

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

TANKLOGIX, LLC,
Petitioner,

v.

SITEPRO, INC.
Patent Owner.

Case IPR2025-00648

Patent No. 8,646,909

DECLARATION OF DR. ROBERT A. DURHAM

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2. 1[b]: “a plurality of geographically distributed site master controllers, each site master controller corresponding to a respective one of the oil wells, petro water disposal or re-injection facilities, or petroleum pumping stations, each site master controller comprising:”	59
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4. 1[g]: “receiving, via the network interface, from the command center server, a plurality of commands encoded in a first	

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5. 1[i]: “translating the plurality of commands into translated commands encoded in a plurality of protocols different from the first protocol, each translated command being translated into a protocol among the plurality of protocols suitable for a fluid-handling device to which the respective command is directed, the at least some of the translated command being operative to cause a local controller of the given fluid-handling device to drive the given fluid-handling device to the plurality of different target states, the local controller being responsive to the translated commands and feedback from the given fluid-handling device indicative of whether the given fluid-handling device is in a targeted state; and”	62
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2. 1[b]: “a plurality of geographically distributed site master controllers, each site master controller corresponding to a respective one of the oil wells, petro water disposal or re-injection facilities, or petroleum pumping stations, each site master controller comprising:” 69
3. 1[f]: “one or more processors communicatively coupled to the communication module, the network interface, and the memory, wherein the memory stores instructions that when executed by the processors cause the processors to effectuate steps comprising:” 71
4. 1[g]: “receiving, via the network interface, from the command center server, a plurality of commands encoded in a first protocol to control the fluid-handling devices from a user corresponding to one of the user accounts, different commands among the plurality of commands being directed to different fluid handling devices among the plurality of fluid-handling devices;” 72
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6. 1[i]: “translating the plurality of commands into translated commands encoded in a plurality of protocols different from the first protocol, each translated command being translated into a protocol among the plurality of protocols suitable for a fluid-handling device to which the respective command is directed, the at least some of the translated command being operative to cause a local controller of the given fluid-handling device to drive the given fluid-handling device to the plurality of different target states, the local controller being responsive to the translated commands and feedback from the given fluid-handling device indicative of whether the given fluid-handling device is in a targeted state; and” 75

1[j]: “sending the translated commands to respective local
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I, Dr. Robert Durham, Ph.D., hereby declare as follows:

I. INTRODUCTION & QUALIFICATIONS

1. I have been retained on behalf of SitePro, Inc. (“SitePro”) to provide my opinions regarding Tanklogix LLC’s Petition for Inter Partes Review of Claims 1-12 and 14-21 of U.S. Patent No. 8,649,909 (“the ’909 Patent”). I submit this declaration based on my personal knowledge and in support of SitePro’s Patent Owner Preliminary Response.

2. In formulating my opinions, I have relied upon my knowledge, training, and experience in the relevant art. My qualifications are detailed more fully in my curriculum vitae, which is included as Appendix A. Below, I provide a brief summary of my qualifications.

3. I am being compensated for my time spent in connection with this matter at my usual rate. My compensation is in no way contingent on the substance of my opinions or the outcome of this case.

A. QUALIFICATIONS

4. 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 '909 Patent, which I describe below in **Section V** (“Overview of the '909 Patent”).

5. I received both my Bachelor of Science degree 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.

6. 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 to 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, holding two-year terms in each position: Secretary, Vice Chair, Chair, and Chair of the Advisory and Awards Committee.

7. 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.

8. I have worked directly in the area of electrification of 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 was administratively responsible for all electrical equipment, including overhead power lines, transformers, switchgear, drives, and motors, throughout NDL’s production, exploration, and drilling areas.

9. After a brief stint as Vice President for EDG Power Group, where I was responsible for Engineering and Project Management of generation and cogeneration facilities across the U.S., I transitioned to the role of consulting engineer. In that role, I have served as a consulting engineer, designing, constructing, and analyzing various systems, particularly those in the oil and gas industry. This has included the design and selection of equipment, as well as the analysis of equipment failures in the oil and gas field, spanning from drilling and completion sites to production facilities, midstream locations, and downstream (refinery) sites.

