

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

DECLARATION OF ERIC PRIM

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TABLE OF EXHIBITS

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, 2001)
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)
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=ChYqEAgBEgoyMDE0LTEwLTA0GABCAggBOgMKATBCAggASg0I_____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.”)
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I. Introduction

1. My name is Eric Prim. I have prepared this Declaration in connection with Patent Owner Pilot Intellectual Property, LLC (“PIP”)’s Response to Scout Energy Management, LLC and Chevron U.S.A. Inc.’s Petition for *Inter Partes* Review of U.S. Patent No. 8,505,332 (the “’332 Patent”) (EX1001), which is to be filed concurrently with this Declaration.

2. I am the inventor of the natural gas liquid recovery process described and claimed in the ‘332 Patent, which is marketed as the CO2Flex[®] process. I am the President of Pilot Energy Solutions, LLC (“Pilot Energy”), and Vice President of Holloman Holdings Corporation (“Holloman”). Holloman is the parent company of both Pilot Energy and the Patent Owner PIP.

3. The purpose of this Declaration is to present the history of the CO2Flex[®] process, from the initial ideas I developed into a working process that is described and claimed in the ‘332 Patent, to the successful commercialization of the process including the building of six gas processing plants that use the process. Four of those six CO2Flex[®] plants are still in operation today. I also present the history of Pilot Energy’s proposals to Petitioner Chevron for the building of a gas processing plant using the CO2Flex[®] process at Chevron’s Mabee gas plant near Midland, Texas, from Pilot’s presentation of proposals and disclosure of the CO2Flex[®]

process, to Chevron's rejection of the proposals, followed by Chevron's copying of the process.

4. In my presentation of the history of the commercialization of the CO2Flex[®] process, I show how Pilot Energy marketed its innovative process to the gas processing industry as distinctly different from and better than the Ryan Holmes process that is the prior art on which Petitioners rely for each of the grounds in their Petition asserting obviousness challenges to the '332 Patent.

II. Educational and Professional Background

5. I received a Bachelor of Science in Chemical Engineering from the University of Texas at Austin in 1982, and a Master of Business Administration (Business/Finance) from Amberton University in 1987.

6. I am a licensed Professional Engineer, licensed by The Texas Board of Professional Engineers since 1988.

7. From 1987 to 1997 I was employed by Rexene Corporation as their Technical Manager, responsible for Olefins operations, in Odessa, Texas.

8. I joined Holloman Corporation in 1997, and have served in various positions in Engineering, Construction Management, and Executive Management with Holloman. I currently serve as Senior Vice President of Holloman Corporation and Holloman Holdings Corporation. I have served as the President of Pilot Energy

since its formation as a subsidiary of Holloman in 2008 to commercialize the CO2Flex[®] process set forth in the '332 Patent.

9. In addition to the '332 Patent, I am an inventor on more than forty other patents associated with natural gas and CO2 processing.

III. Conception and Development of the CO2Flex[®] Process

10. The initial ideas that ultimately led to the development, patenting, and commercialization of the CO2Flex[®] process dates back to the year 2001 when I was running Holloman's Facility Construction division in Odessa, Texas. I was working on a compressor build project at Exxon's Means San Andres Unit in Andrews County, Texas, just north of Midland/Odessa.

11. The Exxon Means San Andres Unit uses CO2 gas injection to extract oil from the reservoir, referred to as a CO2 flood. They were not processing the produced CO2 gas to recover hydrocarbons such as natural gas liquids, but instead were re-injecting the natural gas liquids, along with the gas produced from the well, back into the reservoir. EX2041:1. The process of re-injecting the produced gas requires compressors to compress the produced gas, mostly CO2, in preparation for re-injecting the gas back into the reservoir to extract more oil.

12. I was running Holloman's Plant/Facilities Construction division that was building compressors used for this reinjection process. Holloman Construction

had been hired by Exxon to build a compressor system at their Means field. Because I oversaw the Plant/Facilities Construction division, I was on site periodically during the construction phase of the project. I was also on site during the startup of the new compressor system.

13. I was on location at the Exxon Means facility watching a compressor startup when I noticed a significant amount of fluids accumulating in the interstage scrubbers between the multiple stages of compression. Each stage of compression consists of a unit that raises the pressure, a unit that cools the higher-pressure gas, and a scrubber that catches the liquids that are formed as a result of raising the pressure and lowering the temperature. The scrubbers have a sight glass that allows one to observe the color, clarity, and accumulation of water or other fluids that have been condensed between stages of compression.

14. When I observed what I thought was water accumulating in the scrubbers I cracked open the valve to get a sample of the liquid. Unexpectedly, to my surprise, what I had thought was only water turned out to also include hydrocarbons, which I could smell from the sample. This surprised me because the compressed gas was almost 90% CO₂. Also, I noticed that the sample contained two phases, a water phase and a hydrocarbon phase.

15. I asked my counterpart at Exxon to provide me with a sample of the inlet gas, which once again to my surprise showed a lot of hydrocarbons, including

lots of natural gas liquids that could be very valuable if one could develop a way to economically recover them from the stream, rather than just reinjecting them back into the reservoir as Exxon was doing. After observing this phenomenon, I decided to spend the energy to try to develop a cost-effective way to remove hydrocarbon liquids from these high CO₂ fields. Exxon was gracious enough to provide me with a compositional analysis of the CO₂ recycle stream. Also, I had access to a Hyprotech process simulation program, called "HYSYS."

16. At this time, in the high CO₂ gas processing industry the most common processes available were a Mechanical Refrigeration Unit ("MRU"), and the Ryan/Holmes process. In fact, there was a Ryan/Holmes facility a few miles down the road from that Exxon Means facility that sparked the ideas which led my invention.

17. While the MRU is a relatively simple process, and relatively inexpensive to build, the recovery of natural gas liquids is relatively low. On the other hand, the Ryan/Holmes process provides for very high recoveries of natural gas liquids, but is very expensive to build. My plan was to develop a process that falls in between those two processes, to provide a higher level of recovery than the MRU, although more expensive to build, but much less expensive than the Ryan/Holmes process, although providing lower levels of recovery of the natural gas liquids than Ryan/Holmes.

18. I then set about to find a way to recover the natural gas liquids that I observed accumulating in the scrubbers between the compression stages at the Exxon Means facility, including using chemical process simulation software (“HYSYS”) to thermodynamically model the chemical processes for recovering the natural gas liquids.

19. Armed with the compositional analysis, a process simulator, and P/V/T data from the Exxon Means field, I set out to develop a new process to recover the hydrocarbons contained in this stream. After working on the problem for approximately a month I came up with the first iteration of what ultimately became the CO2Flex[®] process.

20. I started first investigating the use of an MRU process, attempting to develop a more efficient version than currently available. I was not able to accomplish that goal, so moved on to a second alternative using a JT expander as a refrigeration method. I even investigated the use of turbo expanders, which proved impossible because of the CO2 freezing problem at normal expander outlet temperatures.

21. My fourth alternative was to use a distillation process to recover the natural gas liquids, throwing out refrigeration as the primary method for the recovery process, and limiting refrigeration in the process to the reflux step in the distillation process. This distillation process uses refrigeration only for the reflux, rather than

using refrigeration to chill the gas as in the MRU, JT expander, or turbo expander alternatives that I rejected.

22. My final alternative process was to continue with the distillation process choice, and to focus on optimizing the distillation column size and the energy requirements, at which point I figured out, unexpectedly, that the most economical and optimum configuration of the process appeared to be to limit the amount of recovery of propane. Modeling of the process I was developing showed that small increases in the propane recovery rate could result in major increases in the capital costs and energy requirements to build the process and operate the process.

