

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SCOUT ENERGY MANAGEMENT, LLC, and
CHEVRON U.S.A. INC.,
Petitioners,

v.

PILOT INTELLECTUAL PROPERTY, LLC,
Patent Owner.

Case IPR2024-00385
Patent 8,505,332 B1

PATENT OWNER'S SUR-REPLY

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EXHIBIT LIST

Exhibit	Description
2001	Declaration of Trevor Bors (May 13, 2024)
2002	<i>Curriculum Vitae</i> of Trevor Bors
2003	U.S. Patent No. 4,529,411 (“Goddin”)
2004	Table of Similarities (demonstrating similarities between Goddin ‘411 Patent Fig. 11 and Three-Column Ryan/Holmes Process)
2005	GPA Engineering Data Book (12th Ed. 2006, FPS version) (Pages 1-300 of 821) (replaced by Ex. 2025 (Part 1 of 3), Ex. 2026 (Part 2 of 3), and Ex. 2027 (Part 3 of 3))
2006	U.S. Patent No. 4,318,723 (“Cryogenic Distillative Separation of Acid Gases from Methane”)
2007	U.S. Patent No. 4,462,814 (“Distillative Separations of Gas Mixtures Containing Methane, Carbon Dioxide and Other Components”)
2008	Holmes AS, Ryan JM, Price BC, Styring RE. Process Improves Acid Gas Separation. <i>Hydrocarbon Processing</i> 1982; 61:131–136
2009	Hannah Kent-Webb PhD, Best Practices for Biological Sample Storage and Management. <i>Biocompare</i> . (Oct. 2022)
2010	Vortex Expansion Devices for High Temperature Cryogenics. Proceedings of the 26 th Intersociety Energy Convention Engineering Conference (1991)
2011	Penflex Engineering Bulletin #113 (including table from The American Society of Materials “ASM Specialty Handbook: Stainless Steels,” published in 1994)

2012	Hydrate Formation in Chevron Mabee Unit for NGL Recovery and CO ₂ Purification for EOR (Submitted to Gas Processors Association 2017)
2013	Canada Patent No. 294,939 (Prosecution File History – including Re-examination)
2014	Proposed Discovery Requests (including annotated Ex. 2012 Figure 3, specifically identifying four particular streams)
2015	Claim Chart_’332 Patent Claims 1-4 6-7_Secondary Considerations_Copying
2016	United States Patent No. 4,753,666 (“Pastor”)
2017	Naomi Baker e-mail “Memo to file. conversation with Allen Hein, Chevron” (2012-02-12) (highlighted) (“He [Chevron’s Allen Hein] told me [Pilot’s Naomi Baker] that they were building a plant identical to their Rangeley (CO) plant”)
2018	Notice Letter from Pilot Energy Solutions to Chevron (August 15, 2013)
2019	Response Letter from Chevron to Pilot Energy Solutions (August 29, 2013) (attaching Pastor ‘666 Patent)
2020	<i>Pilot Energy Solutions, LLC et al. v. Chevron U.S.A. Inc. et al.</i> , Case No. 4:23-cv-02505-AHB, in the U.S. District Court for the Southern District of Texas, Houston Division, Order on Defendants’ Motion to Dismiss (Granting in Part, Denying in Part) (Doc. 41)
2021	<i>Pilot Energy Solutions, LLC et al. v. Chevron U.S.A. Inc. et al.</i> , Case No. 4:23-cv-02505-AHB, in the U.S. District Court for the Southern District of Texas, Houston Division, Agreed Joint Motion to Stay Pending Final Written Decision in Inter Partes Review Proceedings (Doc. 42)
2022	OSHA § 1910.119(d)(3)(i)(B) (requiring “Piping and instrument diagrams (P&ID’s)” for Process safety management of highly hazardous chemicals) (highlighted)

2023	Chevron Mabee Plant Air Permit Application – Texas Commission for Environmental Quality (“TCEQ”) (November 5, 2012)
2024	Transcript (Full) of Deposition of David A. Rockstraw (October 18, 2024)
2025	GPA Engineering Data Book (12th Ed. 2006, FPS version) (Sections 1-15) (Part 1 of 3) (replacing Ex. 2005)
2026	GPA Engineering Data Book (12th Ed. 2006, FPS version) (Sections 16-23) (Part 2 of 3) (replacing Ex. 2005)
2027	GPA Engineering Data Book (12th Ed. 2006, FPS version) (Sections 24-26) (Part 3 of 3) (replacing Ex. 2005)
2028	Declaration of Trevor Bors (November 22, 2024)
2029	Declaration of Eric Prim (November 22, 2024)
2030	Holloman Job No. 3228 New Construction – Description: Plant (Propane) Estimated Start Date: 8/13/01
2031	Exxon Means project development – sketches and notes
2032	Exxon Means project development – HYSYS process simulation (August 9, 2001)
2033	Exxon Means GCF Processing Plant Preliminary Piping and Instrumentation Diagram (“P&ID”) 50 MM Case (August 9, 2001)
2034	Exxon Means project development – Equipment needed (August 16, 2021)
2035	Exxon Means - Material Balance of Gas Available for Processing (January 5, 2002)
2036	Exxon Means Optimization (November 17, 2002)

2037	Exxon Means Processing Proposal (December 17, 2002) (“The optimized results from the means processing proposal have yielded results that are a little unexpected. Optimization of the system has demonstrated that the best economics are found with an inlet flow of 50 MMSCFD with relatively low propane recovery. Small increases in the propane recovery rate result in major increases in the capital cost.”)
2038	Exxon Means GCF Operations Initial Proposal (January 25, 2003) (“If the operations of the GCF are coupled with the proposed NGL recovery plant, savings will be realized through the synergy of operating both facilities.”)
2039	Exxon Means Processing Proposal (January 30, 2003)
2040	Exxon Means Processing Proposal (March 27, 2003) (“The optimized results from the means processing proposal have yielded results that are a little unexpected. Optimization of the system has demonstrated that the best economics are found with an inlet flow of 50 MMSCFD with relatively low propane recovery. Small increases in the propane recovery rate result in major increases in the capital cost.”)
2041	Exxon Means San Andres Unit - Means Field - Hydrocarbon Gas Production Forecast (June 2003)
2042	Exxon Means NGL Recovery Proposal e-mail (July 16, 2003)
2043	Exxon Means Processing Information (July 21, 2003) (“The original plant was intended to be a <u>high recovery</u> 60MMSCFD plant that was estimated to cost \$12MM to \$15MM. Next the plant size was reduced to 25MMSCFD, also with <u>high propane recovery</u> . The 25MM option was estimated to cost around \$5MM. The current case is designed for 50MMSCFD with <u>low (25%) propane recovery</u> and is estimated to cost around \$7MM.”) (emphasis added)
2044	Exxon Means project development – Process Flow Diagram (“PFD”) Front Page (July 21, 2003) HYSYS process simulation (July 21, 2003)

2045	Exxon Means project development – All Equipment List (notes reducing Costs from \$7,461,160 to \$5,152,492)
2046	Exxon Means Optimization (November 17, 2002 Optimization Corrected for Presentation (August 30, 2003)
2047	U.S. Provisional Application No. 60/938,726, filed May 18, 2007 ('322 Patent Provisional Application)
2048	NGL Recovery in CO2 Floods, Options and Reasons, Eric Prim & Naomi Baker, Midland CO2 Conference (December 2011) (available at https://www.co2conference.net/wp-content/uploads/2012/12/1.4-EricPrim_NGL_Recovery_Options_in_CO2_Floods_2011-CO2FloodingConf.pdf)
2049	NGL Recovery in CO2 Floods, Options and Reasons, Eric Prim & Naomi Baker, 6th Annual Wyoming CO2 Conference, Casper, Wyoming (July 11-12, 2012) (mistakenly marked as EX2072)
2050	Rangely Weber Sand Unit Case History, Rory Clark – Reservoir Engineer, Chevron North America E&P, 6th Annual Wyoming CO2 Conference, Casper, Wyoming (July 12, 2012)
2051	New Process Recovers NGLs From CO2, Naomi Baker, The American Oil & Gas Reporter (February 2013)
2052	Summary of Charts Demonstrating that Pilot's CO2Flex® Plants Perform the Steps of the Challenged '332 Patent Claims 1-4, 6-7 ("coextensive" – "essentially the claimed invention")
2053	Monell 20 Chart Demonstrating One-to One Correspondence between Challenged '332 Patent Claims 1-4, 6-7 and Monell 20 CO2Flex® Plant as Shown in Process Flow Diagram
2054	Monell 20 NGL Recovery Plant, Piping and Instrumentation Diagram (April 9, 2007 – Revised per PHA Review)

