

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

WEATHERFORD U.S., L.P.,

Petitioner

v.

HALLIBURTON ENERGY SERVICES, INC.

Patent Owner

Case IPR2024-00990

Patent No. 11,333,007

**SECOND DECLARATION OF DR. ROBERT A. DURHAM
IN SUPPORT OF PATENT OWNER'S CONTINGENT MOTION TO
AMEND**

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I, Robert Durham, declare as follows:

I have been retained on behalf of Halliburton Energy Services, Inc. (“Halliburton”) to provide my opinions regarding Weatherford U.S., L.P.’s Petition for *Inter Partes* Review of Claims 1-23 of U.S. Patent No. 11,333,007 (“the ’007 Patent”). I submit this declaration based on my personal knowledge and in support of Halliburton’s Contingent Motion to Amend.

I. INTRODUCTION

1. In formulating my opinions, I have relied upon my knowledge, training, and experience in the relevant art. My qualifications are stated more fully in my curriculum vitae, previously submitted as Ex. 2003. My CV also lists publications on which I am a named author and identifies parties on behalf of whom I have previously provided expert testimony within the past four years. Here, I provide a brief summary of my qualifications.

2. I am a consulting engineer with experience in a number of technical areas. I have oil and gas industry expertise from drilling and completion to downstream. As a consultant, I have worked with oil field production companies, refining and chemical plants, equipment manufacturers, and technology development companies for over twenty years. My work relates to the subject matter of the U.S. Pat. No. 11,333,007 (“the ’007 Patent”).

A. Background

3. My relevant qualifications, including my educational background and career history is summarized below. A copy of my curriculum vitae, which includes a more detailed enumeration of my background, experience, patents, and publications, is attached as Ex. 2003.

4. I received my Bachelor of Science in Electrical Engineering and Master of Engineering and Technology Management degrees from the University of Tulsa in 1992 and 1997, respectively. After years of professional work and research, I received my Ph.D. in Engineering Management from Kennedy Western University in 2004.

5. I have also served in leadership positions in the Petroleum and Chemical Industry Committee (PCIC) of the Institute of Electrical and Electronics Engineers (IEEE) for nearly twenty years. IEEE is the world's largest technical professional association. The PCIC is the premier forum for the exchange of electrical applications technology related to the petroleum and chemical industry. From 2005 to 2012, I served as secretary, vice chair, and ultimately chair of the Production Subcommittee of the PCIC. The Production Subcommittee is the primary method for PCIC members to communicate technical papers related to drilling, wellhead, and facilities operations of oil and gas wells. In 2013, I was appointed as Vice-Chair of the Standards Subcommittee of the PCIC, a role which transitioned to Chair in 2014. I served as Chair until 2022. The Standards Subcommittee of the

PCIC is the Sponsor of IEEE standards relating equipment operations in the Oil and Gas Industry. The PCIC Standards Subcommittee sponsors nearly 50 electrical and oil and gas-related standards. In September 2022, I was elected as an Executive Officer of the PCIC. I will serve as an Executive Officer for eight years, serving two-year terms in each position: Secretary, Vice Chair, Chair, and Chair of Advisory and Awards.

6. My peers have recognized my contributions, particularly in the area of electrical equipment in the oil and gas industry. Because of this recognition, in 2019, I was elevated to the grade of Fellow of the IEEE for “contributions to submersible electrical equipment analysis and multi-point ground methods in hazardous petroleum and chemical environments.” The IEEE Fellow grade is limited to the top 0.1% of the IEEE membership worldwide.

7. I have worked directly in the oil and gas fields both as an employee and as a consulting engineer. From 2000 until the end of 2002, I was employed as Manager of Electric Infrastructure for New Dominion, LLC (NDL). In that capacity, I administratively owned and was responsible for all electrical equipment, including overhead power lines, transformers, switchgear, drives, and motors, throughout NDL’s production, exploration, and drilling areas.

8. After a brief stint as Vice President for EDG Power Group, responsible for Engineering and Project Management of generation and co-generation facilities across the U.S., I transitioned to the role of consulting engineer. In that role, I have

served as a consulting engineer in designing, constructing, and analyzing all kinds systems, especially those in the oil and gas industry. This has included the design and selection of equipment and the analysis of equipment failures in the oil and gas field from drilling/completion sites to production facilities, midstream, and downstream (refinery) locations.

9. I am also a principal of PEDOCS, Inc., an oil and gas production company operating over 50 oil and gas production wells in Oklahoma. As such, I am familiar with oil and gas well operations, including well stimulation, completion, hydraulic fracturing, and production.

10. I have been familiar with oil and gas drilling, fracturing (fracking), completion, production, midstream, and downstream operations for over twenty years. I am familiar with sand control technologies, including sand screens and gravel packs. I have specified and used sand control devices in production wells owned by PEDOCS, particularly in loosely consolidated sand formations. Additionally, I was familiar with sand control devices when employed at New Dominion, LLC. I have studied gravel pack technologies in a consulting role, even before this engagement, and have testified regarding such technologies

11. I have been familiar with the Occupational Safety and Health Administration (“OSHA”) and its responsibilities at oil and gas locations. I have consulted and investigated incidents on multiple oil and gas sites where OSHA has also performed investigations about injuries and fatalities that have occurred at oil

and gas locations, including drilling, fracturing and completion operations. As Principal Scientist of THEWAY Labs, part of my responsibilities include overseeing the Health Safety and Environmental (HSE) program at THEWAY Labs, including establishing policies and procedures commensurate with OSHA requirements at all locations, including requirements for oil and gas sites.

12. I author or co-author over fifty published papers and five books. A list of publications that I have written over the last thirty years is included in my professional CV.¹

13. Therefore, based on my education, professional experience of over 30 years, and scholarly books and publications, I am an expert in the relevant field of the '007 Patent and have been an expert in this field since before the '007 Patent was filed with the United States Patent and Trademark Office (“USPTO”). I am familiar with how a person having ordinary skill in the art would have understood and used the terminology found in the '007 Patent at the time of filing.

II. SUMMARY OF CONCLUSIONS

14. It is my opinion that the substitute claims of the '007 Patent are patentable, and that the limitations of the substitute claims are not rendered obvious by the prior art references cited by Petitioner in this *Inter Partes* Review.

¹ See Ex. 2003.

15. It is my opinion that the substitute claims of the '007 Patent narrow the scope of the original claims of the '007 Patent.

16. It is my opinion that the original application and the provisional application for the '007 Patent provide written description support for and enable the substitute claims of the '007 Patent, and that the substitute claims of the '007 Patent do not add new matter.

III. MATERIALS REVIEWED

17. I have been asked to review the Petition for *Inter Partes* Review of Claims 1-23 of the '007 Patent along with the '007 Patent, File History, alleged Prior Art and other associated exhibits and provide my opinions regarding the Petition and Substitute Claims in Patent Owner's Contingent Motion to Amend. In forming my opinions, I have reviewed the materials cited in the List of Exhibits and the materials cited throughout my declaration.