23. Now that I had a basic concept of how the invention would work, I was still a long way from finalizing the technology. Even though I had verified the thermodynamic calculations, I needed to build a demonstration unit to prove the concept, and further develop the technology. This demonstration work was necessary because streams that have high CO₂ concentrations “misbehave” thermodynamically and standard correlations can be unpredictable. I worked with Exxon to try to develop a structure where we could build a demonstration plant, but understandably, Exxon did not have any desire to associate themselves with a new, untested technology.

24. Attached as Exhibits 2030 through 2041 are documents that I found in my Exxon “Means” folders at my office. These documents date back to the years 2001 through 2003, the time period in which I developed the initial ideas that ultimately led to the development of a working process that is described and claimed in the ‘332 Patent, and successfully commercialized as the CO2Flex® process.

25. Exhibits 2030-34, 2036-40, 2042-46 are documents that I created, or were created by my staff and colleagues on my behalf. These records were made and kept as part of the Holloman business’s regular course of operation. These records were created at or near the time of the events at issue in the documents. And, these records were created by someone who had personal knowledge of the event or from information provided by someone with knowledge.

26. Exhibit 2072 is the Financials spreadsheet exhibit that includes financial calculations based on records from Holloman/Pilot’s business records, are documents that I created, or were created by my staff and colleagues on my behalf. These records were made and kept as part of the Holloman/Pilot business’s regular course of operation. These records were created at or near the time of the events at issue in the documents. And, these records were created by someone who had personal knowledge of the event or from information provided by someone with knowledge.

A. MMSCFD = “Million Standard Cubic Feet per Day”

27. In the gas processing industry, we often describe plants based on their inlet capacity. Inlet capacity is defined as the volume of recycle CO₂ gas that is available at the inlet of the plant. This volume is usually expressed as MMSCFD which is an acronym for Million Standard Cubic Feet per Day. This designation is important because the use of “standard” conditions makes the measurement units independent of temperature and pressure. For example, what we would refer to as a 50 refrig plant is in actuality a Mechanical Refrigeration Plant that is capable of processing an inlet feed rate of 50MMSCFD. Another example would be a 100 cryo. This is an expander plant that is capable of processing 100MMSCFD. We adopt this convention with our plants. For example, when we talk about the Monell 20 plant it is a CO₂Flex[®] plant that is capable of processing 20MMSCFD of feed gas. The larger plant that replaced this plant is referred to as the Monell 120. This is a CO₂Flex[®] plant in the same location that is capable of processing 120MMSCFD. A few years ago, this plant was expanded and is now referred to as the Monell 160 plant. This final description means that the plant at the Monell location can now process 160MMSCFD of inlet feed gas. This convention is what we use when we refer to the other plants. Specifically, these plants are: 1) Goldsmith 30; 2) Wellman 60; 3) Monell 160; and 4) Weyburn 12.

B. Exxon Means Proposals for “Proof of Concept” Plant – 2002-2003

28. Once I got to the point that I had come up with a process which I had a reasonable level of confidence could work, based on my computer modeling, I then presented proposals to Exxon to build a “proof of concept” plant for processing the gas at their Means facility, the same place which had sparked my idea from the beginning. As discussed above, this proof of concept plant was a necessary step because the thermodynamic property predictors were notoriously inaccurate when the streams contained high levels of CO₂. I presented various proposals to Exxon in December of 2002, through July of 2003. EX2037 (December 17, 2002); EX2039 (January 30, 2003); EX2040 (March 27, 2003); EX2043 (July 21, 2003).

29. At this time, I was also presenting proposals to Exxon for Holloman to operate all of the Exxon Means gas reinjection facility, in addition to proposals for building and operating a “proof of concept” plant within that facility for the NGL recovery process that I was developing. EX2038.

30. In addition to the Exxon Means proposals dating from December 2002 to July 2003, which were found in the Exxon “Means” files at my office, these records also refer to two earlier Exxon Means proposals, which although were not found in my files, are still significant to note. The July 21, 2003 proposal describes the history of the proposals, reflecting the continued improvements in my

development of the process, including some “unexpected results” encountered along the way. EX2043.

31. The July 21, 2003 proposal states as follows:

Over the past two years, the Means processing proposal has undergone many modifications. The original plant was intended to be a high recovery 60MMSCFD plant that was estimated to cost \$12MM to \$15MM. Next the plant size was reduced to 25 MMSCFD, also with high propane recovery. The 25MM option was estimated to cost around \$5MM. The current case is designed for 60MMSCFD with low (25%) propane recovery and is estimated to cost around \$7MM. The advantage of this case is that it will provide higher recovery at lower gas flows, but will still operate with gas flow rates as high as 50MM of 60MM.

EX2043 (emphasis added).

32. This passage is referring to the first two proposals (not found in my files), in which the original plant, and the modified plant design, both were intended to recover a high amount of propane. The plan then shifted with modifications (improvements) to “low (25%) propane recovery.” This improvement was referred to in two of the proposals, on December 17, 2002 (EX2037) and March 27, 2003 (EX2040), which state as follows:

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.

(emphasis added).

33. This description of the development of the process shows that I was continuing to develop my ideas into what I had hoped would be a working process, and that in that development discovered “unexpected results.”

34. Despite my best efforts to convince Exxon to join with me and Holloman to build my proposed “proof of concept” gas processing plant, Exxon was skeptical of the proposed process and rejected my proposals. My last attempt to work with Exxon on the Means NGL recovery plant was in February of 2023. At this time, Exxon was still not processing the reinjection gas stream at the Means field. To this day, it is my understanding that Exxon is continuing to re-inject the produced hydrocarbon gas along with the produced and purchased CO₂ at its Means field facility, with no processing of the produced gas to recover natural gas liquids.

C. Monell 20 “Proof of Concept” Plant - 2008

35. I was fortunate to find another candidate for the technology at the Anadarko Monell field in Sweetwater County, Wyoming. After failing to convince Exxon to join with me to build a “proof of concept” plant for my natural gas liquids recovery process, by June of 2006 we were able to reach a joint venture agreement with Anadarko Petroleum to build a “proof of concept” natural gas liquids recovery plant at Anadarko’s Monell Unit.

36. Anadarko agreed to allow the demonstration plant to be built on their Monell CO2 flood, and Holloman paid for a 7.5% interest in the plant. This plant was small by today's standards with an inlet flow rate of only 20MMSCFD. However, this was large enough for us to prove that the basic design was functional, make modifications to the process design, and file the provisional and nonprovisional application that issued as the '332 Patent.

37. For this project there were three parties willing to participate in the project. Anadarko took a 50% stake, Marlin Midstream (then DBA URS Field services), for a 42.5% stake, and Holloman for a 7.5% stake. Anadarko was in the early stages of developing their CO2 flood and could understand the value of processing the recycle stream for additional revenue. This was a very big risk because a plant of this nature had never been built before. We, the before mentioned JV, worked with Interstate Treating in Odessa Texas to source the major equipment. Because this a demonstration plant, the first of its kind, we decided to use used/surplus equipment to minimize the cost. Interstate Treating was/is a major supplier of surplus equipment. They also have the ability to refurbish and skid mount the equipment which minimized construction costs. The JV also employed Elk Horn construction to install the plant skids along with the associated interconnecting piping. Various subcontractors were also employed to construct the process buildings, design/install the control system, and the electrical system.

38. This plant was completed in the Fall of 2007. In October of 2007 the plant produced its first product. Over the next several months, several modifications were made to the control system to improve reliability, but the general configuration of the plant equipment proved that it could work as described in the provisional patent application that we had filed in May of 2007. Therefore, the nonprovisional application that issued as the '332 Patent was filed in May of 2008 to secure the intellectual property.

39. The plant cost approximately \$7,000,000 to build and produced approximately \$16,000,000 in revenue over the next four years from sale of the Natural Gas Liquids recovered by the process. Thus proving the economic viability of the '332 Patent process. Eventually, after several years of operation, Anadarko bought out the JV and henceforth operated the plant on a 100% basis as its sole owner. The fact that Anadarko purchased the plant from the other JV owners is also a statement of the operational and financial viability of the project.