2055	Monell 20 CO2Flex® Plant, Process Flow Diagram, NGL Fractionation System (November 11, 2024)
2056	HYSYS Chemical Process Simulation, Monell 20, (May 3, 2007 [regenerated November 11, 2024])
2057	Goldsmith - Golden Hammer Chart Demonstrating One-to One Correspondence between Challenged ‘332 Patent Claims 1-4, 6-7 and Goldsmith - Golden Hammer CO2Flex® Plant as Shown in Process Flow Diagram
2058	Goldsmith Processing Plant, Process Flow Diagram, Project No. 5100928 (March 13, 2012 – Final Design)
2059	Mobile Analytical Labs, Inc., Goldsmith Feed Gas Analysis Gas Extended Analysis (2012-10-12), and Gas Analysis Report (2018-01-11)
2060	Pantechs Laboratories, Goldsmith Feed Gas Analysis C6+ Gas-Vapor Fractional Analysis (2017-01-08)
2061	Weyburn Chart Demonstrating One-to One Correspondence between Challenged ‘332 Patent Claims 1-4, 6-7 and Weyburn 20 CO2Flex® Plant as Shown in Process Flow Diagram
2062	Weyburn NGL Recovery Plant, Process Flow Diagram and Material Balance (April 23, 2012 – Approved)
2063	Bureau Veritas Laboratories, Weyburn Plant Gas Analysis, Extended Gas Analysis (2020-12-15)
2064	Wellman Chart Demonstrating One-to One Correspondence between Challenged ‘332 Patent Claims 1-4, 6-7 and Wellman CO2Flex® Plant as Shown in Process Flow Diagram
2065	Wellman CO2Flex® Plant, Process Flow Diagram (February 19, 2015 – Final as Built)
2066	Wellman CO2Flex® Plant, Corrected Stream Table

2067	Pantechs Laboratories, Wellman Plant Gas Analysis, C6+ Gas-Vapor Fractional Analysis (2018-01-17)
2068	Pantechs Laboratories, Wellman Plant, Extended Crude Oil Fractional Analysis (2017-01-04)
2069	Monell 120 Chart Demonstrating One-to One Correspondence between Challenged ‘332 Patent Claims 1-4, 6-7 and Monell 20 CO2Flex® Plant as Shown in Process Flow Diagram
2070	Monell 120 CO2Flex® Plant, Process Flow Diagram, Project No. 14154 (July 31, 2015 – Issued Final)
2071	American Mobile Research, Inc., Monell Plant Extended Hydrocarbon Gas and Liquid Analysis (2016-08-31)
2072	Financials
2073	Maintenance Fee Record for U.S. Patent No. 4,753,666 (“Pastor”) (“Patent expired on 06/28/1992 due to non-payment of [first – 3.5Year] maintenance fee”)
2074	Google Earth Images – Chevron Mabee CO2 Recycle Facility (02/21/2013) (before addition of NGL Recovery Plant) https://earth.google.com/web/@32.21102082,-102.2292088,884.43526729a,580.57327589d,35y,-0.00009674h,26.71434883t,0r/data=ChYqEAgBEgoyMDEzLTAYLTIXGABCAggBOgMKATBCAggASg0I_____ARAA
2075	Google Earth Images – Chevron Mabee CO2 Recycle Facility (10/4/2014) (after addition of NGL Recovery Plant) https://earth.google.com/web/@32.21102082,-102.2292088,884.43526729a,580.57327589d,35y,-0.00009674h,26.71434883t,0r/data=ChYqEAgBEgoyMDE0LTExwLTA0GABCAggBOgMKATBCAggASg0I_____ARA_A
2076	Comparison of Pilot Monell 20 CO2Flex® Plant to Chevron Mabee NGL Recovery Plant

2077	E-mail from Julie K. Huff, Chevron Facilities Engineer – CO2 Injection Projects, to three other Chevron personnel (Shintaku/Hein/Acero) and three Pilot personnel (Prim/Baker/Holloman), regarding plan for flights to visit Pilot’s Monell 20 CO2Flex® plant in Wyoming (November 11, 2008) (“[T]rip confirmed ... to visit the Anadarko/[Pilot] Monell CO2 recovery plant. Purpose of trip, understand the [Pilot] process for CO2 removed and Q&A with Anadarko Operations.”)
2078	Summary of Charts Demonstrating that Pilot’s CO2Flex® Plants Do Not Perform All of the Steps of the ‘332 Patent Claim 5
2079	Monell 20 Chart Demonstrating that Pilot’s Monell 20 CO2Flex® Plant Did Not Perform All of the Steps of the ‘332 Patent Claim 5
2080	Goldsmith - Golden Hammer Chart Demonstrating that Pilot’s Goldsmith - Golden Hammer CO2Flex® Plant Does Not Perform All of the Steps of the ‘332 Patent Claim 5
2081	Weyburn Chart Demonstrating that Pilot’s Weyburn 20 CO2Flex® Plant Does Not Perform All of the Steps of the ‘332 Patent Claim 5
2082	Wellman Chart Demonstrating that Pilot’s Wellman CO2Flex® Plant Does Not Perform All of the Steps of the ‘332 Patent Claim 5
2083	Monell 120 Chart Demonstrating that Pilot’s Monell 120 CO2Flex® Plant Does Not Perform All of the Steps of the ‘332 Patent Claim 5
2084	Claims 4 and 7 Analysis of the Three Examples in the ‘332 Patent
2085	Claim 5 Analysis of the Three Examples in the ‘332 Patent

I. INTRODUCTION

Each of the arguments set forth in Petitioners' Reply rests on a fundamentally flawed refusal to recognize that all of the Challenged Claims of the '332 Patent recite the disregard for recovery of methane and ethane from the carbon dioxide recycle stream as part of the claimed process steps, which allows for the patented CO2Flex® process to recover NGLs with relatively little process equipment or energy.

As described in the specification, the innovative process claimed in the '332 Patent improves the process of recovering NGLs from carbon dioxide recycle streams by “disregarding the recovery” of methane and ethane, to recover NGLs “with relatively little process equipment or energy” (EX1001, 4:55-60). The specification defines the term “natural gas liquids” (NGLs) as “C3-C8 hydrocarbons” (3:4-7), not C1 methane, and not C2 ethane.

This disregard for recovery of methane and ethane is found in independent Claim 1 in at least four places, which are:

- 1) reciting the hydrocarbon feed stream as including “natural gas liquid (NGL)” (defined in the specification as “C3-C8 hydrocarbons”), then reciting the NGL to comprise “C3-C8 hydrocarbons” - not C1 methane, and not C2 ethane;
- 2) reciting the sweet and sour NGL streams as “Rich” (“sweet NGL rich stream” and “sour NGL rich stream”). “NGL rich” meaning “relatively lean with respect to methane, ethane, and acid gases” (5:1-2); and

- 3-4) excluding cryogenic conditions and carbon dioxide recovery solvents from the process, which are necessary for recovery of methane and ethane.

The disregard for recovery of methane and ethane is further recited with specific limits for methane and ethane in dependent Claims 4 and 7. Claim 4 limits the amount of methane and ethane in the “sweet NGL rich stream” to “no more than 1 molar percent” each. Claim 7 limits the amount of methane and ethane in the “sour NGL rich stream” to “no more than 1 molar percent methane, and no more than 5 molar percent ethane.”

Claim 1 specifies that the NGL Streams are “Rich” - meaning that the streams have relatively high amounts of NGLs (C3-C8) compared to the non-C3-C8 components in the stream (C1 methane, C2 ethane, and acid gases), with the corresponding relatively lower amounts of methane, ethane, and acid gasses contrasted to be “lean” (5:1-2). Claims 4 and 7 specify particular levels of richness for the NGL Rich Streams, specifying very low upper limits for the percentages of methane and ethane in the Sweet and Sour NGL Rich Streams.

Petitioners rely on their refusal to recognize this disregard for recovery of methane and ethane in the Challenged Claims throughout their Reply, to argue that the Ryan/Holmes process (“Ryan/Holmes”) does not teach away from the Challenged Claims, to assert that Ryan/Holmes renders obvious the Challenged

Claims, and to assert that the tremendous commercial success of Pilot's CO2Flex[®] process lacks a nexus with the Challenged Claims.

With the proper recognition that the Challenged Claims do recite the disregard for recovery of methane and ethane as part of the claimed process steps, which allows for the patented CO2Flex[®] process to recover NGLs with relatively little process equipment or energy, each of Petitioners' arguments in their Reply fails.

Ryan/Holmes, which is the basis for all six of the obviousness Grounds asserted in the Petition, teaches away from the Prim '332 Patent CO2Flex[®] process recited in the Challenged Claims. Ryan/Holmes uses hydrocarbon solvents ("additives"), and an extensive amount of process equipment (up to four distillation columns), to solve two particular problems in the separation of methane and ethane from carbon dioxide recycle streams, making possible the recovery of methane and ethane. In contrast, the Prim '332 Patent CO2Flex[®] process, as recited in each of the Challenged Claims, disregards recovery of methane and ethane, to allow for a significantly more economical recovery of NGLs, by using relatively little process equipment or energy.