IV. LIST OF EXHIBITS

Exhibit No.	Description
1001	U.S. Patent No. 11,333,007 ("'007 Patent")
1002	File History for U.S. Patent No. 11,333,007
1003	Declaration of Michael R. Chambers Sr. ("Chambers Decl.")
1004	CV of Michael R. Chambers Sr.
1005	U.S. Patent No. 9,797,226 ("Yeh")
1006	IPTC 12549 ("Yeh2")
1007	U.S. Patent No. 4,945,991 ("Jones")
1008	U.S. Patent No. 5,113,935 ("Jones2")

1009	L.G. Jones et al., <i>Alternate Path Gravel Packing</i> , Society of Petroleum Engineers, SPE 22796 (Oct. 1991)
1010	U.S. Patent No. 7,661,476
1011	<i>ExxonMobil Awards Alternate Path Technology License to Weatherford</i> , ExxonMobil Press Release (Aug. 27, 2013)
1012	U.S. Patent No. 5,588,487
1013	G. Hurst et al., <i>Alternate Path Completions: A Critical Review and Lessons Learned From Case Histories With Recommended Practices for Deepwater Applications</i> , Society of Petroleum Engineers, SPE 86532 (Feb. 2004) (“Hurst”)
1014	K.W. Lagrone et al., <i>A New Development in Completion Methods The Limited Entry Technique</i> , Society of Petroleum Engineers, SPE 530 (July 1963) (“Lagrone”)
1015	M.T. Hecker et al., <i>Extending Openhole Gravel Packing Capability: Initial Field Installation of Internal Shunt Alternate Path Technology</i> , Society of Petroleum Engineers, SPE 135102 (Sept. 2010) (“Hecker”)
1016	A. Bonner et al., <i>Design and Validation of an Improved Shunt Tube System</i> , Society of Petroleum Engineers, SPE-169440-MS (2014) (“Bonner”)
1017	API Technical Report 5C3, published in December 2008 with an Addendum in October 2015 (excerpts)
1018	ASTM A554-16: Standard Specification for Welded Stainless Steel Mechanical Tubing (2016) (excerpts)
1019	Declaration of Christine Diedrich of the Society of Petroleum Engineers
1020	Complaint for Patent Infringement, <i>Halliburton Energy Servs. v. Weatherford U.S. L.P.</i> , Case No. 24-cv-00090 (W.D. La. Jan. 22, 2024)
1021	U.S. District Courts – Combined Civil and Criminal Federal Court Management Statistics (March 31, 2023), available at https://www.uscourts.gov/statistics-reports/federal-court-management-statistics-march-2023
1022	Shahryar Saebi, <i>The Evolution of Completion Designs Using Alternate Path (Shunt-Tubes) Technology</i> , Society of Petroleum Engineers SPE 155129 (Mar. 2012)
1023	U.S. Patent No. 5,476,143
1024	U.S. Patent No. 7,938,184

1025	Larry G. Myers et al., <i>Case History in Achieving High Rate Producers in Sub Sea Gravel Packed Completions</i> , Society of Petroleum Engineers, SPE 39433 (Feb. 1998)
1026	Raymond Tibbles, et al., <i>Design and Execution of a 3000-ft Horizontal Gravel-Packed Completion (A Kazakhstan Case History)</i> , Society of Petroleum Engineers, SPE 64410 (Oct. 2000)
1027	M.D. Barry et al., <i>Openhole Gravel Packing With Zonal Isolation</i> , Society of Petroleum Engineers, SPE 110460 (Nov. 2007)
1028	U.S. Patent No. 5,890,533
1029	ASTM A500/A500M-13: Standard Specification for Cold- Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes (2013) (excerpts)
1030	U.S. Patent No. 4,629,218
1031	Declaration of Stephen McNamee
1032	Fischer Stainless Steel Tubing - Part Number List
1033	L.G. Jones et al., <i>Gravel Packing Horizontal Wellbores with Leak-Off Using Shunts</i> , Society of Petroleum Engineers, SPE 38640 (Oct. 1997)
1034	D.W. Bryant & L.G. Jones, <i>Completion and Production Results from Alternate-Path Gravel-Packed Wells</i> , SPE Drilling & Completion, SPE 27359 (Sept. 1995)
1035	U.S. Patent No. 6,588,506
1036	Halliburton Cementing Tables (1979) (excerpts)
1037	Introduction to Otis Multi-Position Gravel Pack System, Otis Engineering Corporation, Technical Manual 2004/88 (excerpts)
1038	Johnson Oil and Gas Well Screens Catalog (1991) (excerpts)
1039	U.S. Patent No. 2,905,245
1040	U.S. Patent No. 8,839,861
1041	U.S. Patent No. 5,842,516
2001	Deposition Transcript of Dr. Michael R. Chambers re: IPR2024-00990 (February 21, 2025)
2002	Declaration of Robert A. Durham
2003	Curriculum Vitae of Robert A. Durham
2004	Omitted

V. UNDERSTANDING OF THE LAW

18. I am not an attorney and offer no legal opinions, but, in my work, I have had experience studying and analyzing patents and patent claims from the perspective of a person skilled in the art (a “POSITA”).

19. For the purposes of this declaration, Patent Owner’s counsel has informed me about certain aspects of the law that are relevant to my opinions, as set forth below. I understand that the patentability of a patent is analyzed on a claim-by-claim basis, from the perspective of a hypothetical person of ordinary skill in the art (“POSITA”).

A. Priority Date and Prior Art

20. I understand that, subject to the next paragraph, the asserted “priority date” of a patent is the earlier of: (a) the date on which a patent application is filed; or (b) the date on which an earlier-filed patent application is filed if the patentee claims the benefit of priority to that earlier-filed patent application.

21. I understand that it is not enough for a patent to merely claim the benefit of an earlier-filed application, but that additional criteria must be met. In particular, the prior application itself must describe the claimed invention, and must do so in sufficient detail that one skilled in the art can clearly conclude that the inventor invented the claimed invention as of the filing date sought. First, I understand that a priority-date analysis is on a claim-by-claim basis. Second, I understand that, in

order for a patent claim to be entitled to the filing date of an earlier patent application, a “Section 112 analysis” must be conducted. I am informed that a “Section 112” analysis encompasses looking to the earlier patent application, and ascertaining whether that earlier patent application meets both the written description and enablement requirements as of the filing date of the earlier application. I understand that it is not enough that the claim would have been obvious from the earlier application, but that application itself must describe the claimed invention.

22. I understand that in order to satisfy the written description requirement the earlier application must reasonably convey to those skilled in the art that the inventors had possession of the subject matter of the patent as of the filing date of the earlier application. I have been informed that it is the disclosures of the earlier patent application that count, and that while the meaning of terms, phrases, or diagrams in the earlier patent application must be interpreted from the vantage point of one skilled in the art, all of the claimed limitations must appear in the specification. Further, I understand that this analysis is not a question of whether one skilled in the art might be able to construct the claimed invention from the teachings of the disclosure. The question is not whether a claimed invention is an obvious variant of that which is disclosed in the specification; rather, I understand that an earlier application must itself describe each of the claim limitations.

23. I also understand that in order to satisfy the enablement requirement, the earlier application must enable a person of ordinary skill in the art to practice the claimed invention without undue experimentation.

24. I understand that publications and patents, that were published or otherwise publicly available before the date of a claimed invention may qualify as “prior art” to that invention. I further understand that prior art may render one or more claims of a patent invalid for one of two reasons: (a) anticipation and (b) obviousness. However, I understand that a patent or other publication must first qualify as prior art before it can be used to invalidate a patent claim and that all prior art must be viewed from the perspective of a POSITA at the time of the invention.

25. I understand that to qualify as prior art, a reference must contain an enabling disclosure that allows one of ordinary skill to practice the claims without undue experimentation.

B. Anticipation

26. It is my understanding that the claims of a patent are anticipated by a prior art reference if each and every element of the claim is found either explicitly or inherently in a single prior art reference or system. I understand that inherency requires a showing that the missing descriptive matter in the claim is necessarily or implicitly present in the allegedly anticipating reference, and that it would have been so recognized by a POSITA. In addition, I understand that an enabling disclosure is

a disclosure that allows a POSITA to make the invention without undue experimentation.

27. I understand that in this *inter partes* review, Petitioner does not allege that any claims are anticipated.

C. Obviousness

28. I understand that the prior art may render a patent claim “obvious.” I understand that two or more prior art references (e.g., prior art articles, patents, or publications) that each disclose fewer than all elements of a patent claim may be combined to render a patent claim obvious if the combination of the prior art collectively discloses all elements of the claim and one of ordinary skill in the art at the time would have been motivated to combine the prior art in such a way. I understand that this motivation to combine need not be explicit in any of the prior art, but may be inferred from the knowledge of one of ordinary skill in the art at the time the patent was filed. I also understand that one of ordinary skill in the art is not an automaton, but is a person having ordinary creativity. I further understand that one or more prior art references, articles, patents or publications that disclose fewer than all of the elements of a patent claim may render a patent claim obvious if including the missing element would have been obvious to one of skill in the art (e.g., the missing element represents only an insubstantial difference over the prior art or a reconfiguration of a known system).

29. I understand that under the doctrine of obviousness, a claim may be invalid if the differences between the invention and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a POSITA to which the subject matter pertains.