10. I am also a Principal of PEDOCS, Inc., an oil and gas production company that has operated 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.

11. I have been familiar with oil and gas drilling, fracturing (fracking), completion and production operations for nearly twenty years. In addition to being responsible for interfacing with drilling and fracturing operations with regards to electrical needs as an employee of New Dominion, LLC, I have been further educated about drilling, fracturing and operations as I have consulted and investigated incidents on multiple well drilling, fracturing, completion and

production sites over my engineering consulting engagements, including numerous water collection, storage and disposal facilities.

12. I have been familiar with power distribution, including generation, transmission, and distribution equipment. As an employee, I worked as a design and construction engineer for generation facilities for Central and Southwest (now American Electric Power (AEP)). I was also responsible for the design and construction of generation facilities when employed by EDG Power Group, as discussed above. While at AEP, I spent three years as a transmission planner, responsible for modeling transmission systems and developing plans for increased power distribution capacities at high voltages. While at New Dominion LLC, I owned and was responsible for the design, construction, and maintenance of several hundred miles of medium-voltage (5–25 kV) distribution lines, switchgear, drives, and motors used for oil and gas drilling, completion, and production. Over the last ~ 20 years, I have consulted with numerous clients, ranging from utilities to oil and gas development and production companies, on the design, upgrades, and maintenance of generation and power distribution facilities.

13. I have been familiar with the design, specification, construction and operation of Adjustable Speed Drive (ASD) systems for over 30 years. While at AEP, I gained my first exposure to ASDs (sometimes referred to as variable

frequency drives or VFDs). Between 1990 and 1992, while employed by Public Service Company of Oklahoma (an AEP company), I was responsible for overseeing the field installation of multiple 4,500+ hp VFDs for fans and pumps. I continued working with ASDs and related technologies, such as back-to-back inverter systems, throughout my career at AEP. When I took over as Manager of Electric Infrastructure at New Dominion, I was responsible not only for overhead lines but also for the specification, installation, and operation of all ASDs for production pump applications on both downhole and surface pumping systems. These ASDs ranged from a few hundred to around 1,000 HP at both medium and low voltages. At EDG Power Group, I was responsible for specifying and overseeing the installation of VFDs that ran pumps and fan motors on power generation facility installations. Since I began consulting nearly 20 years ago, I have specified, installed, analyzed, and torn down ASDs on numerous projects. As Standards Chair of the PCIC, I have been responsible for overseeing the management of several standard working groups for ASD applications in the Oil and Gas Industry, including IEEE 1662, 1826, and 1566. I am comfortable in stating that I have worked with several hundred ASDs throughout my career.

14. I have been familiar with control systems, Supervisory Control and Data Acquisition (SCADA) systems, and remote control operations for over thirty

years. I have become familiar with web-based control systems over the last decade as part of my various consulting engagements, including drilling systems, fluid handling systems, production systems, and others. I have designed control systems, including remote control, for various facilities throughout my career, including oil and gas production, water storage and disposal facilities, water treatment facilities, power generation plants, generator systems, and aggregate conveying systems, among others. The first control system I designed, for a water treatment facility, was as a junior engineer in 1990-1991. I am a licensed controls system engineer and a licensed petroleum engineer.

15. I am the author or co-author of 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, which is attached as Appendix A.

16. 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 '909 Patent and have been an expert in this field since before the '909 Patent was filed with the United States Patent and Trademark Office ("USPTO").

II. TASK SUMMARY AND MATERIALS REVIEWED

17. I have been asked to review the Petition for *Inter Partes* Review of Claims 1-12 and 14-21 of the '909 Patent along with the associated patent (Ex.

1001), the prosecution history of the '909 Patent (Ex. 1004), the alleged prior art relied on in Petitioner's invalidity grounds (Ex. 1005, Ex. 1006, Ex. 1007), the declaration of Petitioner's expert, Dr. Wooley (Ex. 1002), and other associated exhibits and provide my opinions regarding the Petition and corresponding documents. In forming my opinions, I have reviewed the materials cited in the List of Exhibits Reviewed (**Section III**, below) and the materials cited throughout my declaration.