40. The financial calculations at Page 3 of Exhibit 2072 show the basis for my estimate that the Monell 20 CO2Flex[®] Plant generated over \$16 million in revenue, and approximately \$15 million in operating profits, over its four years of operation, recovering approximately 250,000 barrels of hydrocarbons from the CO2 gas, which otherwise would have been reinjected back into the reservoir along with the CO2 gas.



D. Mentone “Mini Plant” - 2011

41. The next CO2Flex[®] plant that we built was Mentone, in 2011. This plant was built on a single compressor that was operated by Great Western Drilling Company and was sized for 1MMSCFD. The plant was built to try to determine whether an ultra-small plant could be built in an economic manner. The plant also needed to prove that unattended operation was possible. The plant utilized some used equipment that was inappropriate for west Texas operations. Also, the Great Western Compressor was very unreliable, and usually went down every day. All of

these issues, unreliable feed stream, improper equipment, and control issues, contributed to the fact that the plant never ran for more than a few hours at a time. Eventually, we dismantled the plant and moved it to Odessa where the equipment is stored at a local Holloman field office. I don't think the plant ever produced any revenue. It was truly an experiment. We learned that the plant could not be operated in an unattended manner. We also learned that the small size made the plant very hard to control. It is possible that we will try the plant again at a different location, but not very likely.



IV. Commercialization of the CO2Flex® Process

42. Pilot introduced its '332 Patent process (CO2Flex®) technology to the CO2 flood industry through presentations at industry conferences, and articles published in industry journals. We have presented the technology at several conferences. This is an important part of our outreach because most people in the CO2 flood industry simply don't know the technology exists. They usually only know about Ryan/Holmes, Membrane amine systems, and mechanical refrigeration plants. These presentations all endeavor to explain that there is a middle ground between the expensive Ryan/Holmes and Membrane amine systems, and low recovery Mechanical Refrigeration systems. A few of these presentations are included as Exhibits with this Declaration.

43. Exhibit 2049 is the PowerPoint presentation that I presented in July 2012 at the 6th Annual Wyoming CO2 Conference in Casper, Wyoming. In these PowerPoint slides, I demonstrate the differences between the four most common NGL recovery schemes. These Recovery options included Ryan/Holmes, Membrane/Amine, the '332 Patent process (CO2Flex®), and Refrigeration. (EX2049 at 11-18.) This is the customary way that we introduced the CO2Flex® process to the industry, specifically distinguishing the '332 Patent process from the Ryan/Holmes process, showing how CO2Flex® is different and better than the Ryan/Holmes process.

44. Exhibit 2048 is a similar PowerPoint presentation that I presented the prior year (December 2011) at the Midland CO2 Conference. Pages 25-33 of Exhibit 2048 is the part of the presentation where I specifically distinguished the '332 Patent CO2Flex[®] process from the Ryan/Holmes process, demonstrating how the CO2Flex[®] process is different and better than Ryan/Holmes.

45. Exhibit 2051 is a Pilot article published in the American Oil & Gas Reporter (February 2013), introducing the '332 Patent CO2Flex[®] process to the industry, once again describing the differences between the '332 Patent CO2Flex[®] process and the Ryan/Holmes process, demonstrating how the CO2Flex[®] process is different and better than the Ryan/Holmes process. (EX2051 at 3, column 2.)

46. At the July 2012 Wyoming CO2 Conference, where I presented the Exhibit 2049 presentation, Chevron was also presenting a case history of their Rangely Weber Sand Unit. Exhibit 2050 is the PowerPoint presentation that Chevron reservoir engineer Rory Clark presented at the Conference, describing the history of Chevron's Rangely, Colorado facility.

47. After I had finished my presentation on NGL recovery, the Chevron presenter, Rory Clark came up to me to talk about our presentation. He made the statement: "wow, I sure wish we could get your recoveries at our Rangely NGL plant." As Chevron has stated, the Rangely facility utilizes the Pastor '666 Patent process, U.S. Patent No. 4,753,666 (EX2016.). According to the Pastor '666 Patent,

this process recovers no propane, 20% of the I-C4, 55% of the N-C4 and essentially all of the C5+. In contrast, the '332 Patent process typically recovers around 25% of the propane, 70% of the I-C4, 90% of the N-C4, and essentially all of the C5+. Therefore, to Chevron's point, the differences in recovery are substantial and impressive.

48. In reviewing the Pastor patent (a year later in 2013), it was clear to me that the main focus of the technology was to attempt to moderate MMP, (Minimum Miscibility Pressure), while extracting some NGLs. I am not a reservoir expert, but I do know that compounds that are more volatile than CO₂ generally increase MMP while compounds that are less volatile generally lower MMP. For example, nitrogen (N₂) and methane (C₁) raise MMP, CO₂ and ethane (C₂) are neutral, and propane (C₃) and heavier compounds (C₄+) lower MMP.

49. Essentially MMP is the pressure that the CO₂ injection stream needs to be compressed to in order to obtain miscibility in the reservoir. At this pressure, the oil "dissolves" into the CO₂ stream so that it can be transported to the surface. Even though the Pastor patent was fixated on MMP, the '332 Patent process didn't think it was a concern.

50. The '332 Patent is focused on economic extraction of products. In a typical '332 process, the volume of the extracted products is only between 1% and 2% of the inlet stream. Because 98% to 99% of the stream remains intact, I assumed

that effect on MMP would be small. In our current facilities, we have never heard any concerns about changes in MMP due to our extraction of C3+ NGL's.

51. In our marketing efforts we have offered many different terms and deal structures in an effort to deploy additional plants. We have offered to license the technology. We have offered to participate in "joint ventures" such as the one we participated in on the original Monell plant. In the "joint venture" structure, each party pays their proportionate share of the capital to build the plant. Then after the plant is built each party pays their proportionate share of the operating cost. Finally, each party splits the revenue stream according to their share position in the "joint venture."

52. Another structure that we have participated in is a special purpose vehicle JV. This is the structure of the Weyburn plant (discussed below), where our original counter party was Cenovus. In this structure we formed a JV where we participated at the 35% level and Cenovus participated at the 65% level. We paid for the plant based on our percentages in the JV. When the plant was started up, we charged the operator a fixed fee based on the inlet flow and the final capital cost of the project. This plant is still operational and Pilot gets a fee every month from the operation of the plant.

53. A third commercial arrangement is called a "percent of proceeds" arrangement. In this arrangement Pilot pays for 100% of the plant installation and

then gives the producer a certain percentage of the products. This arrangement is by far the most common arrangement in the gas processing industry. This is our commercial arrangement for both the Goldsmith plant and also the Monell 120/160 plant (discussed below). This works because usually, (but not always), the economics of the plants are so good that we don't need to keep all of the revenue to have a good rate of return.

54. A fourth type of arrangement is a simple fee. In the simple fee structure the processor charges a fee based on the inlet flow (\$/MCF) or based on the products (\$/BBL). This is done when the processor doesn't want to assume the reservoir risks or the commodity risk of oil and NGL price fluctuations. Our Wellman plant (discussed below) is on a fee structure where Pilot receives a fee based on the volume of inlet flow to the plant. The producer gets all of the products and takes the commodity and reservoir risks.

55. Today, when we are marketing the technology we offer all five types of commercial arrangements. To reiterate, these are: 1) Technology License; 2) JV; 3) Special Purpose Vehicle; 4) Percent of Proceeds; and 5) Simple Fee.

A. Goldsmith - Golden Hammer - 2012

56. The Goldsmith plant was the first viable plant that was 100% funded by Pilot. The plant was designed to process the CO₂ recycle stream from the

Goldsmith CO2 flood that was operated by Legado Resources. The plant was designed to process 30 MMSCFD of CO2 recycle gas.