30. To assess obviousness, I understand that I am to consider the scope and content of the prior art, the differences between the prior art and the claim, the level of ordinary skill in the art, and any secondary considerations to the extent they exist.

31. I understand that any evidence of secondary indicia of non-obviousness should be considered when evaluating whether a claimed invention would have been obvious to one of ordinary skill at the time of invention. These secondary indicia of non-obviousness may include, for example:

- a long felt but unmet need in the prior art that was satisfied by the claimed invention;
- commercial success of processes claimed by the patent;
- unexpected results achieved by the invention;
- praise of the invention by others skilled in the art;
- the taking of licenses under the patent by others; and
- deliberate copying of the invention.

32. I understand that there must be a nexus between any such secondary indicia and the claimed invention.

33. It is also my understanding that there are additional considerations that may be used as further guidance as to when the above factors will result in a finding that a claim is obvious, including the following:

- the claimed subject matter is simply a combination of prior art elements according to known methods to yield predictable results;
- the claimed subject matter is a simple substitution of one known element for another to obtain predictable results;
- the claimed subject matter uses known techniques to improve similar devices or methods in the same way;
- the claimed subject matter applies a known technique to a known device or method that is ready for improvement to yield predictable results;
- the claimed subject matter would have been “obvious to try” choosing from a finite number of identified, predictable solutions, with a reasonable expectation of success;
- there is known work in one field of endeavor that may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces if the variations would have been predictable to a POSITA;
- there existed at the time of the invention a known problem for which there was an obvious solution encompassed by the patent’s claims; and
- there is some teaching, suggestion, or motivation in the prior art that would have led a POSITA to modify the prior art reference or to combine prior art reference teachings to arrive at the claimed subject matter.

34. Finally, I understand that a claim may be deemed invalid for obviousness in light of a single prior art reference, without the need to combine references, if the elements of the claim that are not found in the reference can be

supplied by the knowledge or common sense of one of ordinary skill in the relevant art.

D. Claim Construction

35. I understand that the first step in determining whether a patent claim would have been anticipated or obvious is to ascertain how a POSITA would have understood the claim terms.

36. I have been instructed by counsel on the law regarding claim construction and patent claims, and I understand that a patent may include two types of claims: independent claims and dependent claims. An independent claim stands alone and includes only the limitations it recites. A dependent claim can depend from an independent claim, or it can further depend from another dependent claim. I understand that a dependent claim includes all the limitations that it recites, in addition to all the limitations recited in the claim(s) from which it depends.

37. It is my understanding that in proceedings before the USPTO, the claims of a patent are to be construed under what is referred to as the “*Phillips* standard.” I understand that this *Means* that claim terms of a patent are given the meaning the terms would have to a POSITA, in view of the description provided in the patent itself and the patent’s file history.

38. I understand that to determine how a person of ordinary skill would understand a claim term, one should look to those sources available that show what a person of skill in the art would have understood the disputed claim language to

mean. I understand that, in construing a claim term, one looks primarily to the intrinsic patent evidence, including the words of the claims themselves, the remainder of the patent, and the patent's prosecution history. I understand that extrinsic evidence, which is evidence external to the patent and the prosecution history, may also be useful in interpreting patent claims when the intrinsic evidence itself is insufficient.

39. I understand that words or terms should be given their ordinary and accepted meaning unless it appears that the inventors were using them to mean something else. In making this determination, the claims, the remainder of the patent, and the prosecution history are of paramount importance. Additionally, the patent and its prosecution history must be consulted to confirm whether the patentee has acted as its own lexicographer (i.e., provided its own special meaning to any disputed terms), or intentionally disclaimed, disavowed, or surrendered any claim scope.

40. In comparing the claims of the '007 Patent to the prior art, I have considered the '007 Patent and its file history in light of the understanding of a person of skill at the time of the alleged invention.

41. It is my opinion that a POSITA would understand all the claim terms to have their plain and ordinary meaning, and I have applied the plain and ordinary meaning, in the context of the '007 Patent, for all claim terms.

VI. LEVEL OF ORDINARY SKILL IN THE ART

42. When interpreting a patent, I understand that it is important to identify the relevant art pertaining to the patent-in-suit as well as the level of ordinary skill in that art at the time of the claimed invention. The “art” is the field of technology to which the patent is related.

43. I have been instructed by counsel that the person of ordinary skill in the art (“**POSITA**”) is a hypothetical person who is presumed to know the relevant prior art. I understand that the actual inventor’s skill is not determinative of the level of ordinary skill. I further understand that the factors that may be considered in determining the level of skill include the types of problems encountered in the art, prior art solutions to those problems, rapidity with which innovations are made, sophistication of the technology, and educational level of active workers in the field. I understand that not all such factors may be present in every case, and one or more of them may predominate.

44. Petitioners assert that a POSITA “would have had a B.S. degree in mechanical or petroleum engineering or a similar technical discipline, with at least five years of experience in oil or gas well drilling, completion, and/or subsurface production operations or in technical support of such operations including at least some experience in unconsolidated formations utilizing sand control methods and means. Also, additional education in a relevant technical discipline could compensate for less experience in the relevant field, and vice versa.” Pet. pp.31-32.

45. I possess not only the education requirements of POSITA's definition but also the field experience. Not only is my education in a similar technical discipline to that of Petitioner's definition, but I also have additional education beyond a bachelor's degree. Further, I have over twenty years of experience in oil and gas drilling, completion and subsurface production operations, including experience in unconsolidated formations using sand control.

46. For purposes of this declaration, I have applied the level of skill proposed by Petitioner's expert.²

VII. OVERVIEW OF ALLEGED PRIOR ART REFERENCES

A. Yeh (Ex. 1005)

47. *Yeh* is a United States Patent issued to *Charles S. Yeh et al.* granted on October 24, 2017. The title of *Yeh* is "Crossover Joint for Connecting Eccentric Flow Paths to Concentric Flow Paths."

48. As the title of *Yeh* suggests, *Yeh* is directed to a "crossover tool" that couples two wellbore tools (e.g. sand screens, packers) where "radial center of the primary flow path in the first wellbore tool is offset from a radial center of the primary flow path in the second wellbore tool."³ *Yeh* describes the primary problem purportedly solved as "a need exists for an improved sand control system utilizing a crossover joint for connecting an eccentric sand screen with a concentric packer, or

² Ex. 1003, §VI,

³ Ex. 1005 (*Yeh*) at Abstract.

vice versa.”⁴ *Yeh* describes several considerations in designing the crossover joint, which include minimizing curvature, providing mechanical integrity, limiting “outer diameter” of the tool, and “maximizing inner diameter of the primary flow path.”⁵ *Yeh* teaches the use of the crossover tool primarily in a gravel pack environment where concentric and eccentric sand screens are connected with each other and with concentric and eccentric packers.⁶

49. *Yeh* provides several examples of the use of this crossover tool, with the preferred embodiment being eccentric screen → crossover tool → concentric packer.⁷ This is the embodiment relied on in the Petition. *Yeh* does not purport to improve on existing sand screens, but rather focuses on connecting sand screens together, and connecting sand screens to packers.⁸ *Yeh* teaches using more readily available, lower friction and less expensive eccentric screens downstream, instead of more expensive, less available, higher friction, more complex concentric screens, may “reduce the overall cost of completion.”⁹

⁴ Ex. 1005 (*Yeh*) 4:12 – 14.

⁵ Ex. 1005 (*Yeh*) 26:57-64, 28:25-30.

⁶ see, e.g., Ex. 1005 (*Yeh*) 29:58 – 30:46

⁷ Ex. 1005 (*Yeh*), 30:13-39.

⁸ See, e.g., Ex. 1005 (*Yeh*) 3:23 – 24 (“It is known to use rectangular shunt tubes that are eccentrically attached to the outside of a sand screen.”; see also, e.g., 3:24 – 51 describing a known “Alternate Path sand screen having concentric internal shunt tubes.”)

⁹ Ex. 1005, 30:20-33.