A proper recognition that the Challenged Claims do recite the disregard for recovery of methane and ethane as part of the claimed process steps, confirms that Ryan/Holmes teaches away and cannot serve as the basis for asserting obviousness of the Challenged Claims.

Nor can Ryan/Holmes, which was developed and implemented to maximize recoveries of methane and ethane, render obvious the Challenged Claims that each recite the disregard for recovery of methane and ethane.

And finally, with a proper recognition that each of the Challenged Claims recites the disregard for recovery of methane and ethane, Petitioners' attack on the substantial evidence of secondary considerations of non-obviousness, including the tremendous commercial success of Pilot's CO2Flex[®] process, miserably fails.

Petitioners argue that the disregard for recovery of methane and ethane is a critical feature of the CO2Flex[®] process that is "unclaimed," and the commercial success therefore lacks nexus with the Challenged Claims. A proper recognition that the Challenged Claims do recite the disregard for recovery of methane and ethane confirms the nexus between the commercial success and the Challenged Claims.

Patent Owner Pilot respectfully requests that the Board reject Petitioners' refusal to recognize that the Challenged Claims recite the CO2Flex[®] process disregard for recovery of methane and ethane, reject Petitioners' assertions of obviousness, recognize the nexus between the tremendous commercial success of the CO2Flex[®] process and the Challenged Claims, and thereby confirm the patentability for each of the Challenged Claims.

II. The Asserted Prior Art Ryan/Holmes Process Teaches Away from The Prim ‘332 Patent CO2Flex® Process as Recited in the Challenged Claims

Petitioners criticize Pilot’s assertions that Ryan/Holmes “teaches away” from the Prim ‘332 Patent process. But Petitioners’ criticism is founded on their fundamentally flawed refusal to recognize that the Challenged Claims recite the disregard for recovery of methane and ethane. Petitioners correctly note that the teaching away doctrine is based on whether the prior art “criticize[s], discredit[s], or otherwise discourage[s] the solution claimed.”

Ryan/Holmes uses hydrocarbon solvents (“additives”), and an extensive amount of process equipment (up to four distillation columns), to solve two particular problems in the separation of methane and ethane from carbon dioxide recycle streams, making possible the recovery of methane and ethane. Understanding that the entire focus of Ryan/Holmes is to maximize recoveries of methane and ethane, and recognizing that the Challenged Claims do recite the CO2Flex® process disregard for recovery of methane and ethane, confirms that Ryan/Holmes absolutely discourages the CO2Flex® process solution, which is to do the opposite of Ryan/Holmes, by disregarding recovery of methane and ethane, to allow for a significantly more economical recovery of NGLs, by using relatively little process equipment or energy.

As part of their refusal to recognize that the Challenged Claims include disregarding the recovery of methane and ethane, Petitioners assert that “[t]he ‘332 Patent provides several embodiments that recover ethane” (Reply 3).

The ‘332 Patent provides three examples of the CO2Flex[®] process using process simulation software. The material streams and compositions for each of these three examples are shown in Tables 1-9. Each of these three examples show zero methane in the NGL Rich Stream 162, confirming the disregarding recovery of methane. (Tables 2C, 5C, 8C.) The first two of the three examples show very small amounts of ethane, while the third example shows zero ethane, confirming the disregarding recovery of ethane for all three examples.¹

¹ In an apparent attempt to propose all possible alternatives, the ‘332 Patent does have a single brief reference to an alternative that disregards recovery of methane but does recover ethane, even to the point that the “purified carbon dioxide recycle stream 164 may ... be substantially free of C2+” (5:49-52). This briefly mentioned alternative is not included in the three examples detailed in the specification in Tables 1-9, which leave all (or almost all) of the methane and ethane in the carbon dioxide recycle stream, and is not included in Claim 1 which requires NGL Rich streams (relatively lean in ethane), nor Claims 4 and 7 which set very low upper limits of 1 and 5 molar percent ethane for the sweet and sour NGL rich streams. And

Petitioners in their Reply include excerpts of Tables 2B and 5B from the ‘332 Patent for the first two of the three examples, annotated to support their assertion that these examples are “embodiments that recover ethane” (Reply 3). But a close review of the numbers in these Tables confirm that these in fact are embodiments showing the disregard for recovery of both methane and ethane.

TABLE 2B

Stream Compositions			
Name	Purified CO ₂ Recycle Stream 164	Sour NGL Rich Stream 264	Cooled Sour NGL Rich Stream 266
Comp Mole Frac (H ₂ S)	0.0327	0.0000	0.0421
Comp Mole Frac (Nitrogen)	0.0058	0.0000	0.0000
Comp Mole Frac (CO ₂)	0.8359	0.0500	0.0500
Comp Mole Frac (Methane)	0.0558	0.0000	0.0000
Comp Mole Frac (Ethane)	0.0348	0.0281	0.0281
Comp Mole Frac (Propane)	0.0313	0.1728	0.1728
Comp Mole Frac (i-Butane)	0.0022	0.0789	0.0789
Comp Mole Frac (n-Butane)	0.0015	0.2388	0.2388
Comp Mole Frac (i-Pentane)	0.0000	0.0887	0.0887
Comp Mole Frac (n-Pentane)	0.0000	0.0866	0.0866
Comp Mole Frac (n-Hexane)	0.0000	0.1063	0.1063

each of the five commercially successful CO2Flex[®] plants disregard recovery of both methane and ethane. In other words, this briefly mentioned alternative has no relevance to the patentability of the Challenged Claims, and certainly is not a “critical unclaimed feature” of the commercially successful CO2Flex[®] process.

TABLE 5B

Stream Compositions				
Name	Purified CO ₂ Recycle Stream 164	Sour NGL Rich Stream 264	Cooled Sour NGL Rich Stream 266	
	Disregarded	Recovered		
Comp Mole Frac (H ₂ S)	0.0004	0.0008	0.0008	
Comp Mole Frac (Nitrogen)	0.0162	0.0000	0.0000	
Comp Mole Frac (CO ₂)	0.6975	0.0250	0.0250	
Comp Mole Frac (Methane)	0.1922	0.0800	0.0000	
Comp Mole Frac (Ethane)	0.0620	0.0613	0.0613	
Comp Mole Frac (Propane)	0.0275	0.2670	0.2670	
Comp Mole Frac (i-Butane)	0.0017	0.0836	0.0836	
Comp Mole Frac (n-Butane)	0.0024	0.2751	0.2751	
Comp Mole Frac (i-Pentane)	0.0000	0.0697	0.0697	

Petitioners reference the amounts of ethane in Tables 2B and 5B, highlighting the amounts of ethane in the Purified CO₂ Recycle Stream 164 as “Disregarded,” and in the Sour NGL Rich Stream 264 as “Recovered” (Reply 3-4). While Petitioners characterize these ethane numbers as directly contradicting Pilot’s assertion that the ‘332 Patent’s process “leaves all (or almost all) of the methane and ethane in the carbon dioxide recycle streams,” a close review of the stream compositions in these tables confirms the disregarding of both methane and ethane.

When Petitioners highlight the numbers in these tables, they make it appear as if the amounts of ethane “recovered” are about the same as the amounts “disregarded.” This is the support for Petitioners’ assertion that these examples are “embodiments that recover ethane.” In Table 2B, Petitioners assert that 0.0281 ethane is “recovered,” and only 0.0348 ethane is “disregarded” – not much

difference, so how could this be anything other than confirmation this this is an embodiment for which there is no (or at least not much) disregard for the recovery of ethane. An even more extreme example is in Table 5B, where Petitioners assert that 0.0613 ethane is “recovered,” and only 0.0620 ethane is “disregarded.” Only a 1% difference ($0.0620 - 0.0613 = 0.0007$, divided by $0.0613 = 0.01$). So how could “disregarding” only 1% more than the “recovered” amount be anything other than absolute confirmation that this is an embodiment where ethane is “recovered” and certainly not “disregarded.” Case closed. Not so fast.

One must recognize that the numbers shown in Tables 2B and 5B are “stream compositions” that show the relative amounts of components in each stream. These are the percentages of each component in the stream (the “Mole Fraction”). In order to determine how much of each component is in the stream, and compare the amount of ethane that remains in the Purified CO₂ Recycle Stream 164 (“Disregarded”), versus the amount of ethane that is in the Sour NGL Rich Stream 264 (“Recovered”), one must look at the flow rate of each stream. The flow rate numbers for these streams are shown in Tables 1B and 4B.