57. The arrangement with Legado was that Pilot Energy Solutions would build, own, and operate the plant. Legado would provide the CO2 gas stream at approximately 600 psi of pressure. Pilot would process the gas, recover the high value C4+ compounds, along with an optimum amount of propane. After processing the gas, Pilot would redeliver the gas to the Legado facility at approximately 15 psi lower pressure, approximately 20 degrees lower temperature, approximately 1% lower volume and with a very low water content of approximately 5 pounds per MMSCF.

58. The commercial arrangement between Pilot and Legado was negotiated where Pilot would pay for all of the capital and construction cost in return for 65% of the value of the plant products. Legado would receive 35% of the plant products. This agreement was executed in December of 2010 and the facility is still in operation today. Pilot sold a 70% ownership in this project to Ceritas Energy in December of 2012 and repurchased the interest in January of 2019. Today, Pilot Energy Solutions operates the plant as a 100% owner.

59. The financial records shown on pages 4-11 of Exhibit 2072 show the revenue, operating expenses, and operating profits for the Goldsmith CO2Flex[®] plant from 2013 to 2023. The projections for future revenue at page 2 of Exhibit

2072 are based on an estimated ten years of remaining life for the reservoir\, with an expected 5% annual decline. These numbers show that the Goldsmith CO2Flex[®] plant through the end of 2023 had produced approximately \$58 million in revenue, and \$38 million in operating profits, with an expected future revenue of approximately \$35 million, and \$24 million in operating profits, through the expected remaining life of the reservoir. (EX2072 at 1.) The cost to install this plant was \$22MM.



B. Weyburn - 2013

60. While at the Midland CO2 Conference in 2010, a representative from Cenovus Energy, Calgary AB, discovered that Pilot was building an NGL recovery plant at Goldsmith. At this same time Cenovus was investigating NGL recovery for their CO2 flood, located just south of Weyburn, Saskatchewan, Canada. They had hired DPH engineers in Calgary to help investigate NGL recovery options at Weyburn. DPH first proposed the Ryan/Holmes process as a solution. Cenovus discarded this option because of the exorbitantly high cost, but also because the Ryan/Holmes process recovers large amounts of ethane. Since there are no ethane markets in Saskatchewan, this option was rejected. They then investigated a refrigeration plant. Cenovus liked the fact that cost was reasonable, but did not like the fact that the NGL recovery from the refrigeration process was not very high. Cenovus asked DPH if there were any other options besides Ryan/Holmes and refrigeration. DPH investigated this, and reported back to Cenovus that there were no other options for this high CO2 gas stream.

61. When Cenovus learned about the existence of the '332 Patent process at the Midland CO2 Conference, they immediately asked DPH to analyze this new process and determine whether the recovery claims were true. DPH quickly confirmed that the '332 Patent was capable of recovering much higher levels of propane and heavier NGLs, and was only slightly more expensive than a

refrigeration process. They also determined that the '332 Patent process was only a small fraction of the cost of the Ryan/Holmes process. Pilot Energy Solutions quickly executed an agreement with Cenovus for the new NGL recovery plant in Weyburn. This plant began operations in 2013 and continues to operate to this day.

62. The financial records shown on pages 12-13 of Exhibit 2072 show the revenue, operating expenses, and operating profits for the Weyburn CO2Flex[®] plant from 2013 to 2023. The projections for future revenue at page 2 of Exhibit 2072 are based on an estimated twenty years of remaining life for the reservoir, with an expected 1% annual decline. These numbers show that the Weyburn CO2Flex[®] plant through the end of 2023 had produced approximately \$125 million in revenue, and \$103 million in operating profits, with an expected future revenue of approximately \$228 million, and \$157 million in operating profits, through the expected remaining life of the reservoir. (EX2072 at 1.) The cost to install this plant was \$46MM CAD.



C. Wellman - 2015

63. In December of 2012 Ceritas acquired a 70% interest in the Goldsmith plant along with the right to participate in future plant projects at the 70% level. After this agreement was reached Pilot and Ceritas did business together as a joint venture called Pilot Ceritas. Our first project as a JV was a 60MM/day plant in Wellman, Texas. The original contract was a POL that was converted to a fee-based contract in 2022. Our producer counter-party for this project was Trinity

Exploration. This plant was built, owned, and operated by the Pilot Ceritas JV in 2015. In January of 2019, Pilot purchased the Ceritas piece of the JV and operates the plant today as a 100% owner.

64. The financial records shown on pages 14-21 of Exhibit 2072 show the revenue, operating expenses, and operating profits for the Wellman CO2Flex[®] plant from 2014 to 2023. The projections for future revenue at page 2 of Exhibit 2072 are based on an estimated five years of remaining life for the reservoir, with an expected 5% annual decline. These numbers show that the Wellman CO2Flex[®] plant through the end of 2023 had produced approximately \$51 million in revenue, and \$32 million in operating profits, with an expected future revenue of approximately \$29 million, and \$20 million in operating profits, through the expected remaining life of the reservoir. (EX2072 at 1.) The cost to install this plant was \$33MM.



D. Monell 120/160 - 2016

65. In 2016 the Pilot Ceritas JV contracted with Anadarko Petroleum to process additional high CO₂ gas from their Monell field. This plant was designed for a throughput of 120 MMSCFD which is six times the capacity of the original demonstration plant. This plant was contracted on a POL basis and is still operating under this contract today. Pilot purchased the Ceritas interest in this plant in January 2019 and continues to operate this plant as a 100% owner. It is noteworthy that the plant was expanded to be able to process 160 MMSCFD in 2021.

66. The financial records shown on pages 22-29 of Exhibit 2072 show the revenue, operating expenses, and operating profits for the Monell 120/160 CO2Flex[®] plant from 2015 to 2023. The projections for future revenue at page 2 of Exhibit 2072 are based on an estimated twenty years of remaining life for the reservoir, with an expected 5% annual decline. These numbers show that the Monell CO2Flex[®] plant through the end of 2023 had produced approximately \$82 million in revenue, and \$58 million in operating profits, with an expected future revenue of approximately \$135 million, and \$93 million in operating profits, through the expected remaining life of the reservoir. (EX2072 at 1.) The cost of the original 120MM plant was \$45MM and the expansion project to increase the capacity to 160MM was an additional \$5MM.



V. Charts Demonstrating One-to-One Correspondence between Challenged ‘332 Patent Claims 1-4, 6-7 and Each of the Five CO2Flex[®] Plants Confirm that the CO2Flex[®] Plants are “Coextensive” (Essentially the Claimed Invention)

67. The Totals at page one of the financial records Exhibit 2072 confirm that the five CO2Flex[®] Plants had produced a total combined revenue of over \$330 million, and over \$245 million in operating profits, through the end of 2023. For the four plants still in operation today, the total annual revenue for 2023 was approximately \$23 million, and around \$16 million in operating profits. Based on the expected remaining life of the reservoirs for these four plants continuing to operate, projections estimate an additional \$427 million in combined revenue.

68. The Totals at page one of the financial records Exhibit 2072 also confirm that the five CO2Flex[®] Plants had recovered a combined total of approximately 7 million barrels of hydrocarbons through the end of 2023, which otherwise would have been re-injected back into the reservoir with the CO2 gas. For the four plants still in operation today, the total annual recovery for 2023 was approximately 270 thousand barrels of hydrocarbons, which otherwise would be re-injected back into the reservoir.

69. Exhibits 2053 (Monell 20), 2057 (Goldsmith), 2061 (Weyburn), 2064 (Wellman), and 2069 (Monell 120) are charts demonstrating one-to-one correspondence between the Challenged '332 Patent Claims 1-4, 6-7 and each of the five CO2Flex[®] plants, which confirm that the CO2Flex[®] plants are “coextensive” (essentially the claimed invention).