18. I reserve the right to respond to anything that may be made available to me in the form of (1) information that may be provided in the expert report(s) of Petitioner's expert witness(s); (2) additional discovery information, such as Petitioner's expert(s)'s report(s) and declaration(s), deposition testimony, document production, etc.; and (3) information obtained through my own investigation. Further, should I not include analysis for certain claim limitations or elements in the sections below, this does not imply that I agree with Petitioner's claim that the limitation or element is anticipated by or obvious over the prior art, nor does it imply that I agree with Dr. Wooley's analysis of the claim limitation or element.

III. LIST OF EXHIBITS REVIEWED

Exhibit No.	Description
1001	U.S. Patent No. 8,646,909 ('909 Patent)
1002	Declaration of Dr. Gary Wooley
1003	Curriculum Vitae of Dr. Gary Wooley
1004	File Wrapper for U.S. Patent No. 8,646,909
1005	U.S. Patent Application No. 2015/0308244 to Cardamone
1006	U.S. Patent No. 8,667,091 to Almadì
1007	U.S. Patent Application No. 2008/0316048 to Abdallah

IV. LEGAL STANDARDS

A. LEVEL OF ORDINARY SKILL IN THE ART

19. 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.

20. 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, the rapidity with which innovations are made, the sophistication of the technology, and the 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.

21. I am familiar with how a POSITA would have understood and used the terminology found in the '909 Patent at the time and before the priority date of the '909 Patent.

B. LEGAL STANDARD FOR CLAIM CONSTRUCTION

22. 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.

23. 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.

24. 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 the 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.

25. 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.

26. 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.

27. In comparing the claims of the '909 Patent to the prior art, I have considered the '909 Patent and its file history in light of the understanding of a person of skill at the time of the alleged invention.

C. ANTICIPATION

28. It is my understanding that a prior art reference anticipates a claim of a patent 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 a POSITA would have so recognized it. In addition, I understand that an enabling disclosure is a disclosure that allows a POSITA to make the invention without undue experimentation.

D. OBVIOUSNESS

29. 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).

30. 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.

31. 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.

32. 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.

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

34. 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.

35. 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.

E. PRIORITY DATE

36. 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.

37. 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.

38. 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.

39. 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.

V. OVERVIEW OF THE '909 PATENT

A. PATENT SPECIFICATION AND CLAIMS

40. The '909 Patent, entitled "Remote Control of Fluid-Handling Devices," was issued by the USPTO on February 11, 2014.¹ The '909 Patent describes a web-based, remote industrial monitoring and control system for geographically distributed facilities in oil and gas fields. The system described is designed to receive

¹ Ex. 1001 ('909 Patent) cover.

with a command-center server, commands from a user device and send those commands to fluid handling devices at oil and gas facilities. The '909 Patent describes several features that enable the system to operate in a hosted web-based environment.

B. PRIORITY DATE

41. I understand that the priority date of the '909 Patent claims a priority date of December 7, 2012, which is the filing date of U.S. App. No. 13/708,557 that corresponds to the '909 Patent.²

VI. OVERVIEW OF PETITIONER'S REFERENCES

A. CARDAMONE (EX. 1005)

42. *Cardamone* is U.S. Patent Application Publication No. 2015/0308244, which was filed as U.S. App. No. 14/646,970 on May 22, 2015, and published October 29, 2015. *Cardamone* claims priority to PCT Patent Application No. PCT/US2013/071976, filed on November 26, 2013, which ultimately claims priority to U.S. Provisional Application No. 61/729,815 ("*Cardamone provisional*"), which was filed on November 26, 2012.³ However, I understand that

² Ex. 1001 front page and Petition at 7-8.

³ Ex. 1005 (*Cardamone*) front page.