TABLE 1B

Material Streams			
Name	Purified CO ₂ Recycle Stream 164	Sour NGL Rich Stream 264	Cooled Sour NGL Rich Stream 266
Vapor Fraction	1.0000	0.00000	0.0000
Temperature (F.)	97.39	202.6	120.0*
Pressure (psig)	325.0	340.0	635.3*
Molar Flow (MMSCFD)	15.88	1.119	1.119

TABLE 4B

Material Streams			
Name	Purified CO ₂ Recycle Stream 164	Sour NGL Rich Stream 264	Cooled Sour NGL Rich Stream 266
Vapor Fraction	1.0000	0.00000	0.0000
Temperature (F)	87.48	290.7	120.0*
Pressure (psig)	585.0	600.0	635.3*
Molar Flow (MMSCFD)	18.86	1.139	1.139
Mass Flow (lb/hr)	7.780e+04	7552	7552
Liquid Volume Flow (USGPM)	232.2	25.83	25.83
Heat Flow (Btu/hr)	-2.663e+08	-7.411e+06	-8.371e+06

It's important to note that in each of these two examples the flow rate for the Recycle Stream 164 is about 15 times the flow rate of the Sour NGL Rich Stream 264. Quite a large difference, so now let's see how the math works out to expose Petitioners' sleight of hand.

Pilot's technical expert Bors did the calculations at paragraph 127 of his Declaration (EX2028) for the first example in the '332 Patent, explaining that one

must multiply the stream flow rate by the mole fraction to determine the flow rates for the individual components in the streams. Bors confirmed in his calculations that the first example in the '332 Patent shows that 94.9% of the ethane is “disregarded,” and 5.3% is “recovered.”

Pilot for this Reply did these same calculations for the second and third examples (EX2085), confirming that in the second example 94.3% (F27) of the ethane is “disregarded” while only 5.6% (N27) is “recovered.” In the third example, example 99.6% (F46) is “disregarded” while 0% (N46) is “recovered.”

One may still question why 5.3 to 5.6% numbers for ethane “recovered” would not be considered “recovery” of ethane, even though most all (94.3 to 94.9% is disregarded). The answer lies in the fact that separations of components in these distillation processes are not perfect. As noted in Aycaguer,² and repeated by Petitioners’ expert Rockstraw,³ distillation does not separate components perfectly, so these examples in the '332 Patent describing a disregard of 95% for recovery of

²² “The separation of the produced gas stream does not isolate all components perfectly, and the CO₂ stream destined for reinjection also contains some methane and C₂” ethane in Ryan/Holmes, even though the purpose of the process is to recover all of the methane and ethane. (EX1005:6.)

³ “[D]istillation is an imperfect process” (EX1002 ¶41.)

ethane, and disregard of 99% for recovery of methane, confirms Pilot's assertion that the '332 Patent's process "leaves all (or almost all) of the methane and ethane in the carbon dioxide recycle streams."

The third example in the '332 Patent shows zero methane and zero ethane in the Sweet and Sour NGL Rich Streams (Tables 8B/8C), confirming complete disregard for the recovery of both methane and ethane in this third example in the patent.

III. Pilot's Evidence of Secondary Considerations of Non-Obviousness Have A Nexus with The Challenged Claims

A. Pilot Is Entitled to A Rebuttable Presumption of Nexus Because the Critical Features of The CO2Flex® Process Are Recited in Each of the Challenged Claims

Pilot is entitled to a rebuttable presumption of nexus between the objective evidence of nonobviousness and the Challenged Claims because the evidence is tied to a specific process, Pilot's CO2Flex® process, and that process is the invention disclosed in the '332 Patent and claimed in the Challenged Claims. As demonstrated in Pilot's Response, Pilot's CO2Flex® process embodies the claimed features and is coextensive with the Challenged Claims.

The presumption of nexus can be rebutted by showing that commercial success or other asserted secondary evidence was due to extraneous factors, other than the patented invention, such as unclaimed features. However, a patent

challenger cannot successfully rebut the presumption with argument alone—it must present evidence.

Petitioners contend that Pilot is not entitled to a rebuttable presumption of nexus by continuing their refusal to recognize that all of the Challenged Claims recite the disregard for recovery of methane and ethane as part of the claimed process steps, which allows for the CO2Flex[®] process to recover NGLs with relatively little process equipment or energy. Petitioners thereby assert that the objective evidence of nonobviousness, including the tremendous commercial success of Pilot's CO2Flex[®] process, is due to “unclaimed features.”

Each of the Challenged Claims recites the disregard for recovery of methane and ethane, confirming that this is a claimed (not “unclaimed”) feature of the commercially successful CO2Flex[®] process. As explained above, the disregarding of methane and ethane is recited in at least four places in independent Claim 1, including the sweet and sour “NGL Rich” streams, defined in the specification to mean that the NGL streams are “rich” in C3-C8, and “relatively lean with respect to methane, ethane, and acid gases” (EX1001 5:1-2).

The disregard for recovery of methane and ethane is further recited with specific limits for methane and ethane in dependent Claims 4 and 7 (specifying particular levels of richness for the NGL Rich streams). Claim 4 limits the amount of methane and ethane in the “sweet NGL rich stream” to “no more than 1 molar

percent” each. Claim 7 limits the amount of methane and ethane in the “sour NGL rich stream” to “no more than 1 molar percent methane, and no more than 5 molar percent ethane.”

In addition to refusing to recognize that all of the Challenged Claims recite the disregard for recovery of methane and ethane, Petitioners take it a step further in their attempt to block the presumption of a nexus between the tremendous commercial success of the CO2Flex[®] process and the Challenged Claims, by asserting that “critical features ... appear to be recited in Claim 5, which is ***not*** challenged in this proceeding” (Reply 20).

Petitioners’ argument is that the feature recited in Claim 5 is “critical” to the commercial success of CO2Flex[®], and that this “critical feature” is not recited in the Challenged Claims (therefore an “unclaimed feature”).

Petitioners are correct that there is an additional alternative feature described in the patent, and recited in Claim 5. This alternative feature is referred to as the “less aggressive cut,” whereby one could limit the recovery of the NGLs (C3-C8), in addition to disregarding the recovery of methane and ethane. The patent explains that these two features could each be used alone, or in combination.

By taking a less aggressive cut of the NGLs and/or disregarding the recovery of methane, ethane, and optionally propane from the dehydrated carbon dioxide recycle stream 160, the NGL recovery

process 110 may produce a relatively high quality NGL rich stream 162 with relatively little process equipment or energy.

(4:55-60 (emphasis added).) The patent further describes this alternative “less aggressive cut” feature at Column 8, referring to Figure 3, and concludes that:

[T]he economics of the NGL recovery process when the NGL recovery rate is in the first amount 304 [20-35% C3+ Recovery] may be significantly better than the economics of the NGL recovery process when the NGL recovery rate is in the second amount 306 [40-65% C3+ Recovery]. Such a relationship is counterintuitive considering that in many other processes, the process economics generally improve with increased recovery rates.

(8:3-47.) Claim 5 recites this alternative feature, specifying a range 20-40% C3+ recovery. (18:40-42.) This is the Claim 5 “less aggressive cut” alternative feature that Petitioners assert is a “critical feature” of the commercially successful CO2Flex[®] process, which is not recited in the Challenged Claims, and therefore precludes a presumption of nexus between the objective evidences of non-obvious and the Challenged Claims, including commercial success.

In response to this new argument from Petitioners, Pilot analyzed the C3+ recoveries for each of the five commercially successful CO2Flex[®] plants, and confirmed that none of these plants use the “less aggressive cut” feature. Pilot details this analysis in Exhibits 2079-2083. These Exhibits present a claim chart for each plant, confirming that each plant does not use the “less aggressive cut” feature

recited in Claim 5, including spreadsheet calculations supporting the analysis. Exhibit 2078 summarizes the results of the analysis.

While all of the CO2Flex[®] plants disregard the recovery of both methane and ethane, none of the CO2Flex[®] plants limit C3+ recoveries to the 20-40% range recited in Claim 5. All of the CO2Flex[®] plants operate at C3+ recoveries above 50%, and the most commercially successful CO2Flex[®] plant (Weyburn) operates at over 88% C3+ recovery.

<u>CO2Flex[®] Plants</u>	<u>C3+ Recoveries</u>	<u>Exhibits</u>
Monell 20	50.8%	EX2079
Goldsmith	76.5%	EX2080
Weyburn	88.1%	EX2081
Wellman	57.4%	EX2082
Monell 120/160	59.7%	EX2083

Petitioners' assertion that the commercial success of the CO2Flex[®] plants is due to the "less aggressive cut" feature recited in Claim 5 is incorrect because the CO2Flex[®] plants do not use this alternative feature.

B. Even If Pilot Somehow Is Not Entitled to A Rebuttable Presumption of Nexus, Pilot Has Still Proven The Nexus Between The Commercial Success of The CO2Flex® Process And The Challenged Claims

Even if Petitioners could somehow prevent/rebut a presumption of nexus, Pilot has still proven nexus by showing that the evidence of secondary considerations is the “direct result of the unique characteristics of the claimed invention.”

The unique characteristics of the claimed invention, providing a bridge for the gap between the two existing technologies (Ryan/Holmes and Mechanical Refrigeration Units (“MRUs”)), by disregarding recovery of methane and ethane to allow for a significantly more economical recovery of NGLs by using relatively little process equipment or energy, is the alternative solution that CO2 recycle facilities need, and what led them to implement the CO2Flex® process.