B. Yeh2 (Ex. 1006)

50. *Yeh2* is a paper presented at the International Petroleum Technology Conference held December 3 – 5, 2005. *Yeh2* was assigned paper number IPTC 12549 and is titled “Unlocking the Limits of Extreme Length in Alternate Path Gravel Packing.”¹⁰ *Yeh2* describes a concentric sand screen for use in a gravel pack application “over much longer production intervals (~5,000 ft)”, longer than the then known lengths “up to 2,800 ft”.¹¹ *Yeh2* primarily accomplishes this through the use of internal, closed-end shunt tubes in a 6x3 configuration and “shunt manifolds,” which “incorporates a continuous non-ported shunt tube to transport the slurry and a non-continuous, ported packing tube on each joint used to discharge the slurry. *Yeh2* does not describe the shunt tube wall thickness or describe any approach for modifying shunt tube wall thickness throughout the length of the production interval. *Yeh2* instead teaches to rate shunt tubes to withstand the highest burst pressure at the heel.”¹²

C. Jones (Ex. 1007)

51. *Jones* is a United States Patent issued to *Lloyd Jones* granted on August 7, 1990. The application that led to *Jones* (Appl. No. 397,217) was filed on August 23, 1989.¹³ The title of *Jones* is “Method for Gravel Packing Wells.”

¹⁰ Ex. 1006 (*Yeh2*) pg 1.

¹¹ Ex. 1006 (*Yeh2*) pg 1.

¹² Ex. 1006 (*Yeh2*) pg 5.

¹³ Ex. 1007 (*Jones*) Cover.

52. *Jones* describes an early example of a gravel pack system with “one or more conduits [] positioned coaxially adjacent the exterior of the sand screen with openings to provide fluid communication between the conduit and a substantial portion of the annulus between the borehole casing and the sand screen.”¹⁴ In this arrangement, a gravel slurry is pumped into the annulus to create a gravel pack and “[i]f injection of the slurry of gravel forms a gravel bridge in any portion of the annulus being packed thereby plugging the annulus between the casing and the sand screen, the slurry of gravel will continue to flow down the conduit and into the annulus below the gravel bridge thereby completely packing the annulus between the sand screen and the borehole casing.”¹⁵ *Jones* teaches that it is applicable “to placing gravel packs in an open-hole wellbore adjacent to a substantial portion of an unconsolidated or poorly consolidated subterranean oil or gas reservoir.”¹⁶ *Jones* explains that the shunt tubes “may be made of any pressure-resistant material,” such as “stainless steel.”¹⁷

¹⁴ Ex. 1007 (*Jones*) at Abstract.

¹⁵ Ex. 1007 (*Jones*) at Abstract.

¹⁶ Ex. 1007 (*Jones*) at Abstract.

¹⁷ Ex. 1007 (*Jones*) 4:11 – 13.

D. Jones2 (Ex. 1008)

53. *Jones2* is a United States Patent issued to *Lloyd Jones* granted on May 19, 1992. The application that led to *Jones* (Appl. No. 694,163) was filed on May 1, 1991.¹⁸ The title of *Jones* is “Gravel Packing of Wells.”

54. *Jones2*, like *Jones*, describes an “[a]pparatus for gravel packing a wellbore interval having shunt means (i.e. conduits) on the external surface of a sand screen.”¹⁹ However, unlike *Jones*, which only taught 2 round conduits (i.e., shunt tubes) on the outside of the sand screen, *Jones2* describes “a variety of differently configured, perforated conduits and/or arrangements of these conduits.”²⁰ These configurations include different lengths, different perforations, connecting the shunt tubes with manifolds, and different combinations thereof.

VIII. THE SUBSTITUTE CLAIMS NARROW THE SCOPE OF THE ORIGINAL CLAIMS OF THE '007 PATENT

A. Substitute independent claims 28, 31, and 38 narrow the scope of respective claims 11, 14, and 21 of the '007 patent

55. A POSITA would understand that substitute independent claims 28, 31, and 38 further narrow the original claims they replace, and as such, do not enlarge the scope of the original claims of the '007 patent. As included in Patent Owner's Contingent Motion to Amend, substitute claims 28, 31, and 38 each recite “a first eccentric sand screen assembly” and “a second eccentric sand screen assembly.”

¹⁸ Ex. 1008 (*Jones2*) Cover.

¹⁹ Ex. 1008 (*Jones2*) at Abstract

²⁰ Ex. 1008 (*Jones2*) at Abstract

Original claims 11, 14, and 21, to be replaced by claims 28, 31, and 38, each recite “a first sand screen assembly” and “a second sand screen assembly.” A POSITA would understand that an eccentric sand screen assembly is a specific type, or configuration, of a sand screen assembly.²¹ Accordingly, the recitation of a first and second “eccentric sand screen assembly” in substitute claims 28, 31, and 38 narrows the recitation of a first and second “sand screen assembly” in original claims 11, 14, and 21.

B. Substitute dependent claims 29-30, 32-37, and 39-40 narrow the scope of their respective original claims

56. A POSITA would understand that substitute dependent claims 29-30, 32-37, and 39-40 further narrow substituted independent claims 28, 31, and 38 discussed in the previous section, as well as the original claims they replace, and as such, do not enlarge the scope of the original claims of the '007 patent. Each of Substitute Claims 29-30, 32-37, and 39-40 retains the limitations of the original claim to be replaced and recites additional narrowing limitations.

C. Substitute dependent claims 24-27 likewise narrow the scope of their respective original claims

57. A POSITA would understand that substitute dependent claims 24-27 further narrow the original claims they replace, and as such, do not enlarge the scope of the original claims of the '007 patent. Each of Substitute Claims 24-27 retains the

²¹ *E.g.*, Ex. 1002, 10:17-21; Ex. 2005, 14:8-12.

limitations of the original claim to be replaced and recites additional narrowing limitations.

IX. THE ORIGINAL AND PROVISIONAL APPLICATIONS INCLUDE SUPPORT FOR AND ENABLE THE SUBSTITUTE CLAIMS

A. The original application and provisional application for the '007 Patent include support for the Substitute Claims

58. I have been asked to provide my opinions regarding whether the substitute claims are supported by the original application and the provisional application for the '007 Patent. The '007 patent issued from U.S. Patent Application No. 16/347,711 (“the '711 Application”),²² which is found at pages 7-37 of Exhibit 1002. The '711 Application claimed the benefit of provisional application no. 62/688,813 (the “'813 Provisional,” found at Exhibit 2005).²³ In performing this analysis, I have applied the plain and ordinary meaning of the terms. I include exemplary citations to the original application and the provisional application for the limitations of each substitute claim.

59. As noted above, the Substitute Claims rewrite original claims 3, 6, 8, 9 and 11-23 with additional limitations. The following features, found in the Substitute Claims, were supported by the '711 Application and the '813 Provisional. A POSITA would have found that the inventor was in the possession of the amended features at the time of filing the '711 Application and '813 Provisional.

²² Ex. 1001, item (21).

²³ Ex. 1002, pg 7.

Claim	Citation²⁴ to '711 Application	Citation to '813 Provisional
[1][p] ²⁵ A completion assembly for deployment in a wellbore, the completion assembly comprising:	<i>See</i> Abstract, 4:5-9, 5:18-22, 6:28-7:13, 8:14-16, 9:1-10:9, 15:28-16:28, 21:1-4, Figs. 1-3, 4A-4B, 5, Claim 1.	<i>See</i> 7:8-11, 14:14-15:8, 18:19-21, 21:18-23:6, Figs. 1-3, 4A-4B, 5, Claim 2.
[1][a] a first sand screen assembly comprising a base pipe having perforations therein and extending between a first end and a second ends, a sand screen disposed around a portion of the base pipe, and a shunt tube assembly disposed outwardly of the sand screen, the shunt tube assembly having a transport tube and a packing tube, where each of the tubes has a passageway defined therein, the packing tube further including a plurality of nozzles spaced apart from each other, wherein each of the tubes and each nozzle has a cross-sectional flow area;	<i>See</i> 4:5-9, 16:12-28, Claim 1, Figs. 1-3, 4A-4B.	<i>See</i> 22:11-19, Figs. 1-3, 4A-4B, Claim 2.
[1][b] a second sand screen assembly comprising a base pipe having perforations therein and extending between	<i>See</i> 4:5-9, 16:12-28, Claim 1, Figs. 1-3, 4A-4B.	<i>See</i> 22:19-23:2, Figs. 1-3, 4A-4B, Claim 2.