Patent Owner may contend that U.S. Patent Application No. 2015/0308244 (i.e., the document referred to as “*Cardamone*” in the Petition, Dr. Wooley’s declaration, and this declaration) may not qualify as prior art to the ’909 Patent. Importantly, my analysis and expert opinion regarding the disclosure and teaching of *Cardamone* are directed to the *Cardamone* document, i.e., U.S. Publication No. 2015/0308244. I do not opine whether *Cardamone* is prior art, or on anything in the *Cardamone provisional*.

43. *Cardamone* discloses a system to control a deep-well linear pump system with a “motor driver system (318) connected with the linear motor and configured to provide drive commands to the linear motor, a surface control computer (126) connected with the motor drive system and configured to control the linear motor, a sensor system (224) communicating with the control computer and configured to sense operating parameters of the linear motor, and the sensor system comprising a synchronous serial interface encoder configured to sense position of the motor shaft and a temperature sensor configured to sense the temperature of the motor.”⁴

⁴ Ex. 1005 (*Cardamone*) at Abstract.

B. ALMADI (EX. 1006)

44. *Almadi* refers to United States Patent No. 8,667,091, which was filed on July 22, 2011 (U.S. Application No. 13/188,899) and issued on March 4, 2014. *Almadi* was published as U.S. Patent Application Publication No. 2012/0084400 on April 5, 2012. *Almadi* claims priority to U.S. Provisional Application No. 61/367,207 (“*Almadi provisional*”), filed on July 23, 2010. My analysis and expert opinion regarding the disclosure and teaching of *Almadi* are directed to the *Almadi* document, i.e., U.S. Patent No. 8,667,091. I do not opine on anything in the *Almadi provisional*.

45. *Almadi* discloses a programmable logic controller (PLC) that uses subsystem communications to communicate with remote and in-plant subsystems. *Almadi* teaches systems to verify that data is valid, such as time-stamped data, exception reporting, and monitoring of communication failures and their re-establishment.⁵

C. ABDALLAH (EX. 1007)

46. *Abdallah* is U.S. Patent Application Publication No. 2008/0316048, which published December 25, 2008 and corresponds to U.S. Patent Application No. 12/055,995, filed May 22, 2010. *Abdallah* describes a series of integrated sensor

⁵ Ex. 1006 (*Almadi*) at Abstract.

nodes that gather data from various sensors and communicate that data to other nodes, which then communicate that data to a SCADA system for viewing by remote users.⁶ *Abdallah* also discloses a series of protocol translators that enable communications between devices that use disparate communication languages (protocols).

VII. LEVEL OF ORDINARY SKILL IN THE ART

47. The Petition does not discuss or assert the level that a POSITA would have had at the time of the '909 patent.⁷ Petitioner's expert, Dr. Wooley, asserts that a POSITA "would have had at least a bachelor's degree in engineering (electrical, chemical, or mechanical), computer science, or a related field and significant experience with remotely controlling fluid-handling devices, like SCADA systems."⁸ Dr. Wooley does not opine on what "significant experience" means.

48. It is my opinion that a POSITA would have had at least a bachelor's degree in engineering (electrical, chemical, petroleum or mechanical), computer science, or a related field and at least two years of experience designing control

⁶ See, e.g., Ex. 1007 (*Almadi*) [0053] – [0054].

⁷ See Petition, which does not include a section or statement about the level of skill of a POSITA.

⁸ See Ex. 1002 at pg. 9, ¶¶25-26.

systems for remotely controlling fluid-handling devices, like SCADA systems. Alternatively, a POSITA would have had at least six years of experience in designing control systems for remotely controlling fluid-handling devices, such as SCADA systems.

49. I possess both the education requirements and the field experience of a POSITA. Not only is my formal education in the same technical discipline (electrical engineering) as that of Petitioner's (and my) definition, but I also have additional education beyond a bachelor's degree. Furthermore, I have over thirty years of experience in control system design, including remotely controlling fluid handling devices, as well as SCADA systems. I have over 20 years of experience in oil and gas drilling, completion, and subsurface production operations, including experience with control systems for these operations and associated equipment.

