycle Stream” (Ex. 2070, Page 3).
[2.2] dehydrating at least part of the carbon dioxide recycle stream using a dehydration solvent prior to separating the carbon dioxide recycle stream;	The Stream No. 1 “Carbon Dioxide Recycle Stream” is dehydrated using a dehydration solvent prior to separating the “Carbon Dioxide Recycle Stream.” The Stream No. 1 “Carbon Dioxide Recycle Stream” is dehydrated using the TEG Contactors T-502, T-532, T-542, T-552, T-562, T-572. (Ex. 2070, Page 2.) TEG is Triethylene glycol, which is a dehydration solvent. The Stream No. 1 dehydrated “Carbon Dioxide Recycle Stream” then flows to the T-203 NGL Fractionator for separating. (Ex. 2070, Page 3.)
[2.3] combining a carbon dioxide makeup stream external to the method with the purified carbon dioxide recycle stream; and	As do most all Enhanced Oil Recovery (“EOR”) processes, the Monell 120 EOR uses a “Carbon Dioxide Makeup Stream” external to the NGL recovery process, and combines that makeup stream with the Stream No. 3 “Purified Carbon Dioxide Recycle Stream.”

Claims 1-4, 6-7	Monell 120 Processing Plant (Sweetwater County, Wyoming) Ex. 2070, Monell 120 CO2Flex[®] Plant, Process Flow Diagram, Project No. 14154 (July 31, 2015 – Issued Final)
[2.4] injecting the combined carbon dioxide makeup stream and the purified carbon dioxide recycle stream into a subterranean formation.	The Monell 120 EOR injects the combined “Carbon Dioxide Makeup Stream” and the “Purified Carbon Dioxide Recycle Stream” into the 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.	The Stream No. 1 “Carbon Dioxide Recycle Stream” is <u>not</u> cooled with the Stream No. 3 “Purified Carbon Dioxide Recycle Stream.” The Monell 120 process uses the non-numbered output of the V-205 NGL Reflux Accumulator as cooling for the E-204 Reflux Condenser to cool and condense the Stream No. 2 overhead stream of the T-203 NGL Fractionator, rather than to cool the Stream No. 1 “Carbon Dioxide Recycle Stream” as specified in Claim No. 3. The non-numbered output of the top of the V-205 NGL Reflux Accumulator enters the E-209 Refrigerant Subcooler. The Stream No. 3 “Purified Carbon Dioxide Recycle Stream” exits the top of the E-209 Refrigerant Subcooler and flows to the 3rd Stage Suction for compression and re-injection into the subterranean formation. (Ex. 2070, Page 3.)

Claims 1-4, 6-7	Monell 120 Processing Plant (Sweetwater County, Wyoming) Ex. 2070, Monell 120 CO2Flex® Plant, Process Flow Diagram, Project No. 14154 (July 31, 2015 – Issued Final)												
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.	The Stream No. 49 “Sweet NGL Rich Stream” composition for Methane, Ethane, and Acid Gases (H2S/CO2) is (Ex. 2070, Page 10): The Stream No. 49 “Sweet NGL Rich Stream” has much less than 1 molar percent Methane, Ethane, and Acid Gases. <table><tr><td>C1</td><td>Methane (Mole Fraction)</td><td>0.0001%</td></tr><tr><td>C2</td><td>Ethane (Mole Fraction)</td><td>0.2774%</td></tr></table> Acid gases: <table><tr><td>H2S</td><td>Hydrogen Sulfide (Mole Fraction)</td><td>0.0000%</td></tr><tr><td>CO2</td><td>Carbon Dioxide (Mole Fraction)</td><td>0.0000%</td></tr></table>	C1	Methane (Mole Fraction)	0.0001%	C2	Ethane (Mole Fraction)	0.2774%	H2S	Hydrogen Sulfide (Mole Fraction)	0.0000%	CO2	Carbon Dioxide (Mole Fraction)	0.0000%
C1	Methane (Mole Fraction)	0.0001%											
C2	Ethane (Mole Fraction)	0.2774%											
H2S	Hydrogen Sulfide (Mole Fraction)	0.0000%											
CO2	Carbon Dioxide (Mole Fraction)	0.0000%											
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;	The T-203 NGL Fractionator that separates the Stream No. 1 “Carbon Dioxide Recycle Stream” into the Stream No. 8 “Sour NGL Rich Stream” and the Stream No. 3 “Purified Carbon Dioxide Recycle Stream” uses the E-204 Reflux Condenser and the V-205 NGL Reflux Accumulator to reflux part of the overhead Stream No. 2, and uses the E-207 NGL Reboiler to reboil part of the Stream No. 8 “Sour NGL Rich Stream.” (Ex. 2070, Page 3.) The T-203 NGL Fractionator overhead Stream No. 2 enters the E-204 Reflux Condenser and exits as the partially condensed non-numbered stream that enters the V-205 NGL Reflux Accumulator. Non-numbered												