70. Exhibit 2052 is a summary of those charts, demonstrating the near perfect correspondence between each of the elements of the patent claims and the five CO2Flex[®] plants, with a relatively small number of exceptions for a few of the claim elements and some of the CO2Flex[®] plants, which are:

- i) One of the five CO2Flex[®] plants (Weyburn) does not use solvents for dehydrating the CO2 recycle stream as recited in Claim 2 [2.2]. Weyburn uses a regenerative scrubber and molecular sieves for the dehydration step, which are not solvents.
- ii) One of the five CO2Flex[®] plants (Wellman) does not use an Inlet Heat Exchanger as recited in Claim 3. And Monell 120 did not use an Inlet Heat Exchanger until the plant was expanded to be able to process 160 MMSCFD

in 2021 (expansion from Monell 120 to Monell 160), at which time an Inlet Heat Exchanger was installed.

- iii) One of the five CO2Flex[®] plants (Weyburn) operates with slightly more than 1 molar percent C2 ethane in the “Sweet NGL Rich Stream,” which is over the “no more than 1 molar percent ethane” limit recited in Claim 4.
- iv) Three of the five CO2Flex[®] plants (Weyburn, Wellman, and Monell 120/160) operate with more than 5 molar percent carbon dioxide in the “Sour NGL Rich Stream,” which is over the “no more than 5 molar percent carbon dioxide” limit recited in Claim 7.

71. These relatively small number of variances from a few of the elements of dependent claims for a few of the five CO2Flex[®] plants confirm that these plants are performing the steps of the claimed ‘332 Patent process, and the CO2Flex[®] plants process is essentially the claimed invention.

VI. Proposals to Use CO2Flex[®] Process at Chevron Mabee Facility

72. We first approached Chevron in 2007 with an interest to process the CO2 recycle gas from their CO2 flood at their Mabee facility in Martin County Texas. Our initial contact was with the Chevron office in Midland, Texas. Very quickly the Midland team requested that we produce a formal proposal to “run through channels” for approval. This initial request came from Mel Parks, Russ Wimberley, and Matt Passmore in November 2007. In February of 2008 we presented them with a proposed processing agreement. This initial proposal was a POL type agreement.

73. In the period between 2007 through 2008 we attended numerous meetings with Chevron at their offices in Houston, TX, as well as their offices in Midland, TX. During these meetings we provided Chevron detailed process simulations that predicted the plant performance over a wide range of possible process conditions at Mabee. Pilot visited the Mabee field and went so far as to select the location of the future plant and the tie-in locations for the CO₂ gas connections.

74. During this time, we also took the Chevron engineers to our existing, operating Monell 20 plant. Chevron graciously provided one of their corporate jets to fly us, and their team to Rock Springs, Wyoming. (EX2077, E-mail from Chevron Facilities Engineer Julie K. Huff regarding plans for trip (“[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.”).) During this time Alan Hein from Chevron seemed to be annoyed that Pilot was involved in the process at all. He would ask questions like “what exactly is patented,” and “why can’t we just do this ourselves without you guys (Pilot).”

75. After the trip to Monell, Chevron went strangely “radio silent” for about 6 months. Finally, we heard from Aubrey Arms at Chevron in July of 2009 where she asked us for an updated proposal. After we responded to Ms. Arms, we basically heard nothing for the next year. In August we once again got a response from Aubry

Arms where she stated that Chevron was not going to make a decision on the project until 2012. We reminded Chevron that we were open to other contracting strategies if that would help move the project along. After this communication with Aubrey Arms, Chevron once again went “radio silent” and we did not receive any responses to any of our enquiries.

VII. Copying by Chevron

76. In 2012 we heard from some of our contacts in West Texas that Chevron was building an NGL recovery plant at Mabee, and that this plant was being manufactured by Dickson and Tryer in Odessa, TX. I originally contacted Clark Dickson, whom I knew and asked him about the Chevron project. Even though Clark and I knew each other pretty well, I was told that he wasn’t allowed to discuss the project. Of course, I was very concerned that Chevron was building our process. We had provided a huge amount of detailed information to Chevron about our process, and how it could be applied at the Mabee facility. In fact, we had provided so much detail over several years that you wouldn’t need to be skilled in the “art” to copy our process designs. It is reasonable to presume that all Chevron had to do was to transmit our process simulations (which we gave them) to a packager like Dickson and Tryer to have the plant built.

77. Finally, on August 15 2013, I wrote the Exhibit 2018 letter to Chevron and asked whether they were using the process design from the '332 Patent that we had given them, specifically for an application in the Mabee field. Chevron responded a couple of weeks later and informed me that they were building a plant using their own technology, which was the Pastor '666 Patent. (EX2019.) They attached a copy of the patent which I examined. Actually, I didn't know about the existence of the Pastor '666 Patent until they sent it to me. Upon my analysis of the '666 Patent I noticed that the process did not produce any propane, and produced less than ½ of the butanes. Even though the '666 process did not produce near as much NGL as the '332 process, it also did not require any product treating. Therefore, I thought Chevron must have chosen the '666 process because it was less expensive and did not require any interaction with Pilot. I didn't like that answer, but I understood it. After the receipt of the letter, and my analysis of the Pastor '666 Patent, I dropped the matter, assuming that Chevron was building a Pastor plant at their Mabee field.

78. I didn't think much about this project until July of 2022, when one of our employees forwarded me a paper, concerning the Mabee NGL recovery plant, that was presented at the Gas Processors Association meeting in 2017. (EX2012.) I was shocked and angry when I read through this paper. They described an NGL recovery plant that had propane recovery, high butane recovery, and needed product

treating. The Pastor '666 process had none of these characteristics, but our '332 process did. This paper made it obvious to me that Chevron had not built a '666 Pastor plant, but had in actuality built the '332 Patent process that we had disclosed to them. In fact, Figure 3: Mabee Gas Plant Block Flow Diagram, looks exactly like the block flow diagrams that we drew for Chevron almost ten years prior. (EX2012 at 4.)

A. Comparison of Pilot Monell 20 CO2Flex[®] Plant to Chevron Mabee NGL Recovery Plant (EX2076)

79. A comparison of Pilot's Monell 20 CO2Flex[®] Plant to the NGL Recovery Plant that Chevron added to its Mabee CO2 Recycle Facility demonstrates that Chevron copied Pilot's CO2Flex[®] process. Chevron copied the CO2Flex[®] process that Pilot showed to Chevron personnel on their visit to the Monell 20 CO2Flex[®] Plant in Wyoming (EX2077 (trip planning e-mail)), and based on the drawings and detailed process simulations that Pilot provided to Chevron for implementation of the CO2Flex[®] process at the Mabee field.

80. Exhibit 2076 is a chart that compares Pilot's Monell 20 CO2Flex[®] Plant to the Chevron Mabee NGL Recovery Plant. As summarized in the chart, the Chevron Mabee NGL Recovery Plant includes each of the five main components for performing Pilot's CO2Flex[®] process, each of which are the same as those installed at Pilot's Monell 20 CO2Flex[®] Plant. Those five main components are the