50. For purposes of this declaration, I have applied the level of skill of a POSITA as described above.

VIII. TECHNOLOGY BACKGROUND AND STATE OF THE ART

51. In the subsections below, I describe some of the basic principles of engineering that would be used, or at least considered for use, in the field of oil and gas operations, and particularly in the field of fluid handling during the various stages of drilling, completion, and production. The principles discussed in the

subsections below would have been known to a POSITA in the December 2012 timeframe.

52. I understand that it is important, when viewing the State of the Art and the background technology known to a POSITA, to rely on those materials which would have been known to a POSITA at the time of the filing of the '909 Patent. Reliance on materials published or made publicly available after the filing of the '909 Patent (with the exception of publications specifically documenting the history of an industry) does not show what would have been known to a POSITA in the relevant timeframe.

A. CONTROL SYSTEMS

53. In general, control systems of some variety have been in place since at least the development of water clocks by the Greeks around the 3rd century BC. Automatic control systems for machines were developed in the late 18th century AD, such as the “Watts Fly Ball Governor,” which was developed in 1788.⁹ Butz’s Damper Flapper, a precursor to the thermostat, was developed in 1885 and led to the development of Honeywell.

⁹ <https://www.electrical4u.com/control-engineering-historical-review-and-types-of-control-engineering/> (accessed June 25, 2025).

54. Basic control system theory was developed in the early 20th Century, with practitioners such as Bode, Nyquist developing analytical methods such as the Bode plots (a graph of the frequency response of a system) or Nyquist stability criterion, which plots the open-loop (no feedback) response of a system to measure system stability.¹⁰ Minorsky, another mathematician, developed proportional, integral and derivative control (PID) in the 1920s. Heaviside provided mathematical functions that are useful in analytical tools, such as Laplace transforms.

55. In the 1950s, Kalman changed control systems in two significant ways. First, with the development of the “Kalman Filter”, a mathematical technique to reduce noise in a measurement system, control systems could be tuned with tighter control, as they would not be responding to noise in the system, but more so to the actual values in the physical system. Second, Kalman developed techniques for representing systems (including control systems) in a matrix form, called a state-space representation. Once in matrix form, the matrices can be manipulated algebraically, rather than relying on calculus-based methods of the PID controller.

56. With the development of the Programmable Logic Controller (PLC) by General Motors on New Year's Day 1968, computers entered the realm of automatic

¹⁰ <https://www.electrical4u.com/control-engineering-historical-review-and-types-of-control-engineering/> (accessed June 25, 2025).

control.¹¹ A PLC replaced the previous electromechanical devices (relays, pneumatic plunger timers, electromechanical counters, toggle switches, etc.) with solid-state computer-based control. Thus, a control system for a machine that previously may have occupied an entire wall of a room was replaced by a single computer system. The interface with such systems was still through electromechanical devices such as switches, push buttons and pilot lights. Notably, I worked with versions of the first commercially successful PLC, the Modicon 184, in the early years of my career in the late 1980s.

57. By the late 1980s and early 1990s, companies such as Automation Direct and Allen-Bradley (now Rockwell Automation) began creating computer-based interfaces for programming and interfacing with the PLCs. These were referred to as human-machine interface (HMI) displays.

58. Supervisory Control and Data Acquisition (SCADA) systems were developed around the same time as the PLC, in the late 1960s and early 1970s. SCADA systems were used on private networks or systems under complete control of the SCADA system's owners. One example was the SCADA systems for electric utilities that used the 60Hz electric power signal as a carrier to communicate with

¹¹ <https://library.automationdirect.com/history-of-the-plc/> (accessed June 25, 2025).

breakers in the field. SCADA systems were designed to communicate with sensors and equipment in the field, with control being performed by an operator or an automatic loop at the central control station. With the development of Local Area Networks in the 1980s and 1990s, SCADA utilized these technologies to communicate with equipment, such as throughout an entire plant.

59. The integration of these two technologies led to systems such as Gutierrez, where remote control of the system was possible, again through a network controlled entirely by the system's owner (i.e., private networks or VPN).