Claims 1-4, 6-7	Monell 120 Processing Plant (Sweetwater County, Wyoming) Ex. 2070, Monell 120 CO2Flex[®] Plant, Process Flow Diagram, Project No. 14154 (July 31, 2015 – Issued Final)
	reflux stream exits the bottom of V-205 NGL Reflux Accumulator and is pressured up by P-206 NGL Reflux Pump and returned to the top of the T-203 NGL Fractionator. Non-numbered stream exits the top of the V-205 NGL Reflux Accumulator and enters the E-209 Refrigerant Subcooler. Stream No. 3 “Purified Carbon Dioxide Recycle Stream” exits the E-209 Refrigerant Subcooler and flows to the Outlet Connecting Piping for compression and re-injection into the subterranean formation. (Ex. 2070, Page 3.)
[6.2] reboiling part of the sour NGL rich stream; and	The T-203 NGL Fractionator bottoms Stream No. 4 enters the E-207 NGL Reboiler. Boil-up Stream No. 5 exits the top of the E-207 NGL Reboiler and is returned to the bottom of the T-203 NGL Fractionator. The Stream No. 8 “Sour NGL Rich Stream” exits the bottom of the E-207 NGL Reboiler and flows to the AC-208 Sour NGL Cooler for cooling. (Ex. 2070, Page 3.)
[6.3] cooling and throttling the sour NGL rich stream.	The Stream No. 8 “Sour NGL Rich Stream” is cooled by the AC-208 Sour NGL Cooler and exits as Stream No. 9 cooled “Sour NGL Rich Stream.” (Ex. 2070, Page 3. The Stream Table shows the temperature for Stream No. 8 as 283.75 °F, and Stream No. 9 as 120.00 °F, confirming the cooling done by the AC-208 Sour NGL Cooler. (Ex. 2070, Page 10.) The Stream No. 9 cooled “Sour NGL Rich Stream” is throttled by the “Throttling Valve” downstream of the AC-208 Sour NGL Cooler (Ex. 2070, Page 3), which reduces the pressure of the stream so it can enter the

Claims 1-4, 6-7	Monell 120 Processing Plant (Sweetwater County, Wyoming) Ex. 2070, Monell 120 CO2Flex® Plant, Process Flow Diagram, Project No. 14154 (July 31, 2015 – Issued Final)
	T-501 Liquid-Liquid Amine Contactor at the operating pressure of the Amine Contactor as low pressure “Sour NGL Rich Stream” (Stream No. 10) (Ex. 2070, Page 3). The Stream Table shows the pressure for Stream No. 9 as 648.50 psia, and Stream No. 10 as 449.13 psia, confirming the pressure drop (“throttling”) done by the “Throttling Valve.” (Ex. 2070, Page 10.)
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 <	

Streams:

Stream No. 1 “Carbon Dioxide Recycle Stream”

Stream No. 1 “Carbon Dioxide Recycle Stream” enters the T-203 NGL Fractionator for separating the “Carbon Dioxide Recycle Stream”

Stream No. 2 T-203 NGL Fractionator overhead enters the E-204 Reflux Condenser

Stream No. 2 exits the top of the T-203 NGL Fractionator as the overhead stream and enters the E-204 Reflux Condenser, exiting as a non-numbered stream, which enters the V-205 NGL Reflux Accumulator, exiting as the cooled “Purified Carbon Dioxide Recycle Stream” (non-numbered stream), which enters the E-209 Refrigerant Subcooler, exiting as the “Purified Carbon Dioxide Recycle Stream” (Stream No. 3), which flows to the “3rd Stage Suction.” (Ex. 2070, Page 3 (flows to compression and re-injection (Ex. 2070, Page 2).)

Non-numbered stream exits the E-204 Reflux Condenser as a partially condensed (not fully condensed since it separates into a liquid stream 6 and a vapor stream 8) Stream No. 5, which enters the V-205 NGL Reflux Accumulator.

Non-numbered stream exits the bottom of V-205 NGL Reflux Accumulator, and is pressured up by P-206 NGL Reflux Pump

Non-numbered stream exits the P-206 NGL Reflux Pump and is returned to the top of the T-203 NGL Fractionator

Stream No. 4 exits the bottom of the T-203 NGL Fractionator and flows to the E-207 NGL Reboiler

Stream No. 5 exits the top of the E-207 NGL Reboiler as Boil-up Stream No. 5 and is returned to the bottom of the

T-203 NGL Fractionator

Stream No. 8 exits the bottom of the E-207 NGL Reboiler, then enters the AC-208 Sour NGL Cooler

Stream No. 9 cooled “Sour NGL Rich Stream” exits the AC-208 Sour NGL Cooler, and flows to the “Throttling Valve”

Stream No. 10 low pressure “Sour NGL Rich Stream” exits the “Throttling Valve,” then flows to the T-501 Amine Treating System

The Stream No. 10 low pressure “Sour NGL Rich Stream” is separated into a

“Sweet NGL Rich Stream” (Stream No. 49) and an

“Acid Gas Stream” (Stream No. 38) by the T-501 Liquid-Liquid Amine Contactor

The coldest temperatures in the process are Stream Nos. 22 (30.38°F) and 23 (33.38°F), which are the refrigerant streams entering and exiting the V-218 Suction Scrubber for the overhead Stream No. 22 from the E-204 Reflux Condenser for the overhead stream from the T-203 NGL Fractionator, and Stream No. 2 (42.75°F), which is the overhead stream from the T-203 NGL Fractionator.

The non-numbered overhead stream of the T-501 Liquid-Liquid Amine Contactor enters the F-500 Liquid Product Coalescer, exiting as

Stream No. 48, then flows through a PCV valve, exiting as the

Stream No. 49 “Sweet NGL Rich Stream” (Ex. 2070, Page 5), which flows to the T-401 Product Stabilizer