²⁴ Citations to both the '711 Application and '813 Provisional are to the page and line number of the originally filed specification, the claim number, or the drawing number, rather than the page number as marked for this proceeding.

²⁵ I understand that Patent Owner does not propose amendments to claim 1. I address disclosure for claim 1 because Substitute Claims 24-27 depend from claim 1.

a first end and a second ends, a sand screen disposed around a portion of the base pipe, and a shunt tube assembly disposed outwardly of the sand screen, the shunt tube assembly having a transport tube and a packing tube, the packing tube including a plurality of nozzles spaced apart from each other, wherein each of the tubes and each nozzle has a cross-sectional flow area;		
[1][c] a source of pressurized working fluid fluidly coupled to an upstream end of the transport tube of the first sand screen assembly;	<i>See</i> 5:18-22, 15:28-16:11 Claim 1, Figs. 1-3, 4A-4B, Fig. 5.	<i>See</i> 7:8-11, 21:18-22:9, Figs. 1-3, 4A-4B, Claim 2.
[1][d] wherein the first and second sand screen assemblies are arranged end to end relative to one another so that the base pipes are in fluid communication with one another and the transport tubes are in fluid communication with one another such that the transport tube of the second sand screen assembly is fluidly coupled to the source of pressurized working fluid downstream of the transport tube of the first sand screen assembly; and	<i>See</i> 15:28-16:28, Claim 1, Figs. 1-3, 4A-4B, Fig. 5.	<i>See</i> 7:8-11, 21:18-22:9, 23:1-5, Figs. 1-3, 4A-4B, Claim 2.
[1][e] wherein the transport tube of the first sand screen assembly has a first wall thickness and the transport tube of the second sand screen assembly has a second wall thickness, the first wall	<i>See</i> Abstract, 13:16-18, 21:1-4, Claim 1.	<i>See</i> 14:14-15:8, 18:19-21, Figs. 4A-4B.

thickness being greater than the second wall thickness.		
[24][p] The completion assembly of claim 1,	See claim [1].	See claim [1].
[24][a] wherein the first sand screen assembly further comprises a junction block from which the transport tube and the packing tube extend,	<i>See</i> 4:5-9, 6:18-23, 9:9-11, 16:12-28, Figs. 1-3, Claim 3.	<i>See</i> 5:9-12, 8:13-19, Figs. 1-3, Claim 4.
[24][b] the plurality of nozzles being spaced apart from the junction block; and wherein the second sand screen assembly further comprises a junction block from which the transport tube and the packing tube extend, the plurality of nozzles being spaced apart from the junction block,	<i>See</i> 4:5-9, 6:18-23, 9:9-11, 16:12-28, Figs. 1-3, Claim 3.	<i>See</i> 5:9-13, 8:13-19, Figs. 1-3, Claim 4.
[24][c] wherein the distance between the first sand screen assembly junction block and the packing tube nozzles is greater in the first sand screen assembly than the distance between the second sand screen assembly junction block and the packing tube nozzles in the second sand screen assembly	<i>See</i> 4:5-19, 6:18-23, 9:9-11, 16:12-28, 18:29-32, Figs. 1-3, Claim 3.	<i>See</i> 5:20-22, 8:13-19, Figs. 1-3, Claim 4.
[24][d] ; and wherein <u>shunt tube assemblies of the second sand screen assembly have different spacing between the nozzles.</u>	“Likewise, the spacing D2 between nozzles 216 of shunt tube assemblies of the same sand screen assembly may be the same or different.” 9:28-29. <i>See also</i> Figs. 2-3.	“Likewise, the spacing D2 between nozzles 216 of shunt tube assemblies of the same sand screen assembly may be the same or different.” 13:8-10. <i>See also</i> Figs. 2-3.
[25][p] The completion assembly of claim 1,	See claim [1].	See claim [1].

[25][a] wherein the second end of the first sand screen assembly base pipe is connected to the first end of the second sand screen assembly base pipe forming a joint therebetween,	<i>See</i> 22:22-23:2, Figs. 2-3, Figs. 4A-4B, Claim 6.	<i>See</i> 28:3-8, Figs. 1-3, Claim 11.
[25][b] the completion assembly further comprising a coupling interconnecting one end of a jumper tube to the transport tube of the first sand screen assembly, the other end of the jumper tube in fluid communication with the junction block of the second sand screen assembly whereby the jumper tube straddles the joint between the first and second sand screen assemblies	<i>See</i> 22:22-23:2, Figs. 2-3, Figs. 4A-4B, Claim 6.	<i>See</i> 28:3-8, Figs. 1-3, Claim 11.
[25][c] ; and wherein the cross-sectional flow area of the first transport tube is less than the cross-sectional flow area of the second transport tube.	“a cross-sectional flow area of the transport tube passageway in the first sand screen assembly is less than a cross-sectional flow area of the transport tube passageway in the second sand screen assembly.” 17:28-30.	“In one or more embodiments, the cross-sectional flow area A1 of the transport tube 410 of the first sand screen assembly 202 is less than the cross-sectional flow area A2 of the transport tube 420 of the second sand screen assembly 204. In other words, the downstream sand screen assembly transport tube which is closest to the distal end of the production zone, has a larger cross-sectional flow area than the upstream sand screen assembly transport tube closest to the proximal

		end of the production zone.” 15:10-15.
[26][p] The completion assembly of claim 1,	See claim [1].	See claim [1].
[26][a] wherein the shunt tube assembly of the first sand screen assembly has a pressure rating of between 5000 and 10000 psi	<i>See</i> 6:18-23, 14:3-11, 23:9-11, Figs. 1-3, 4A-4B, Claims 8, 12-13, 18.	<i>See</i> 8:13-19, 19:1-7, 28:14-20, 30:16-21, Figs. 1-3, 4A-4B, Claims 13-14, 18-19, 25.
[26][b] <u>and the packing tube of the first sand screen assembly is interconnected to a junction block of the second sand screen assembly.</u>	“In particular, the packing tube of an upstream sand screen assembly is interconnected to the shunt tube junction block of a downstream sandscreen assembly.” 15:7-9. <i>See also</i> Figs. 1-3.	“In particular, the packing tube of an upstream sand screen assembly is interconnected to the shunt tube junction block of a downstream sandscreen assembly.” 20:18-19. <i>See also</i> Figs. 1-3.
[27][p] The completion assembly of claim 1,	See claim [1].	See claim [1].
[27][a] wherein the shunt tube assembly of the first sand screen assembly has a pressure rating of over a select threshold and the shunt tube assembly of the second sand screen assembly has a pressure rating of no more than the select threshold	<i>See</i> 6:18-23, 10:22-11:6, 13:29-32, 23:12-14, 25:4-6, Figs. 1-3, 4A-4B, Claim 9.	<i>See</i> 8:13-19, 14:14-15:8, 18:21-19:1, 29:1-3, 31:1-3, Figs. 1-3, Claims 15, 26.
[27][b] <u>, and wherein the first sand screen assembly and the second sand screen assembly are eccentric assemblies.</u>	“The one or more shunt tubes 224 may be eccentrically aligned with respect to the base pipe 206 as best seen in FIG. 2. In each of FIGS. 4A and 4B, four shunt tubes 224 are arranged to one side of the base pipe 206. 20 While illustrated	“The one or more shunt tubes 224 may be eccentrically aligned with respect to the base pipe 206 as best seen in FIG. 2. In each of FIGS. 4A and 4B, four shunt tubes 224 are arranged to one side of the base pipe 206. 20 While illustrated