Pilot submitted substantial evidence proving this nexus at pages 44-45 of its Response, through the Declarations of the inventor Prim (EX2029 ¶¶60-61), and technical expert Bors (EX2028 ¶¶33-36, 261-71) serving as a percipient/fact witness for this issue.

Prim and Bors describe in their Declarations the circumstances that led to the building of the Weyburn gas processing facility, which is Pilot’s most successful CO2Flex® plant.

In 2010, Bors was the Manager at Weyburn investigating opportunities to upgrade the facility to add recovery of NGLs from the CO2 recycle stream. He was

considering the two existing technologies he was aware of at that time (Ryan/Holmes and MRUs). Bors rejected Ryan/Holmes because it was “prohibitively expensive,” and because Weyburn did not want to recover ethane. Bors initially had chosen to build an MRU, but when he discovered the existence of the CO2Flex[®] process, he chose to use this process instead because it “recovered more NGL than the MRU [they] were working on, without all of the equipment required to build a Ryan/Holmes plant” (EX2028 ¶¶ 261-69).

In other words, the unique characteristics of the claimed invention, providing a bridge for the gap between the two existing technologies (Ryan/Holmes and MRUs), by disregarding recovery of methane and ethane to allow for a significantly more economical recovery of NGLs by using relatively little process equipment or energy, is the alternative solution that the Weyburn CO2 recycle facility needed, and what led them to implement the CO2Flex[®] process.

C. Pilot’s Secondary Considerations Favor A Finding of Non-Obviousness for Each of The Challenged Claims

1. Long Felt but Unmet Need

Pilot’s Response describes Petitioner Chevron’s recognition of the long felt need for a more economical alternative to the Ryan/Holmes and MRU technologies, as detailed in Chevron’s Pastor ‘666 Patent dating back to 1986. Chevron attempted to solve the problem, but left the problem unresolved by failing to reach the Prim

‘332 Patent solution, which bridges the gap by disregarding recovery of methane and ethane, to allow for a significantly more economical recovery of NGLs (including C3 propane).

The Pastor ‘666 Patent process appeared to be making progress toward the solution by disregarding the recovery of methane and ethane, but fell short by also disregarding the recovery of propane. The Pastor process foregoes/disregards recovery of C3 propane for the NGL product, leaving “substantially all” of the propane in the CO2 injection gas (EX2016, 3:55-57), in order to address what the patent describes as “miscibility problems” (1:41-42).

Two more decades passed before Prim resolved the long felt but unmet need, by disregarding recovery of methane and ethane, and providing an even more economical recovery of NGLs by including propane in the recovery (rather than Pastor’s disregarding recovery of methane, ethane, and propane). Prim’s resolution of this long felt but unmet need is directly tied to the Challenged Claims, each of which recites the disregard for the recovery of methane and ethane, as described above, and further recites the recovery of C3 propane in the C3-C8 NGL Rich Streams.

2. Failure of Others

Petitioner Chevron's failure, as described immediately above, is its failure to achieve the Prim solution, which as also described above is directly tied to each of the Challenged Claims. Petitioners assert that Chevron did not fail, because its Pastor Rangely plant is commercially successful. Chevron's failure is its failure to reach the Prim solution, regardless of whether Chevron may have had some commercial success. The point is that they could have done better, and apparently recognized that when they copied the Prim process including the recovery of propane when they built their Mabee facility, rather than using their Pastor process and continuing to disregard recovery of propane.

3. Skepticism of Experts

Petitioners assert that Exxon's rejection of the '332 Patent CO2Flex[®] process could have been due to something other than Exxon being skeptical as to whether the unproven process would work. The inventor of the '332 Patent CO2Flex[®] process who presented his proposals to Exxon noted in his Declaration that "Exxon was skeptical of the proposed process and rejected my proposals" (EX2029 ¶34).

Petitioners speculate that the rejection of Pilot's proposals could have been for reasons other than Exxon's skepticism of the proposed process, but Petitioners do not dispute the fact that Exxon was skeptical of the then unproven process. That

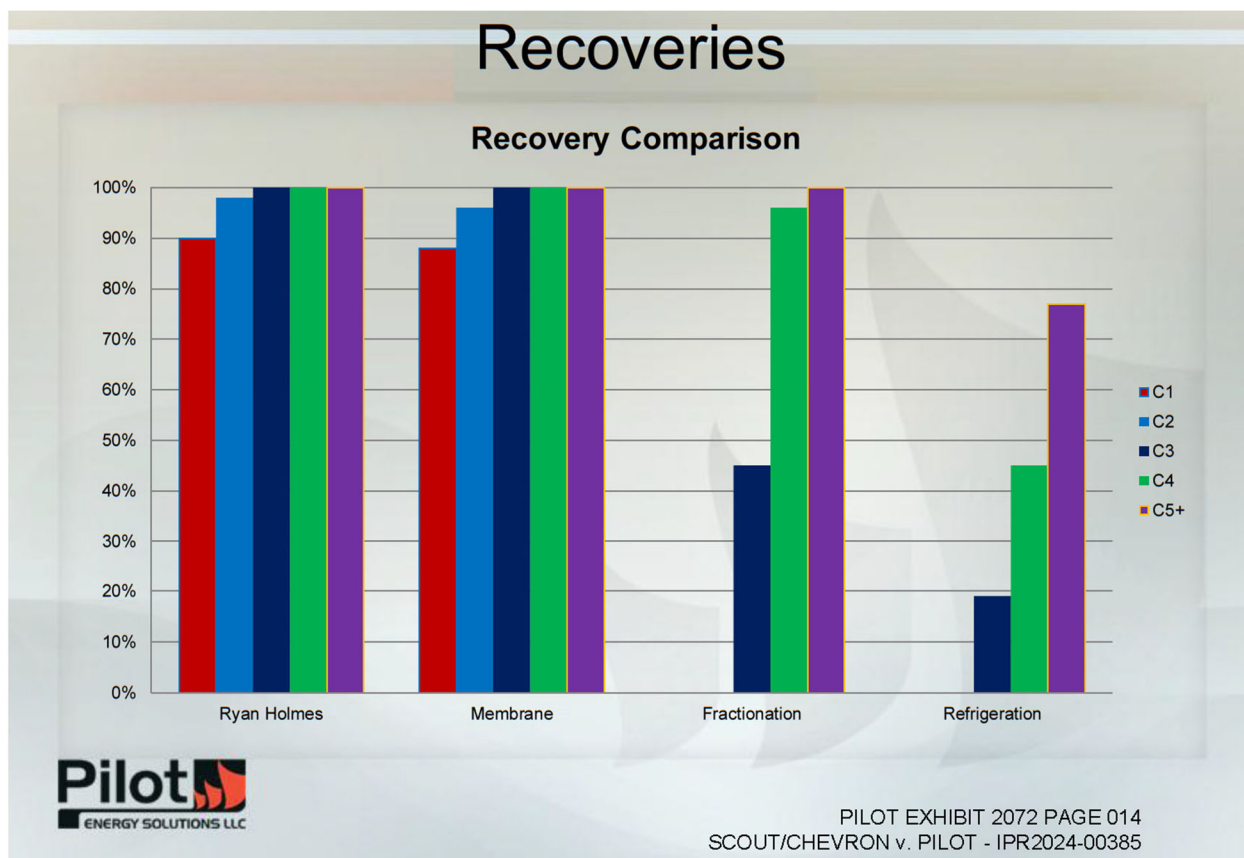
early skepticism from Exxon eventually turned to industry acceptance, adoption, praise, and tremendous commercial success.

4. Unexpected results

Petitioners note that the “unexpected results” that Prim encountered in his early development of the CO2Flex[®] process, which led to Prim proposing a “relatively low propane recovery” to Exxon, is not recited in the Challenged Claims. Pilot concedes that these “unexpected results” are neutral for the Challenged Claims.

5. Industry Acclaim/Praise

Petitioner Chevron’s reservoir engineer in charge of its Pastor Rangely plant expressed praise for Pilot’s CO2Flex[®] process recoveries, as shown on Prim’s PowerPoint presentation (EX2049, 14) (mistakenly marked as EX2072).



Petitioners assert that there is no nexus between the praised “recoveries” of the CO2Flex[®] process and the Challenged Claims. A review of the CO2Flex[®] process (“Fractionation”) recoveries shown in Prim’s “Recovery Comparison” slide confirms the nexus with each of the Challenged Claims, including the Claim 1 disregard for recovery of methane and ethane, the Claim 1 inclusion of C3 propane in the NGL Rich streams, and the Claims 4 and 7 very low upper limits for the percentages of methane and ethane in the NGL Rich streams. The CO2Flex[®] process recoveries presented in the slide show zero recovery of methane and ethane.