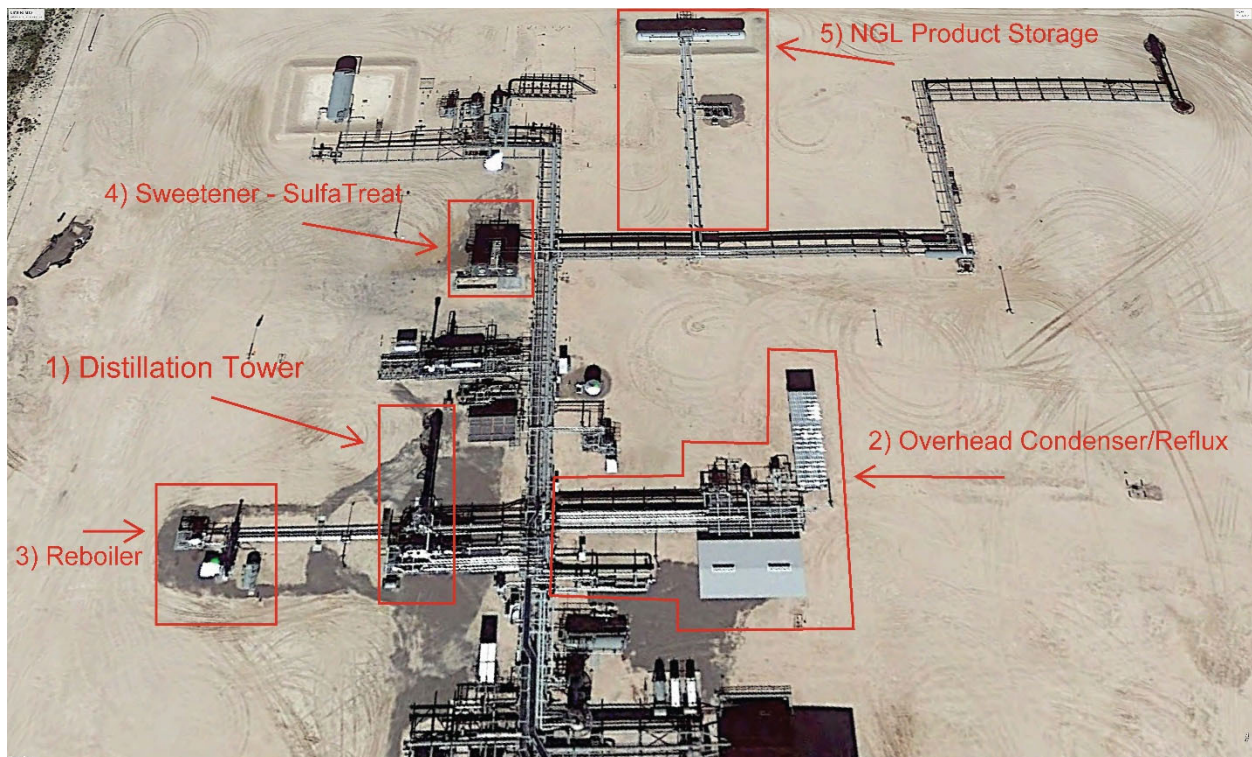
Distillation Tower [1], having an Overhead Condenser/Reflux [2] for the overhead stream exiting the top of the Distillation Tower, a Reboiler [3] for reboiling the NGL stream exiting the bottom of the Distillation Tower, a Sweetener [4] for removing the H₂S acid gas from the NGL Product, and finally an NGL Product Storage/Sales [5] component (NGL Product storage tank and/or sales pipeline).

Comparison of Pilot Monell 20 CO2Flex® Plant to Chevron Mabee NGL Recovery Plant

CO2Flex® Process Steps	Monell 20 CO2Flex® Plant Ex. 2055, Process Flow Diagrams Ex. 2056 HYSYS Chemical Process Simulation, Monell 20 (May 3, 2007 [regenerated November 11, 2024])	Chevron Mabee NGL Recovery Plant Ex. 2012, Hydrate Formation Paper; Ex. 2023, Air Permit; Exs. 2074-75, Google Earth Images
1) Distillation Tower Separation of NGLs from CO2 Recycle Stream	Distillation Tower	Distillation Tower
2) Overhead Condenser/Reflux Reflux – Condensing part of the overhead stream from the top of the Distillation Tower	Overhead Condenser/Reflux	Overhead Condenser/Reflux
3) Reboiler Reboiling the bottoms stream from the Distillation Tower	Reboiler	Reboiler
4) Sweetener Removing the H2S acid gas from the NGL Product	Amine Unit Sweetener	SulfaTreat Tower Sweetener
5) NGL Product to Storage/Sales	NGL Product to Sales	NGL Product Storage/Sales
NGL Recovery includes C3 Propane	Stream Composition Table shows significant amount of C3 Propane in the NGL Product	Stream Composition Table shows significant amount of C3 Propane in the NGL Product

81. Exhibits 2074 and 2075 are Google Earth historical images that show the Chevron Mabee CO₂ Recycle Facility both before (02/21/2013) and after (10/4/2014) Chevron added the NGL Recovery Plant to its Mabee CO₂ Recycle Facility. Pages 2 and 3 of Exhibit 2075 duplicates the zoomed-in versions of the images. One can compare (overlay) these historical images and see the copy of the CO₂Flex[®] process equipment that Chevron installed.

82. Page 4 of Exhibit 2076 is an annotated version of the “after” image, highlighting each of the five main components of the CO₂Flex[®] process that Chevron added to build their NGL Recovery Plant.



EX2075, Google Earth Image – Chevron Mabee CO₂ Recycle Facility (10/4/2014) (after addition of NGL Recovery Plant) (Annotated to show equipment added for NGL Recovery Plant).

Chevron added to their Mabee CO2 Recycle Facility a Distillation Tower [1] having an Overhead Condenser/Reflux [2] for the overhead stream exiting the top of the Distillation Tower, a Reboiler [3] for reboiling the NGL stream exiting the bottom of the Distillation Tower, a Sweetener [4] (SulfaTreat towers) for removing the H2S acid gas from the NGL Product, and finally an NGL Product Storage/Sales [5] component (NGL Product storage tank).

83. In addition to the Google Earth historical images, one can see Chevron's addition of the five main components of the Pilot CO2Flex[®] process by reviewing the Figures in the Hydrate Formation Paper (EX2012). Figure 3 in the Hydrate Formation Paper is a block flow diagram for Chevron's Mabee NGL Recovery Plant, which shows a block for each of the five main components of Pilot's CO2Flex[®] process.

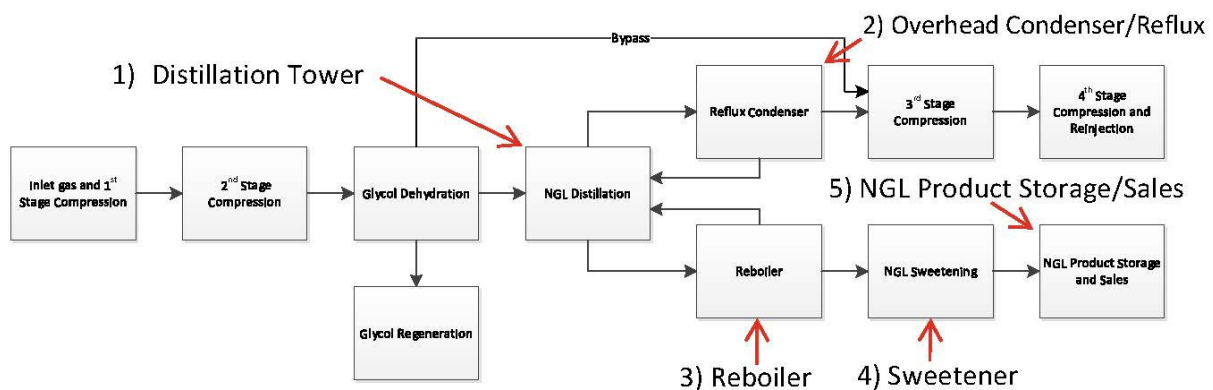


Figure 3: Mabee Gas Plant Block Flow Diagram

EX2012, Page 4, Hydrate Formation Paper, Figure 3 (Annotated to show equipment for adding NGL Recovery Plant to Chevron Mabee CO2 Recycle Facility).

84. Figure 1 in the Hydrate Formation Paper is a process flow diagram for the Distillation Tower in Chevron's Mabee NGL Recovery Plant, which shows the Distillation Tower [1], Overhead Condenser/Reflux [2], and the Reboiler [3].