	in FIGS. 2 and 4 as having an eccentric alignment, other alignments of the one or more shunt tubes about the base pipe 206 may also be possible.” 10:17-21. <i>See also</i> Figs. 2, 4A-4B.	in FIGS. 2 and 4 as having an eccentric alignment, other alignments of the one or more shunt tubes about the base pipe 206 may also be possible.” 14:8-12. <i>See also</i> Figs. 2, 4A-4B.
[28][p] A completion assembly for deployment in a wellbore, the completion assembly comprising:	See claim [1].	See claim [1].
[28][a] a source of pressurized working fluid;	See [1][c]. <i>See also</i> 5:18-22, 15:28-16:11, Fig. 1.	See [1][c]. <i>See also</i> 7:8-11, 21:18-22:11, Fig. 1.
[28][b] a first <u>eccentric</u> sand screen assembly attached to a second <u>eccentric</u> sand screen assembly, wherein the first <u>eccentric</u> sand screen assembly comprises a shunt tube assembly with a first burst pressure and the second <u>eccentric</u> sand screen assembly comprises a shunt tube assembly with a burst pressure less than the first burst pressure, and wherein the shunt tube assembly with the first burst pressure is fluidly coupled between the source of pressurized working fluid and the shunt tube assembly with the burst pressure less than the first burst pressure.	See [27][b]. <i>See also</i> 5:18-22, 14:17-19, 15:28-16:11, 19:29-20:3, Figs. 1-3, Claim 11. “The one or more shunt tubes 224 may be eccentrically aligned with respect to the base pipe 206 as best seen in FIG. 2. In each of FIGS. 4A and 4B, four shunt tubes 224 are arranged to one side of the base pipe 206. 20 While illustrated in FIGS. 2 and 4 as having an eccentric alignment, other alignments of the one or more shunt tubes about the base pipe 206 may also be possible.” 10:17-21. <i>See also</i> Figs. 2, 4A-4B.	See [27][b]. <i>See also</i> 19:18-20, 26:14-18, Figs. 1-3, Claim 17.
[29][p] The completion assembly of claim [[11]]28,	See claim [28].	See claim [28].

[29][a] wherein the shunt tube assembly of the first <u>eccentric sand screen assembly</u> is disposed to operate at pressures between 5000 psi and 10000 psi and the shunt tube assembly of the second <u>eccentric sand screen assembly</u> is disposed to operate at pressures of no more than 5000 psi	See [27][b]. “The one or more shunt tubes 224 may be eccentrically aligned with respect to the base pipe 206 as best seen in FIG. 2. In each of FIGS. 4A and 4B, four shunt tubes 224 are arranged to one side of the base pipe 206. 20 While illustrated in FIGS. 2 and 4 as having an eccentric alignment, other alignments of the one or more shunt tubes about the base pipe 206 may also be possible.” 10:17-21. <i>See also</i> Figs. 2, 4A-4B. <i>See also</i> 13:29-32, 14:3-7, 23:9-11, Claims 7-8, 12, 18-19.	See [27][b]. “The one or more shunt tubes 224 may be eccentrically aligned with respect to the base pipe 206 as best seen in FIG. 2. In each of FIGS. 4A and 4B, four shunt tubes 224 are arranged to one side of the base pipe 206. 20 While illustrated in FIGS. 2 and 4 as having an eccentric alignment, other alignments of the one or more shunt tubes about the base pipe 206 may also be possible.” 14:8-12. <i>See also</i> Figs. 2, 4A-4B. <i>See also</i> 18:21-19:12, 26:18-27:10, 28:18-20, Figs. 3, 4A-4B.
[29][b] ; and wherein a <u>cross-sectional flow area of a packing tube of the high pressure shunt tube system is less than the cross-sectional flow area of a packing tube of the low pressure shunt tube system.</u>	“a cross-sectional flow area of the packing tube passageway in the first sand screen assembly is less than a cross-sectional flow area of the packing tube passageway in the second sand screen assembly.” 16:28-30. <i>See also</i> 9:30-10:10:6, Figs. 3, 4A-4B.	“a cross-sectional flow area of the packing tube passageway in the first sand screen assembly is less than a cross-sectional flow area of the packing tube passageway in the second sand screen assembly.” 23:5-7; Claim 2. <i>See also</i> 18:21-19:12, 26:18-27:10, 28:18-20, Figs. 3, 4A-4B.
[30][p] The completion assembly of claim [[11]]28, further comprising:	See claim [28].	See claim [28].

[30][a] a plurality of first sand screen assemblies forming a lower portion of the completion assembly and attached to a plurality of second sand screen assemblies forming an upper portion of the completion assembly,	<i>See</i> 7:1-5, 13:29-32, 14:3-7, 16:12-28, 23:9-11, Claims 7-8, 12, 18-19.	<i>See also</i> 18:21-19:12, 20:21-23, Claim 19.
[30][b] wherein the first sand screen assemblies each comprises a shunt tube assembly having an operating pressure rating between 5000 psi and 10000 psi, and the second sand screen assembly has a shunt tube assembly having an operating pressure rating of no more than 5000 psi	<i>See</i> [29][a], [30][a]. <i>See also</i> 23:9-11.	<i>See also</i> 18:21-19:12, 20:21-23, 26:18-27:10, 28:18-20, Claim 19.
[30][c] ; and wherein a <u>packing tube of the first eccentric sand screen assembly is interconnected to a shunt tube junction block of the second eccentric sand screen assembly.</u>	<i>See</i> [26][b]. “In particular, the packing tube of an upstream sand screen assembly is interconnected to the shunt tube junction block of a downstream sandscreen assembly.” 15:7-9. <i>See also</i> Figs. 1-3.	<i>See</i> [26][b]. “In particular, the packing tube of an upstream sand screen assembly is interconnected to the shunt tube junction block of a downstream sandscreen assembly.” 20:18-19. <i>See also</i> Figs. 1-3.
[31][a] A method of installing a completion assembly in a wellbore, the method comprising	<i>See</i> claim [1]. <i>See also</i> 14:20-15:27, 23:24-24:30, Figs. 1, 5, Claim 14.	<i>See</i> claim [1]. <i>See also</i> 19:21-22:9, 29:6-30:14, Fig. 5, Claims 23-24.
[31][b] identifying an elongated production zone having an upstream proximal end and a downstream distal end with respect to a source of pressurized working fluid;	<i>See</i> 5:18-22, 15:28-16:11, 24:9-11, 24:26-28, Figs. 1, 5, Claim 14.	<i>See</i> 7:8-11, 21:18-22:9 30:6-7, Figs. 1, 5, Claims 23-24.

[31][c] determining a shunt tube system operating pressure associated with the proximal end of the production zone and selecting a high pressure shunt tube system based on the proximal end determined pressure;	<i>See</i> 24:9-13, Figs. 1, 5, Claim 14.	<i>See</i> 19:21-22:9, 29:21-23, Figs. 1, 5, Claims 23-24.
[31][d] determining a shunt tube system operating pressure associated with the distal end of the production zone and selecting a low pressure shunt tube system based on the distal end determined pressure;	<i>See</i> 24:14-16, Figs. 1, 5, Claim 14.	<i>See</i> 19:21-22:9 29:23-30:3, Figs. 1, 5, Claims 23-24.
[31][e] installing a first <u>eccentric</u> sand screen assembly in a wellbore adjacent the distal downstream end of the elongated production zone;	<i>See</i> [27][b]. <i>See also</i> 24:17-19, Figs. 1, 5, Claim 14.	<i>See</i> [27][b]. <i>See</i> 19:21-22:9, 29:6-30:14, Figs. 1-3, 5, Claims 23-24.
[31][f] attaching a second <u>eccentric</u> sand screen assembly to the first <u>eccentric</u> sand screen assembly at the proximal upstream end of the elongated production zone, wherein the first <u>eccentric</u> sand screen assembly has the low pressure shunt tube system and the second <u>eccentric</u> sand screen assembly has the high pressure shunt tube system, such that a downstream end of the high pressure shunt tube system is coupled to an upstream end of the low pressure shunt tube system; and	<i>See</i> [27][b]. <i>See also</i> 15:20-27, 24:4-9, 24:17-19, Figs. 1-3, 5, Claim 14.	<i>See</i> [27][b]. <i>See</i> 19:21-22:9, 29:6-30:14, Figs. 1-3, 5, Claims 23-24.
[31][g] coupling the source of pressurized working fluid to an upstream end of the high pressure shunt tube system	<i>See</i> 15:28-16:11, 24:26-28, Figs. 1, 5, Claim 14.	<i>See</i> 7:8-11, 21:18-22:9, 29:21-23, Figs. 1, 5, Claims 23-24.