And likely the most significant reason for the praise from Chevron’s reservoir engineer, simultaneously expressing his praise for the CO2Flex[®] process that

recovers propane, and frustration with the Pastor Rangely process that forgoes/disregards the recovery of propane, the CO2Flex[®] recoveries in the slide show recovery of propane.

The CO2Flex[®] process recoveries shown in Prim's "Recovery Comparison" slide thereby confirm the nexus between this industry praise and each of the Challenged Claims.

6. Commercial Success

Petitioners do not dispute the fact that Pilot's CO2Flex[®] process has achieved tremendous commercial success. Petitioners instead merely repeat their fundamentally flawed argument that the disregard for recovery of methane and ethane is a feature that does not appear in the Challenged Claims, to assert that there is no nexus between these Claims and the commercial success.

As explained above, the disregarding of methane and ethane is recited in at least four places in independent Claim 1, including the sweet and sour "NGL Rich" streams, defined in the specification to mean that the NGL streams are "rich" in C3-C8, and "relatively lean with respect to methane, ethane, and acid gases." (EX1001, 5:1-2.)

The disregard for recovery of methane and ethane is further recited with specific limits for methane and ethane in dependent Claims 4 and 7 (specifying

particular levels of richness for the NGL Rich streams). Claim 4 limits the amount of methane and ethane in the “sweet NGL rich stream” to “no more than 1 molar percent” each. Claim 7 limits the amount of methane and ethane in the “sour NGL rich stream” to “no more than 1 molar percent methane, and no more than 5 molar percent ethane.”

Petitioners’ assertion that there is no nexus therefore fails. Petitioners’ only other assertion in their Reply regarding commercial success is an argument that there should be a comparison between Ryan/Holmes and MRUs for revenue or profit that would have been expected, and that “[w]ithout such a comparison, it is impossible to judge the extent to which any of the CO2Flex plants can be considered commercially successful compared to the alternative methods.”

The “comparison” Petitioners seek is found at pages 40-41 of Pilot’s Response, where Pilot describes the industry praise Prim received when presenting an introduction of the CO2Flex[®] process to the CO2 flood industry. Pilot described Prim’s EX2049 PowerPoint presentation, including comparisons between the CO2Flex[®] process and alternatives including Ryan/Holmes and MRUs.

In these PowerPoint slides, Prim demonstrates the differences between the four most common NGL recovery schemes. These “Processing Options” included Ryan/Holmes, Membrane/Amine, CO2Flex[®] (Fractionation), and Mechanical Refrigeration. (EX2049, 8-18.) This is the customary way Pilot introduced

CO2Flex® to the industry, specifically distinguishing the ‘332 Patent process from Ryan/Holmes, showing how CO2Flex® is different and better than Ryan/Holmes.

This “comparison” portion of Prim’s presentation begins with a listing of the four Processing Options to be discussed.

Processing Options

- Ryan Holmes – most expensive
- Membrane/Amine – close to most expensive
- Bulk Fractionation (Pilot)– way less expensive
- Refrigeration – least expensive

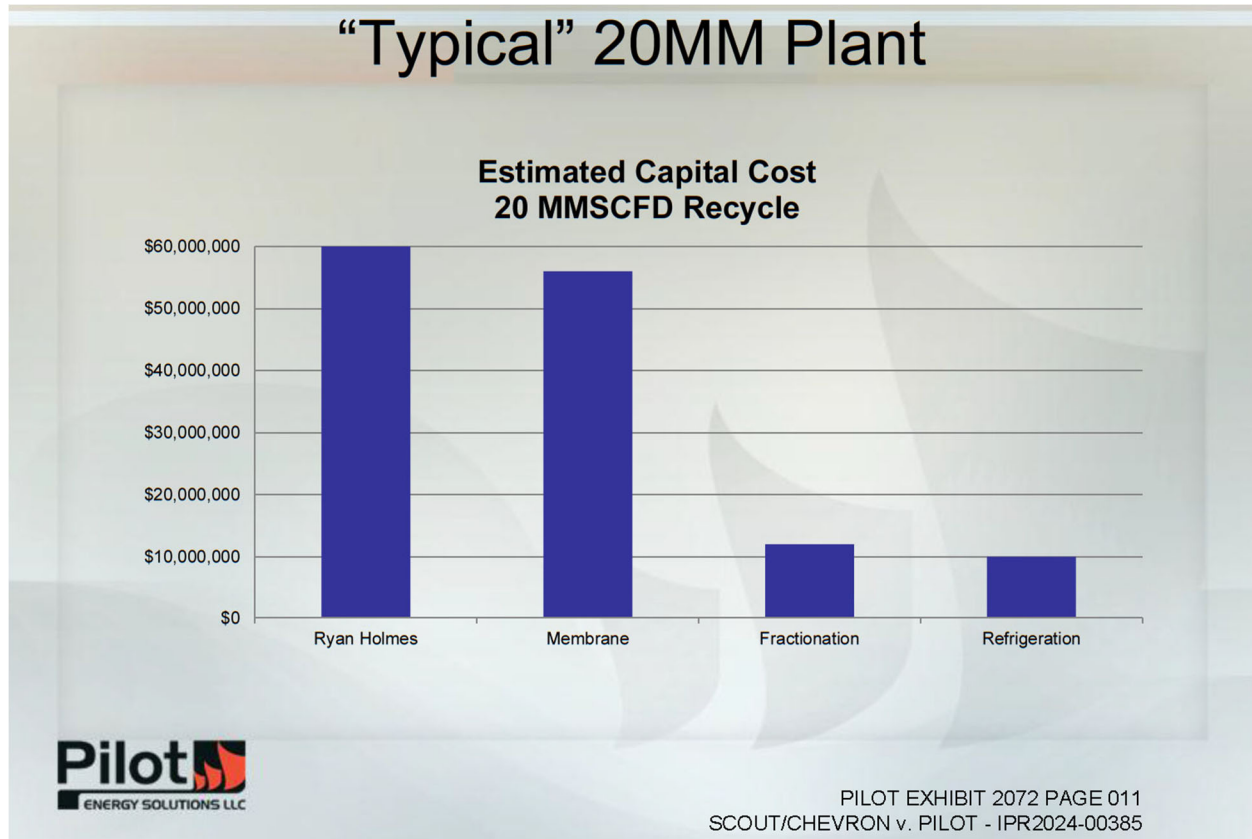
• All are more expensive than conventional gas processing

Pilot
ENERGY SOLUTIONS LLC

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Prim describes Ryan/Holmes as the “most expensive,” CO2Flex® as “way less expensive,” and MRU as the “least expensive.”

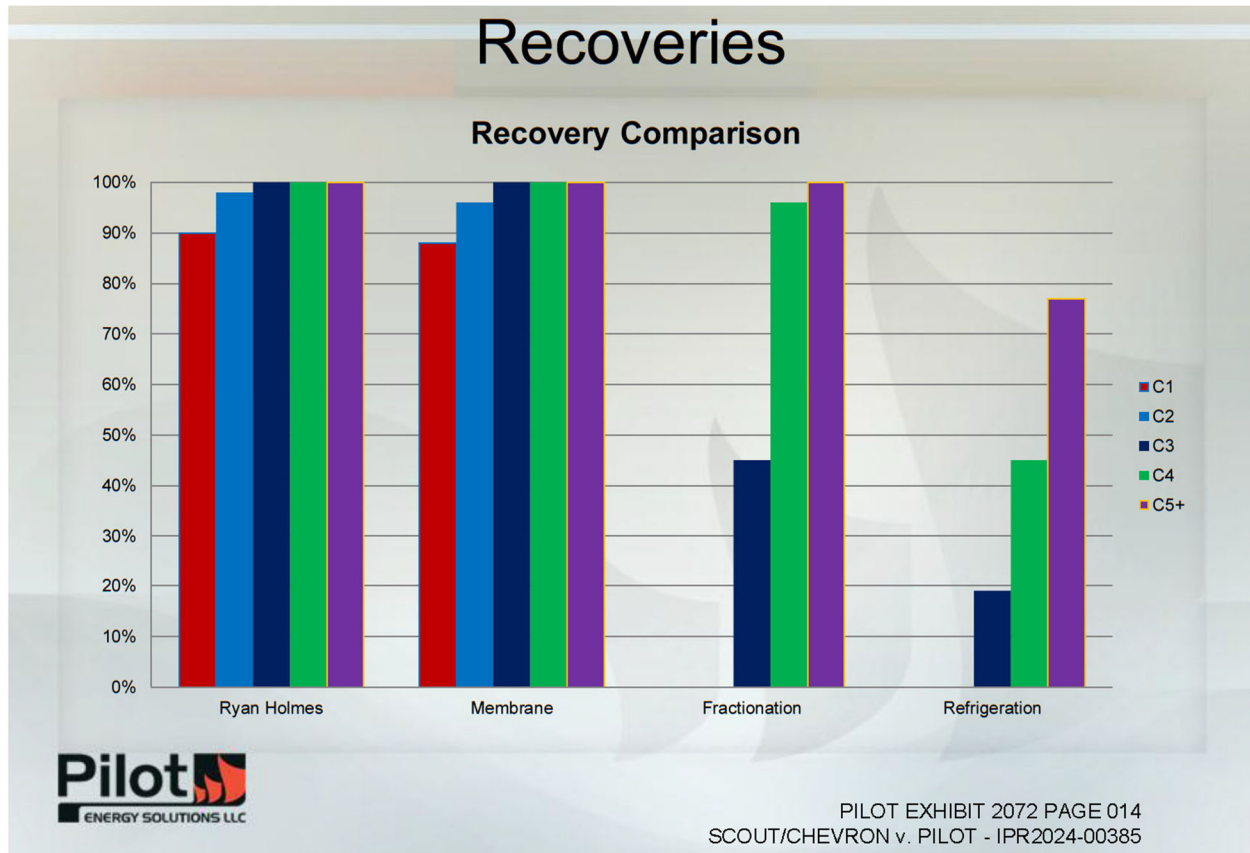
Prim then describes the estimated capital costs for each alternative, with Ryan/Holmes as the highest to build (\$60 million), while CO2Flex® costs way less (\$10 million), slightly more expensive than MRU.