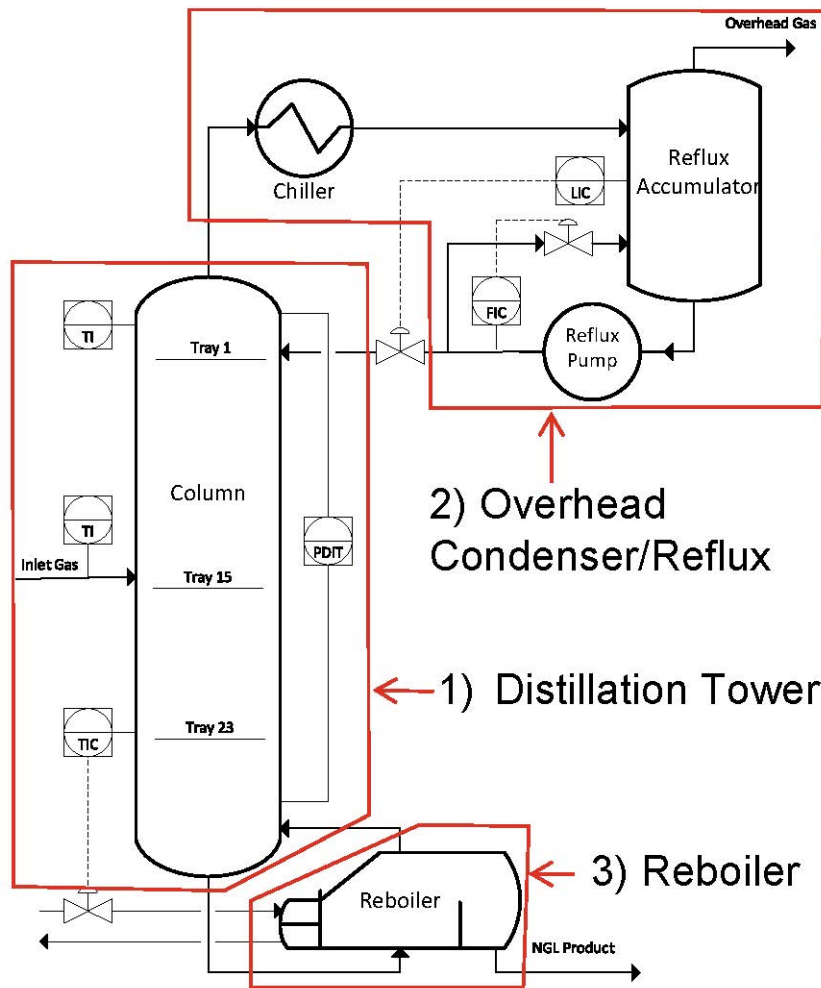
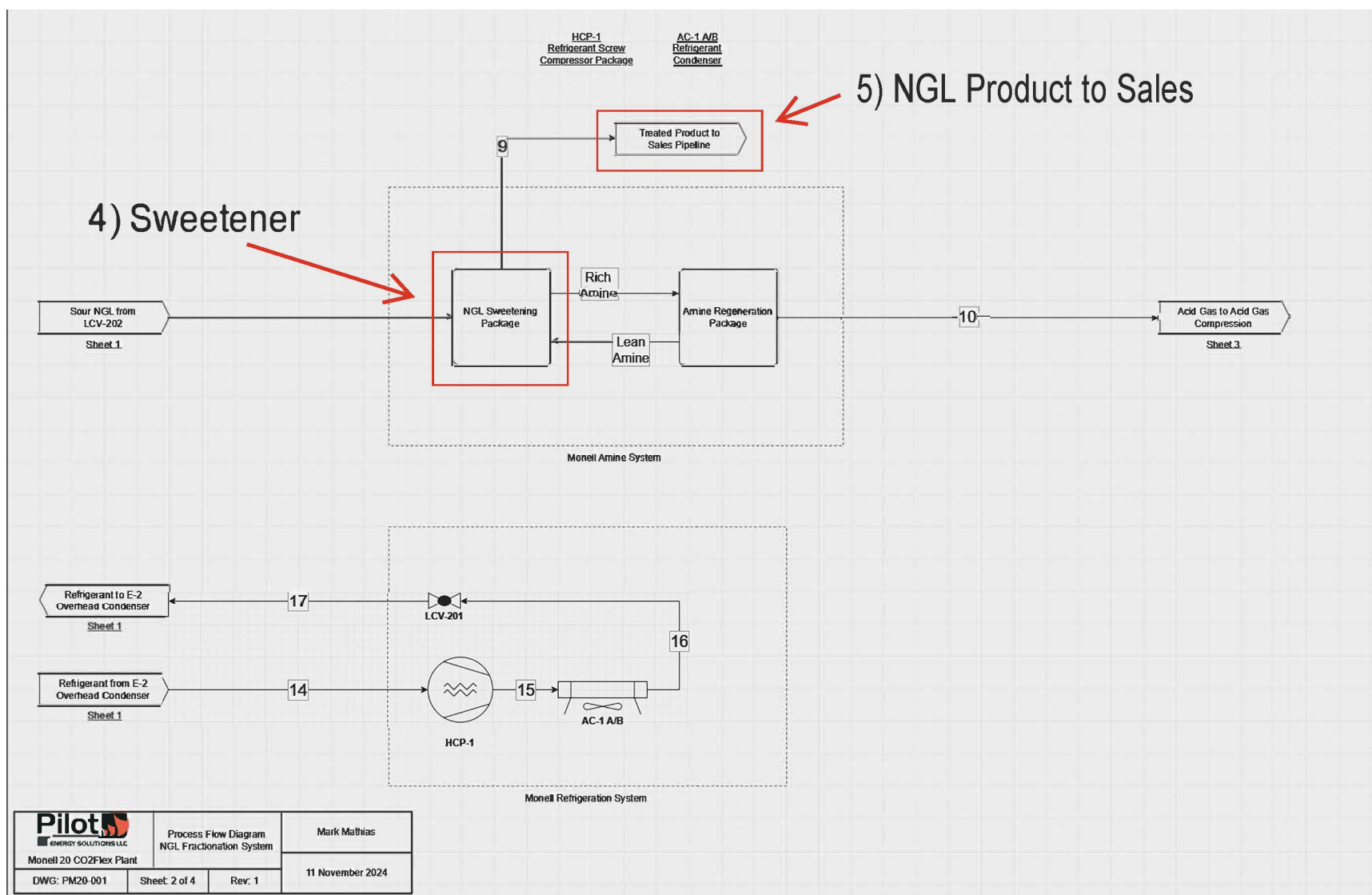


Figure 1: Process Flow Diagram of Distillation Column and Reflux

EX2012, Page 2, Hydrate Formation Paper, Figure 1 (Annotated to show equipment for adding NGL Recovery Plant to Chevron Mabee CO₂ Recycle Facility).

85. One can compare the Google Earth historical images and the Hydrate Formation Paper Figures 1 and 3 with the process flow diagram for Pilot's Monell 20 CO₂Flex[®] Plant to confirm Chevron's copying of Pilot's CO₂Flex[®] process.



EX2055, Page 2, Monell 20 CO2Flex[®] Plant, Process Flow Diagram, NGL Fractionation System (November 11, 2024) (Annotated to show CO2Flex[®] process equipment matching equipment added to Chevron Mabee CO2 Recycle Facility for adding NGL Recovery Plant).

86. This Exhibit 2055 process flow diagram for the Monell 20 CO2Flex[®] Plant matches the Exhibit 2054 Monell 20 Piping and Instrumentation Diagrams (P&IDs) (April 9, 2007 – Revised per PHA Review).

87. The Exhibit 2054 P&IDs, along with the above annotated version of the Exhibit 2055 process flow diagrams for the Monell 20 CO2Flex[®] Plant, shows the five main components of the CO2Flex[®] process, each of which correspond with those components that Chevron copied when adding the NGL Recovery Plant to their Mabee CO2 Recycling Facility.