B. OIL AND GAS WELL DRILLING AND PRODUCTION

60. Oil and gas exploration and production operations depend on identifying, locating and collecting hydrocarbon (i.e., oil and gas (natural gas)) reserves for sale, use as a fuel, lubrication, or for the development of chemicals, pharmaceuticals and plastics used in modern society. For most of human history, petroleum products such as natural asphalts, coal, and surface seeps of oil have been used for various purposes, including paving, construction, waterproofing boats, and as fuel.¹² For the most part, these materials were naturally occurring on the Earth's surface and were collected by simply digging them up and transporting them for use. Some reservoirs of hydrocarbons, however, are located beneath the surface of the

¹² (Vassiliou 2018) at xxv - xxvi

earth and must be reached by some well-drilling technique. The first recorded petroleum wells were drilled circa 347 AD during the Jin dynasty in modern-day China.¹³ These were percussion-type wells similar to cable tool drilling, widely used in the 1800s. Modern oil and gas production relies heavily on wells drilled to reach hydrocarbon-bearing formations located below the Earth's surface.

61. In 1859, the first commercial oil well in the United States was drilled by Edwin Drake near Titusville, PA. This well was drilled with a cable-tool percussion drilling rig and struck oil at a depth of 69 feet.¹⁴ A Cable tool drilling rig uses a heavy chisel-type tool that is suspended from a cable (usually a rope) and repeatedly dropped to chip away at the rock formation. After a certain amount of rock has been chipped, a bucket-type tool (bailer) is lowered to collect and remove the rock chips. The use of cable-tool rigs was widespread through the end of the 19th century, and led to the discovery of many large oil and gas fields in the United States including the NW Pennsylvania fields, Pico Canyon and Los Angeles fields in California, the Neodesha fields in Kansas (Norman No 1), and the Bartlesville-Dewey field in Oklahoma (Nellie Johnstone No. 1).¹⁵

¹³ (Brewer 2022)

¹⁴ (Vassiliou 2018) at xxix, 147, 174-175

¹⁵ (Vassiliou 2018) at 149

62. Rotary drilling techniques, where a drill stem is spun and a drill bit cuts into the rock, had been used as far back as the Egyptian era but had limited use until the invention of the roller cone drill bit in 1908 by Howard Hughes. In a rotary drilling system, the drill bit cuts or pulverizes the rock. A fluid, known as drilling mud, is circulated down the hollow drill stem, out of orifices in the bit and then up the annulus, or the area between the drill stem and the wellbore walls. The drill mud serves the dual purpose of lubricating and cooling the bit teeth and grinding surfaces, as well as carrying detritus from the drilling process out of the hole and to the surface, where it is observed for its characteristics (logged), collected (using shale shakers), and discarded.

63. Traditional well drilling techniques, including both cable tool and rotary methods, focused on maintaining a vertical well and keeping a “straight hole” to reach the target formation at a known location. However, this means that the hydrocarbon-bearing formation is only exposed to the wellbore for the vertical depth of the formation at the wellbore location, which is often only tens of feet. Furthermore, surface drilling locations must be directly above the target formations, limiting access to those formations that are located under geographical features (such as lakes, mountains, oceans), buildings, or other environs that would prevent or make it difficult to locate a traditional drilling pad. In some locations, such as central

Oklahoma and the Permian Basin of Texas, vertical wells were spaced every 330 feet above productive formations to effectively drain the formation of hydrocarbons. This resulted in some locations with as many as 196 wells per square mile. Directional drilling (sometimes referred to as horizontal drilling) overcame these shortcomings of traditional oil well drilling.