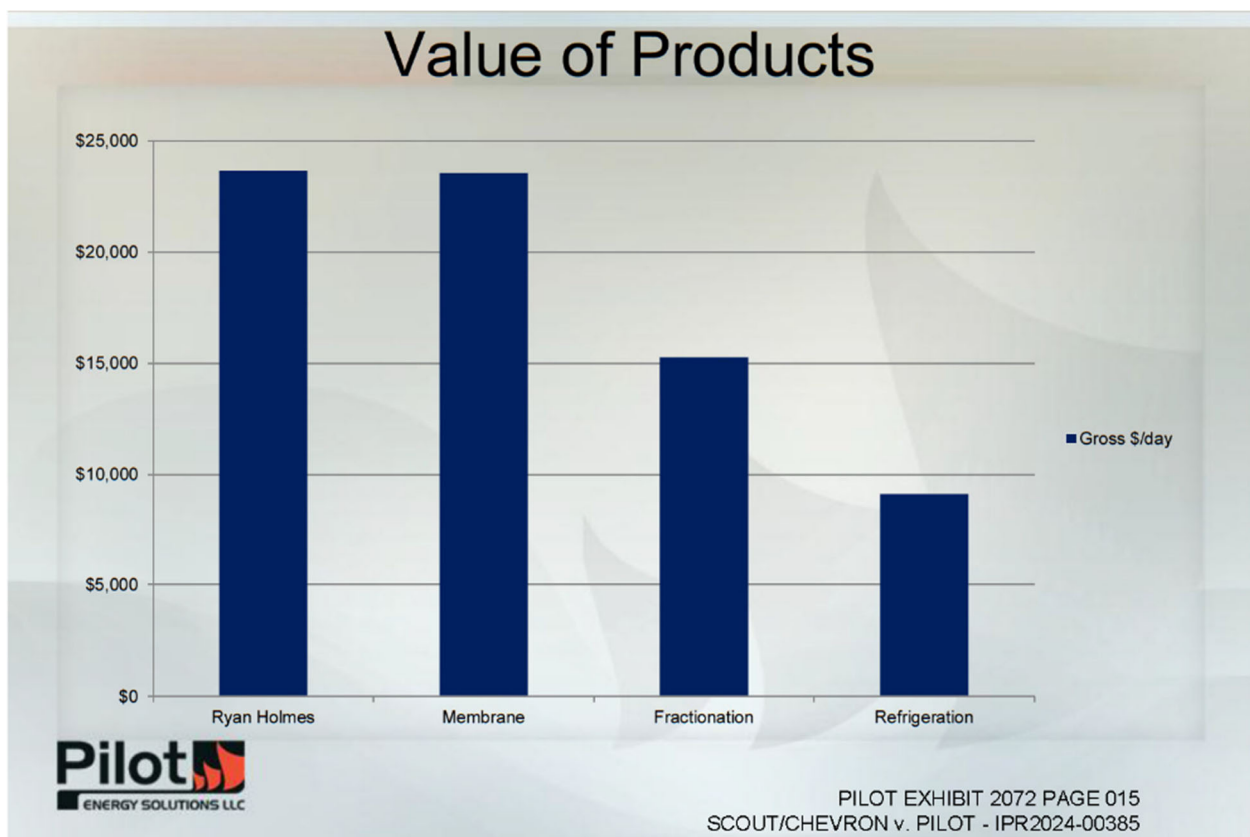
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Prim then describes the differences in recoveries, including Ryan/Holmes' focus on recovering very high levels of methane (90%) and ethane (almost 100%), while CO2Flex[®] disregards the recovery of C1 methane and C2 ethane, limiting its recoveries to C3-C8 NGLs.



Prim then describes the value of the products recovered, with Ryan/Holmes recovering dollars per day of products substantially higher than CO2Flex®, due to Ryan/Holmes’ near complete recovery of methane and ethane, while CO2Flex® disregards the recovery of methane and ethane to allow for a more economical recovery of products, as will be shown in the upcoming “Economic Comparison” slide.



Prim then provides the reasons why CO2Flex[®] disregards the recovery of methane and ethane to provide a more economical alternative. Prim explains that while the methane products Ryan/Holmes recovers can be worth \$600K per year, most/all of that value is consumed to extract it, leaving no payout. And although the ethane Ryan/Holmes recovers is worth more, it's hard to market, and unless one has access to an NGL pipeline, you can't keep it.

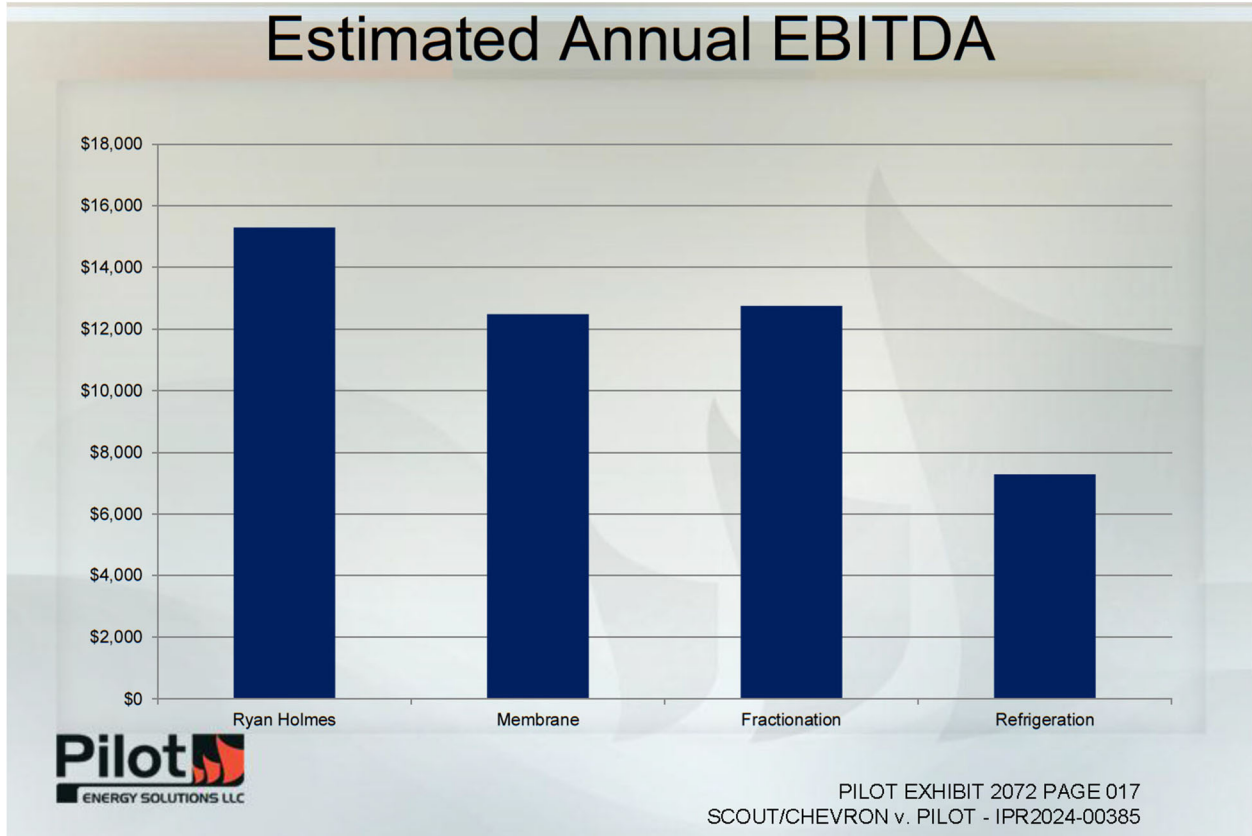
Just Because You Can, Doesn't Mean You Should

- Methane content worth \$600K/Yr, Most/all is consumed to extract. Payout = ∞
- Ethane: Worth more, but hard to market – Unless you have access to an NGL pipeline, you can't keep it.

