

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

Claims 1-4, 6-7	Mabee Air Permit Application (Ex. 2023, Chevron Mabee Plant Air Permit Application (Nov 5, 2012) (“Air Permit”))	Mabee Hydrate Formation Paper (Ex. 2012, Hydrate Formation in Chevron Mabee Unit) (“Hydrate Formation Paper”))	Discovery Request
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;			

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[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;			Request No. 2(a): Stream composition of Glycol Dehydration outlet stream to NGL Distillation tower inlet. (Ex. 2012, Fig 3, Item No. 1.).

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[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			Request Nos. 2(b-c): Stream composition of NGL Distillation tower top stream, after the Reflux Condenser (Ex. 2012, Fig 3, Item No. 2), and NGL Distillation tower bottoms stream, after the Reboiler (Ex. 2012, Fig 3, Item No. 3).

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[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 C₃-C₈ hydrocarbons, and wherein the acid gas stream comprises the acid gas,		Field column for “NGL Composition, mol %” from “data well” (showing C₃-C₈ hydrocarbons in the sweet NGL rich stream) Ex. 2012 (Table 1: Model Validation of [Mabee Gas] Plant Data)	Request No. 2(d): Stream composition of the outlet(s) of the NGL Sweetening Step ... (Ex. 2012, Fig 3, Item No. 4).

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[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			Request No. 1: Piping and Instrumentation Diagrams (P&IDs) and Plot Plan.

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[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.			Request No. 1: Piping and Instrumentation Diagrams (P&IDs) and Plot Plan.
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;	Stage 1 Compressor Stage 2 Compressor EX_____ (Mabee Ranch CO2 Recycle Facility Process Flow Diagram)	1st Stage Compression 2nd Stage Compression Ex. 2012 (Figure 3: Mabee Gas Plant Block Flow Diagram)	

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[2.2] dehydrating at least part of the carbon dioxide recycle stream using a dehydration solvent prior to separating the carbon dioxide recycle stream;	TEG Contactor EX_____ (Mabee Ranch CO2 Recycle Facility Process Flow Diagram)	Glycol Dehydration Ex. 2012 (Figure 3: Mabee Gas Plant Block Flow Diagram)	
[2.3] combining a carbon dioxide makeup stream external to the method with the purified carbon dioxide recycle stream; and			Request No. 1: Piping and Instrumentation Diagrams (P&IDs) and Plot Plan.
[2.4] injecting the combined carbon dioxide makeup stream and the purified carbon dioxide recycle stream into a subterranean formation.			Request No. 1: Piping and Instrumentation Diagrams (P&IDs) and Plot Plan.

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Claim 3 [3] The method of claim 1, further comprising cooling the carbon dioxide recycle stream with the purified carbon dioxide recycle stream.			Request No. 1: Piping and Instrumentation Diagrams (P&IDs) and Plot Plan.
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.		Field column for “NGL Composition, mol %” from “data well” (showing no methane, ethane, carbon dioxide, nor H ₂ S in the sweet NGL rich stream) Ex. 2012 (Table 1: Model Validation of [Mabee Gas] Plant Data)	

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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;		Reflux Accumulator Ex. 2012 (Figure 1: Process Flow Diagram of Distillation Column and Reflux) Reflux Condenser Ex. 2012 (Figure 1: Process Flow Diagram of Distillation Column and Reflux)	
[6.2] reboiling part of the sour NGL rich stream; and		Reboiler Ex. 2012 (Figure 1: Process Flow Diagram of Distillation Column and Reflux) Reboiler Ex. 2012 (Figure 3: Mabee Gas Plant Block Flow Diagram)	
[6.3] cooling and throttling the sour NGL rich stream.			Request No. 1: Piping and Instrumentation Diagrams (P&IDs) and Plot Plan.

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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.		Field column for “NGL Composition, mol %” from “data well” (showing no carbon dioxide in the sweet NGL rich stream) Ex. 2012 (Table 1: Model Validation of [Mabee Gas] Plant Data)	Request No. 2(c): Stream composition of NGL Distillation tower bottoms stream, after the Reboiler (Ex. 2012, Fig 3, Item No. 3).