[32][p] The method of claim 31, further comprising:	See claim [31].	See claim [31].
[32][a] installing a plurality of interconnected first <u>eccentric</u> sand screen assemblies in a wellbore adjacent the production zone;	See [27][b]. <i>See also</i> 15:10-12, 23:24-24:9, Claim 15. Claim 32 was amended solely for antecedent basis and to depend from claim number 31.	See [27][b]. <i>See also</i> 20:21-23, 29:14-19, Claim 22. Claim 32 was amended solely for antecedent basis and to depend from claim number 31.
[32][b] and attaching a plurality of second <u>eccentric</u> sand screen assemblies to an uppermost first <u>eccentric</u> sand screen assembly upstream of the first <u>eccentric</u> sand screen assemblies.	See [27][b]. <i>See</i> 15:10-12, 23:24-24:9, Claim 15. Claim 32 was amended solely for antecedent basis and to depend from claim number 31.	See [27][b]. <i>See also</i> 20:21-23, 29:14-19, Claim 22. Claim 32 was amended solely for antecedent basis and to depend from claim number 31.
[33][p] The method of claim [[14]]31,	See [31].	See [31].
[33][a] further comprising introducing a working fluid into the shunt systems, wherein the working fluid is pressurized in accordance with the operating pressure of the high pressure shunt tube system	<i>See</i> 15:28-16:11, Figs. 1, 3, Claim 16.	<i>See</i> 21:18-22:1, Figs. 1, 3, Claim 27.
[33][b] <u>and a packing tube of the high pressure shunt tube system is interconnected to a shunt tube junction block of the high pressure shunt tube system.</u>	See [26][b]. “In particular, the packing tube of an upstream sand screen assembly is interconnected to the shunt tube junction block of a downstream sandscreen assembly.” 15:7-9. <i>See also</i> Figs. 1-3.	See [26][b]. “In particular, the packing tube of an upstream sand screen assembly is interconnected to the shunt tube junction block of a downstream sandscreen assembly.” 20:18-19. <i>See also</i> Figs. 1-3.

[34][p] The method of claim [[14]]31,	See [31].	See [31].
[34][a] further comprising injecting the working fluid into the annulus adjacent the shunt tube system so as to form a gravel pack in the annulus	See 16:7-11, Figs. 1-3, Claim 17.	See also 7:8-11, 21:18-22:9, 22:4-6, Claim 28.
[34][b] , wherein a cross-sectional flow area of a packing tube of the high pressure shunt tube system is less than a cross-sectional flow area of a packing tube of the low pressure shunt tube system.	See [29][b]. “a cross-sectional flow area of the packing tube passageway in the first sand screen assembly is less than a cross-sectional flow area of the packing tube passageway in the second sand screen assembly.” 16:28-30. See also 9:30-10:6, Figs. 1, 3, 4A-4B.	See [29][b]. “a cross-sectional flow area of the packing tube passageway in the first sand screen assembly is less than a cross-sectional flow area of the packing tube passageway in the second sand screen assembly.” 23:5-7; Claim 2. See also 18:21-19:12, 26:18-27:10, 28:18-20, Figs. 1, 3, 4A-4B.
[35] The method of claim [[14]]31, wherein the high pressure shunt tube system is disposed to operate at pressures of 5000 psi and the low pressure shunt tube system is disposed to operate at pressures of no more than 5000 psi.	See [31]. See also 13:32-14:3, Claim 18. Claim 35 was amended solely to depend from claim number 31 and to clarify an operating pressure of “5000 psi.”	See [31]. See also 19:1-5, 26:18-22, claims 18, 25. Claim 35 was amended solely to depend from claim number 31 and to clarify an operating pressure of “5000 psi.”
[36] The method of claim [[14]]31, wherein the high pressure shunt tube system is disposed to operate at pressures above a select threshold and the low pressure shunt tube system is disposed to operate at pressures of no more than the select threshold.	See [31]. See also 13:29-32, 23:12-14, Claim 19. Claim 36 was amended solely to depend from claim number 31.	See [31]. See also 8:13-19, 14:14-15:8, 18:21-19:1, 29:1-3, 31:1-3, Figs. 1-3, 4A-4B, Claims 15, 26. Claim 36 was amended solely to depend from claim number 31.

[37] The method of claim [[14]]31, wherein installing the first <u>eccentric</u> sand screen assembly and attaching the second <u>eccentric</u> sand screen assembly include disposing the first <u>eccentric</u> sand screen assembly and the second <u>eccentric</u> sand screen assembly in a horizontal portion of the wellbore.	See claim [31] & [27][b]. “The one or more shunt tubes 224 may be eccentrically aligned with respect to the base pipe 206 as best seen in FIG. 2. In each of FIGS. 4A and 4B, four shunt tubes 224 are arranged to one side of the base pipe 206. 20 While illustrated in FIGS. 2 and 4 as having an eccentric alignment, other alignments of the one or more shunt tubes about the base pipe 206 may also be possible.” 10:17-21. <i>See also</i> 3:26-4:1, 4:24-30, Figs. 1, 4A-4B, Claim 20. Claim 37 was amended solely for antecedent basis and to depend from claim number 31.	See [31] & [27][b]. “The one or more shunt tubes 224 may be eccentrically aligned with respect to the base pipe 206 as best seen in FIG. 2. In each of FIGS. 4A and 4B, four shunt tubes 224 are arranged to one side of the base pipe 206. 20 While illustrated in FIGS. 2 and 4 as having an eccentric alignment, other alignments of the one or more shunt tubes about the base pipe 206 may also be possible.” 14:8-12. <i>See also</i> Figs. 2, 4A-4B. <i>See also</i> 5:1-4, 8, 3-9, Fig. 1. Claim 37 was amended solely for antecedent basis and to depend from claim number 31.
[38][p] A completion assembly for deployment in a wellbore, the completion assembly comprising:	See claim [1].	See claim [1].
[38][a] a source of pressurized working fluid;	See [1][c], [28][a].	See [1][c], [28][a].
[38][b] a first, <u>eccentric</u> sand screen assembly comprising a base pipe having perforations therein and extending between a first end and a second ends, a sand screen disposed around a portion of the base pipe, and a	See [1][a] & [27][b]. “The one or more shunt tubes 224 may be eccentrically aligned with respect to the base pipe 206 as best seen in	See [1][a] & [27][b]. “The one or more shunt tubes 224 may be eccentrically aligned with respect to the base pipe 206 as best seen in

shunt tube assembly disposed outwardly of the sand screen, the shunt tube assembly having a transport tube and a packing tube, where each of the tubes has a passageway defined therein, the packing tube further including a plurality of nozzles spaced apart from each other, wherein each of the tubes and each nozzle has a cross-sectional flow area; and	FIG. 2. In each of FIGS. 4A and 4B, four shunt tubes 224 are arranged to one side of the base pipe 206. 20 While illustrated in FIGS. 2 and 4 as having an eccentric alignment, other alignments of the one or more shunt tubes about the base pipe 206 may also be possible.” 10:17-21. <i>See also</i> 20:17-35, Claim 21.	FIG. 2. In each of FIGS. 4A and 4B, four shunt tubes 224 are arranged to one side of the base pipe 206. 20 While illustrated in FIGS. 2 and 4 as having an eccentric alignment, other alignments of the one or more shunt tubes about the base pipe 206 may also be possible.” 14:8-12. <i>See also</i> Figs. 2, 4A-4B. <i>See also</i> 22:11-23:5, Figs. 1-3, Claim 2.
[38][c] a second, <u>eccentric</u> sand screen assembly comprising a base pipe having perforations therein and extending between a first end and a second ends, a sand screen disposed around a portion of the base pipe, and a shunt tube assembly disposed outwardly of the sand screen, the shunt tube assembly having a transport tube and a packing tube, the packing tube including a plurality of nozzles spaced apart from each other, wherein each of the tubes and each nozzle has a cross-sectional flow area;	See [1][b] & [27][b]. “The one or more shunt tubes 224 may be eccentrically aligned with respect to the base pipe 206 as best seen in FIG. 2. In each of FIGS. 4A and 4B, four shunt tubes 224 are arranged to one side of the base pipe 206. 20 While illustrated in FIGS. 2 and 4 as having an eccentric alignment, other alignments of the one or more shunt tubes about the base pipe 206 may also be possible.” 10:17-21.	See [1][b] & [27][b]. “The one or more shunt tubes 224 may be eccentrically aligned with respect to the base pipe 206 as best seen in FIG. 2. In each of FIGS. 4A and 4B, four shunt tubes 224 are arranged to one side of the base pipe 206. 20 While illustrated in FIGS. 2 and 4 as having an eccentric alignment, other alignments of the one or more shunt tubes about the base pipe 206 may also be possible.” 14:8-12. <i>See also</i> Figs. 2, 4A-4B. <i>See also</i> 22:11-23:5, Figs. 1-3, Claim 2.