88. Chevron has repeatedly asserted to Pilot that it did not copy Pilot's CO2Flex[®] process when adding the NGL Recovery Plant to their Mabee CO2 Recycling Facility, because Chevron supposedly built the same Pastor '666 Plant that Chevron had built at their Rangely, Colorado facility in the early 1990s. Chevron is expected to continue this position by asserting that the NGL Recovery Plant it built at Mabee is "architecturally identical" to the Rangely, Colorado plant. Chevron may demonstrate that the Rangely, Colorado plant built in the early 1990s has each of the five main components of the CO2Flex[®] process. But being "architecturally identical" and having each of the components when merely viewed from the outside does not conclude the inquiry. The next question to ask is how the components are configured to operate, mainly, how is the Distillation Tower configured to operate.

89. Recall that the Pastor ‘666 Patent process differs from Pilot’s CO2Flex[®] process in at least two critical ways. First, the Pastor ‘666 process foregoes the recovery of C3 Propane, leaving essentially all of the C3 Propane in the CO2 recycle stream, so it sends essentially all of the C3 Propane out the top of the Distillation Tower (overhead stream), for the purpose of addressing a “miscibility problem,” which is the focus of the Pastor ‘666 process. On the other hand, the ‘332 Patent CO2Flex[®] process recovers an optimum amount of C3 Propane, leaving some C3 Propane in the CO2 recycle stream, and recovering some C3 Propane in the NGL Product.

90. Second, the Pastor ‘666 process concentrates the H2S acid gas in the overhead stream, also for the purpose of addressing a “miscibility problem,” which is the focus of the Pastor ‘666 process. (EX2016 at 3:12-15.) This means that there is essentially no H2S acid gas in the NGL product (Distillation Tower bottoms stream), so there is no need for processing equipment to remove H2S acid gas from the NGL product (i.e., no Sweetener needed).

91. With these two critical factors to keep in mind, the Exhibit 2012 Hydrate Formation Paper confirms that Chevron did not build a Pastor ‘666 plant at Mabee. Instead, Chevron copied Pilot’s CO2Flex[®] process. First, the Hydrate Formation Paper discloses the material composition for the NGL Product at Chevron’s Mabee NGL Recovery Plant. A review of the Table 1 stream composition

for Chevron's Mabee NGL Product shows a significant amount of C3 Propane in the NGL Product. This C3 Propane in the Chevron Mabee NGL Product means that Chevron configured the Distillation Tower to operate the CO2Flex[®] process, not the Pastor '666 process. Compare the C3 Propane percentages in the NGL Product for Chevron Mabee (EX2012, Table 1) and the CO2Flex[®] process (EX2056 Stream Composition) (both having significant amounts of C3 Propane in the NGL Product), with the Pastor '666 process (EX2016, Table I Stream Composition) (essentially no C3 Propane in the NGL Product).

Table 1: Model Validation of Plant Data

	Field	Model
Condenser Temp, F	5.7	5.7
Reboiler Temp, F	260	260
NGL Composition, mol %		
Propane	6.02	5.48
i-Butane	17.11	16.75
n-Butane	41.78	38.39
i-Pentane	14.57	14.20
n-Pentane	9.50	8.96
Hexane +	10.84	10.96

EX2012, Page 4, Hydrate Formation Paper, Table 1
Chevron Mabee NGL Recovery Plant
Stream Composition for NGL Product
(shows significant amount of C3 Propane in the NGL Product)

Composition, mol%	Treated Product
H2S	0.00%
Nitrogen	0.00%
CO2	0.00%
Methane	0.00%
Ethane	0.00%
Propane	29.68%
i-Butane	13.66%
n-Butane	31.66%
i-Pentane	7.28%
n-Pentane	6.24%
n-Hexane	5.20%
n-Octane	6.24%
H2O	0.04%

EX2056, HYSYS Chemical Process Simulation,
Monell 20 (May 3, 2007 [regenerated November 11,
2024])
Stream Composition for NGL Product (excerpted)
(shows significant amount of C3 Propane in the NGL Product)

	<u>Stream Name</u>		
	Feed	Overhead Product	Bottoms Product
Rate	110 MMSCF	107 MMSCF	2620 BPD
H ₂ S (ppmv)	500	514	—
	<u>Mole Percent</u>		
N ₂	3.4	3.5	—
CO ₂	83.9	86.3	—
C ₁	6.6	6.9	—
C ₂	1.4	1.4	—
C ₃	1.1	1.1	0.02
iC ₄	0.5	0.4	3.1
nC ₄	0.7	0.3	16.7
iC ₅	0.4	0.001	16.0
nC ₅	0.6	—	23.3
C ₆	0.6	—	24.4
C ₇₊	0.4	—	16.4

EX2016, Page 6, Pastor '666 Patent at 5:12-27, Table I, Stream Composition for NGL Product (“Bottoms Product”) (showing essentially no C3 Propane in the NGL Product, and essentially all of the C3 Propane from the Feed stream remaining in the CO2 recycle stream (“Overhead Product”).

92. Second, the Hydrate Formation Paper further confirms Chevron's copying of the CO2Flex[®] process by showing the existence of a Sweetener [4] to remove H2S acid gas from the NGL stream. (EX2012, Page 4, Figure 3.) The Exhibit 2023 Air Permit Application shows that Chevron uses SulfaTreat towers for this sweetening process. If Chevron had built a Pastor '666 plant at Mabee, there would be no need for a Sweetener to remove H2S acid gas from the NGL Product. (EX2016 at 3:13-15 (explaining the benefit of the Pastor '666 process concentrating the H2S in the overhead, as opposed to allowing H2S in the bottoms stream with the NGL Product, which would mean that "H2S would have to be removed from a liquid product requiring expensive processing equipment.")).)

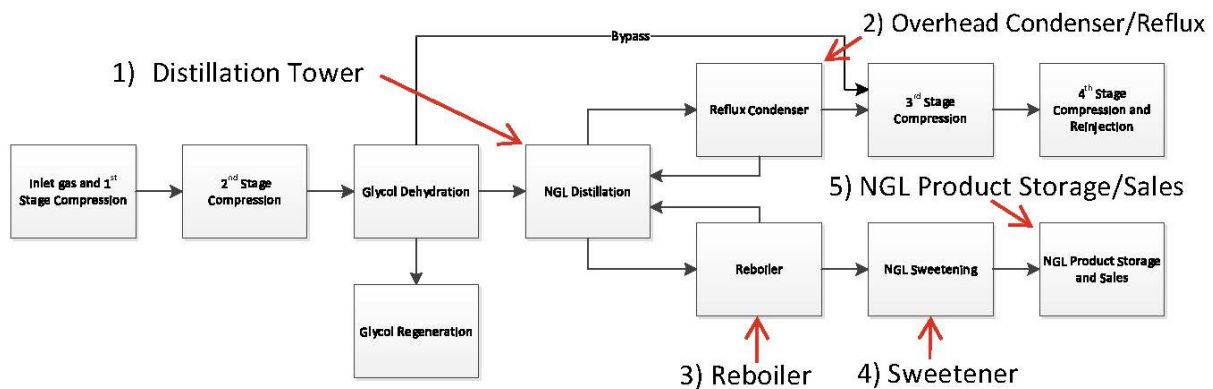


Figure 3: Mabee Gas Plant Block Flow Diagram

EX2012, Page 4, Hydrate Formation Paper, Figure 3 (Annotated to show equipment for adding NGL Recovery Plant to Chevron Mabee CO2 Recycle Facility, including Sweetener [4], which would not be needed if this was a Pastor '666 Rangely Plant).

I, Eric Prim, declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, under Section 1001 of Title 18 of the United States Code.

Dated: November 22, 2024.

/Eric Prim/

Eric Prim