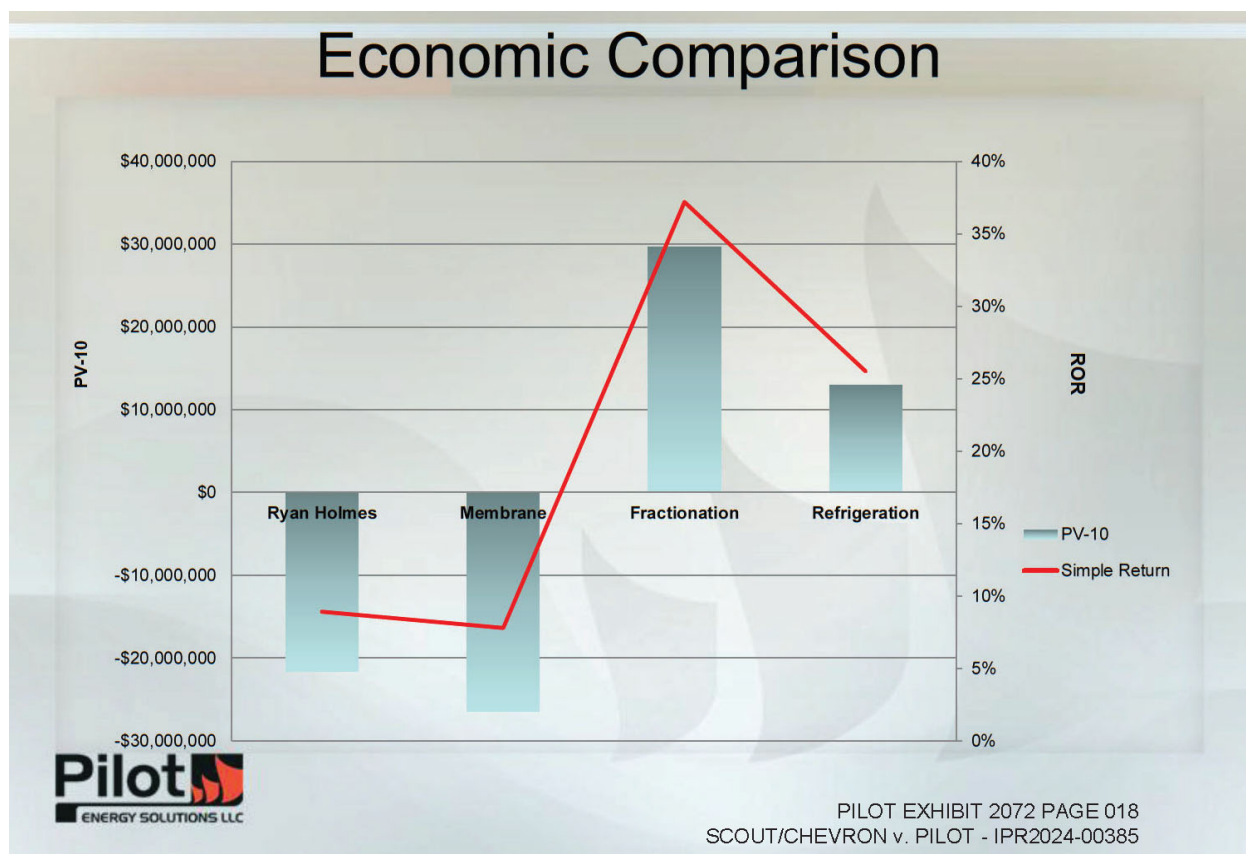


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Prim then describes the estimated annual EBITDA for each alternative, with Ryan/Holmes being the highest.



And finally, Prim provides the resulting economic comparison which demonstrates why CO2Flex[®] is the most economical approach, by disregarding the recovery of methane and ethane, blowing away Ryan/Holmes and its focus on near complete recovery of methane and ethane. The key is in the resulting economics, with Ryan/Holmes in the negative for both PV-10 and ROR, while CO2Flex[®] beats all of the alternatives by far.



This “comparison” Petitioners demand in their Reply makes it clear why CO2Flex[®] has achieved tremendous commercial success, directly resulting from the CO2Flex[®] process disregarding the recovery of methane and ethane as specified in independent Claim 1, and dependent Claims 4 and 7, to provide a more economical

solution compared to the alternatives. In sharp contrast to Ryan/Holmes, for which there were about twelve processing plants built around twenty years before Prim came up with his '332 Patent CO2Flex[®] process, but none built since.

7. Copying

Pilot presented its copying claim based solely on publicly available information. Petitioners continue to refuse to disclose anything further about their Mabee process. Petitioners merely contend that the publicly available information is insufficient to support Pilot's assertion that Chevron copied Pilot's Monell 20 CO2Flex[®] plant.

Petitioners continue to assert that they built a Pastor plant at Mabee just like their Pastor plant in Rangely, and did not copy Pilot's Monell 20 CO2Flex[®] plant. The publicly available information, including documents showing that the Mabee plant recovers propane, and has a sweetener treating the NGLs recovered, confirms that Chevron copied Pilot's Monell 20 CO2Flex[®] plant that recovers propane, and did not operate Mabee as a Pastor plant that forgoes/disregards recovery of propane.

Petitioners first deny that the Pastor process forgoes/disregards recovery of propane. Petitioners point to one sentence from Pastor that refers to monitoring "the recovery of C3/C4," to support a denial of the fact that the overriding purpose of the Pastor process is to forego/disregard recovery of "substantially all" of the propane

in order to re-inject that propane back into the reservoir to address miscibility problems. The Pastor '666 Patent repeatedly emphasizes that “substantially all” of the propane goes out the top of the distillation column to be reinjected into the reservoir, rather than recovered out the bottom of the distillation column to be included in the recovered NGLs. (EX2016, Abstract; 3:55-57; 5:30-32.) The Pastor claims require that the overhead stream of the distillation column for reinjection into the reservoir contain “substantially all” of the propane. (7:12; 7:26-28; 8:45-47.)

Petitioners refuse to disclose the flow rates of the streams at their Mabee facility that would tell us the percentage of propane recovered from the feed stream, but publicly available information (EX2012, Table 1) shows that propane is a significant percentage of the recovered NGLs (6.02% Field, 5.48% Model). Petitioners compare the numbers in the stream tables for Mabee, Monell 20 CO2Flex[®], and Pastor to deceptively assert that the Chevron Mabee “propane recovery is closer to Pastor than CO2Flex.” In raw numbers the 5.48% for Mabee may be closer to the 0.02% for Pastor than to the 29.68% for Monell 20 CO2Flex[®] ($5.48 - 0.02 = 5.46$ and $29.68 - 5.48 = 24.2$). But the true measure of the difference confirms that the propane recovery in the recovered NGLs at Mabee is 250 times closer to Monell 20 CO2Flex[®] than to Pastor ($29.68 / 5.48 = 5.936$, $29.68 / 0.02 = 1,484$, and $1,484 / 5.936 = 250$).

The bottom line is both the Chevron Mabee plant and the Monell 20 CO2Flex® plant recover significant amounts of propane to be included in the recovered NGLs, while the Pastor Rangely plant forgoes/disregards recovery of “substantially all” of the propane, to be re-injected back into the reservoir to address miscibility problems.

Petitioners’ final argument is that the “sulfur cakes” produced by its “Sulfatreat” sweetener at Mabee does not fall within their proposed interpretation of the “acid gas stream” in the ‘332 Patent claims. This is an infringement defense issue to be resolved in federal court, not relevant to the copying issue in this proceeding.

IV. CONCLUSION

Pilot respectfully requests that the Board reject Petitioners’ obviousness challenges and confirm the patentability of all Challenged Claims.

March 21, 2025.

/CRogers/
Charles Rogers
Reg. No. 38,286

CERTIFICATE OF WORD COUNT COMPLIANCE

Pursuant to 37 C.F.R. § 42.24(d), I hereby certify that this Response to Petition complies with the type-volume limitation of 37 C.F.R. § 42.24(c)(4) because it contains 5,594 words (fewer than the limit of 5,600 words), as determined by the word-processing program used to prepare the paper, excluding the parts of the paper exempted by 37 C.F.R. § 42.24(a)(1) (table of contents, table of authorities, mandatory notices under § 42.8, certificate of service, certificate of word count compliance, appendix of exhibits, and claim listing).

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CERTIFICATE OF SERVICE

Pursuant to 37 C.F.R. §§ 42.6(e), I hereby certify that on March 21, 2025 the foregoing *Patent Owner Pilot Intellectual Property, LLC's Sur-Reply* is being served electronically by agreement of the parties, by e-mail to the following counsel of record.

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