[38][d] wherein the first and second <u>eccentric</u> sand screen assemblies are arranged end to end relative to one another so that the base pipes are in fluid communication with one another and the transport tubes are in fluid communication with one another and the source of pressurized working fluid,	See [1][c], [1][d], & [27][b]. “The one or more shunt tubes 224 may be eccentrically aligned with respect to the base pipe 206 as best seen in FIG. 2. In each of FIGS. 4A and 4B, four shunt tubes 224 are arranged to one side of the base pipe 206. 20 While illustrated in FIGS. 2 and 4 as having an eccentric alignment, other alignments of the one or more shunt tubes about the base pipe 206 may also be possible.” 10:17-21.	See [1][c], [1][d], & [27][b]. “The one or more shunt tubes 224 may be eccentrically aligned with respect to the base pipe 206 as best seen in FIG. 2. In each of FIGS. 4A and 4B, four shunt tubes 224 are arranged to one side of the base pipe 206. 20 While illustrated in FIGS. 2 and 4 as having an eccentric alignment, other alignments of the one or more shunt tubes about the base pipe 206 may also be possible.” 14:8-12. <i>See also</i> Figs. 2, 4A-4B.
[38][e] the transport tube of the second <u>eccentric</u> sand screen assembly fluidly coupled to the source of pressurized working fluid downstream of the transport tube of the first <u>eccentric</u> sand screen assembly; and wherein the transport tube of the first <u>eccentric</u> sand screen assembly is formed of a first material and the transport tube of the second <u>eccentric</u> sand screen assembly is formed of a second material, the first material having a greater tensile strength than the second material.	See [1][c], [1][d] & [27][b]. “The one or more shunt tubes 224 may be eccentrically aligned with respect to the base pipe 206 as best seen in FIG. 2. In each of FIGS. 4A and 4B, four shunt tubes 224 are arranged to one side of the base pipe 206. 20 While illustrated in FIGS. 2 and 4 as having an eccentric alignment, other alignments of the one or more shunt tubes about the base pipe 206 may	See [1][c], [1][d], & [27][b]. “The one or more shunt tubes 224 may be eccentrically aligned with respect to the base pipe 206 as best seen in FIG. 2. In each of FIGS. 4A and 4B, four shunt tubes 224 are arranged to one side of the base pipe 206. 20 While illustrated in FIGS. 2 and 4 as having an eccentric alignment, other alignments of the one or more shunt tubes about the base pipe 206 may

	also be possible.” 10:17-21. <i>See also</i> 13:21-31, 15:28-16:28, 20:17-35, 21:7-15, Figs. 1-3, 4A-4B, 5, Claims 1, 21.	also be possible.” 14:8-12. <i>See also</i> Figs. 2, 4A-4B. <i>See also</i> 17:5-11, 29:1-3, Figs. 1-3, 4A-4B, 5, Claims 15, 26.
[39][p] The completion assembly of claim [[21]]38,	See [38].	See [38].
[39][a] wherein the transport tube of the first sand screen assembly has a first wall thickness and the transport tube of the second sand screen assembly has a second wall thickness, the first wall thickness being greater than the second wall thickness	See [1][e].	See [1][e]. <i>See also</i> 18:19-21.
[39][b] ; and wherein a cross-sectional flow area of the packing tube of the first, <u>eccentric sand screen assembly is less than a cross-sectional flow area of the packing tube of the second, eccentric sand screen assembly.</u>	See [29][b]. “a cross-sectional flow area of the packing tube passageway in the first sand screen assembly is less than a cross-sectional flow area of the packing tube passageway in the second sand screen assembly.” 16:28-30. <i>See also</i> 22:1-3.	See [29][b]. “a cross-sectional flow area of the packing tube passageway in the first sand screen assembly is less than a cross-sectional flow area of the packing tube passageway in the second sand screen assembly.” 23:5-7; Claim 2. <i>See also</i> 23:5-7.
[40][p] The completion assembly of claim [[21]]38,	See claim [38].	
[40][a] wherein the first sand screen assembly has a shunt tube assembly with a first pressure rating and the second sand screen assembly has a shunt tube assembly with a	<i>See</i> 6:18-23, 14:7-11, 20:13-17, Claim 23.	<i>See also</i> 8:13-19, 19:8-12, Claims 15-16.

second pressure rating less than the first pressure rating		
<u>[40][b] , and a packing tube of the first eccentric sand screen assembly is interconnected to a shunt tube junction block of the second eccentric sand screen assembly.</u>	See [26][b]. “In particular, the packing tube of an upstream sand screen assembly is interconnected to the shunt tube junction block of a downstream sandscreen assembly.” 15:7-9. <i>See also</i> Figs. 1-3.	See [26][b]. “In particular, the packing tube of an upstream sand screen assembly is interconnected to the shunt tube junction block of a downstream sandscreen assembly.” 20:18-19. <i>See also</i> Figs. 1-3

B. The original application and provisional application for the '007 Patent Enable the Substitute Claims

60. I have also been asked to evaluate whether the Substitute Claims are enabled by the original application. I have been informed that, to be enabling, a specification or application must teach those skilled in the art how to make and use the full scope of the claimed invention without undue experimentation, as of the patent's effective filing date. I understand that the factors to consider when determining whether a disclosure would require undue experimentation include (1) the quantity of experimentation necessary; (2) the amount of direction or guidance presented; (3) the presence or absence of working examples; (4) the nature of the invention; (5) the state of the prior art; (6) the relative skill of those in the art; (7) the predictability or unpredictability of the art; and (8) the breadth of the claims.

61. In view of the table of exemplary citations in the previous section, it is my opinion that a POSITA would have had sufficient information to make and use the full scope of the proposed substitute claims without undue experimentation. To the extent Petitioner and/or Petitioner's expert argue differently, I reserve the right to respond.

X. THE SUBSTITUTE CLAIMS ARE PATENTABLE OVER THE ART OF RECORD

62. I understand that Patent Owner does not bear the burden regarding the patentability of the substitute claims. I nonetheless summarize here exemplary reasons why the art in the Petition does not teach or suggest the Substitute Claims.

63. Substitute Claims 28, 31, and 38 for original independent claims 11, 14, and 21, respectively, as well as Substitute Claim 27 for original claim 9, are amended to require an upstream eccentric screen and a downstream eccentric screen. Petitioner's grounds (and Mr. Chambers opinions) all rely on the *Yeh* reference, or a combination of the *Yeh* and *Yeh2* references, that teach use of concentric screens.²⁶ Petitioner relies on an embodiment of *Yeh* describing an upstream concentric screen and a downstream concentric screen;²⁷ accordingly, Petitioner's grounds do not render obvious use of upstream and downstream eccentric screens having the characteristics of Substitute Claims 28-40. Similarly, it is my opinion that Substitute

²⁶ See, for example, Petition, p.41; Ex. 1003 (Chambers Declaration), ¶¶291-93.

²⁷ Ex. 1005 (*Yeh*) 24:54-60, 30:13-33.

XI. CONCLUSION

64. I reserve the right to supplement the opinions expressed herein and/or offer testimony in support of this Declaration.

65. I hereby 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, further, that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. § 1001.

Executed on March 7, 2025



Robert Durham, Ph.D.