C. SEPARATION AND STORAGE FACILITIES

64. Economic production from oil (and natural gas) wells requires the flow of significant volumes of fluid from the wells, to the surface, and then to storage tanks. The fluid from oil wells is typically a three-phase fluid comprising liquid (oil and salt water), gas (methane and other gases) and solids (sand and rock remnants). At the wellhead, these components are part of a single flow stream. For the sale of commercially valuable components (oil and hydrocarbon gases), the three phases are initially separated in a three-phase separator. A three phase separator is a vessel that “slows down” the production stream (often in a pressurized vessel) and allows for settling of the solids to the bottom of the separator (where they are collected and discarded) as well as allowing the gaseous products to “break out” of the liquid stream. The gas is then collected, often compressed, and delivered to a natural gas pipeline for sale or, in cases where no pipeline is available, burned off in a controlled manner using a flare system.

65. The liquid stream, comprised primarily of salt water and oil (along with treating chemicals and other trace minerals), is then delivered to a processing facility, typically on site or near the wellhead, where another settling process separates the oil and salt water, sometimes accelerated by heat. As oil has a lower density than salt water, most of the oil “floats” to the surface of a settling tank (heater treater, gun barrel, free water knockout or other names). The oil is collected and delivered to storage tanks or a pipeline for sale. The saltwater (i.e., produced water) is directed to storage tanks or a pipeline for eventual disposal. In many wells, the volume of produced water is ten times or greater than the volume of produced oil.

66. A typical oil and gas production facility is diagramed in Figure 1.¹⁶

¹⁶ Source: <https://kimray.com/training/what-does-lact-unit-do>

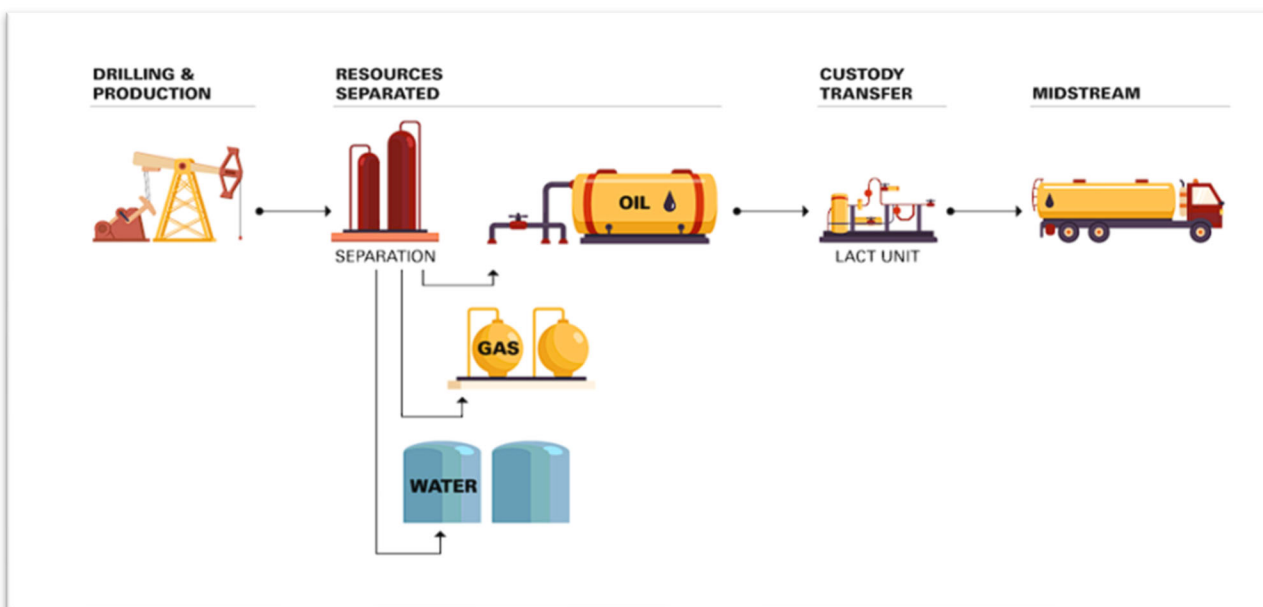


Figure 1 – Typical Oil and Gas Production facility

D. SALT WATER DISPOSAL

67. The most common method of disposal of produced water is re-injection into a disposal, or injection, well. These wells are typically drilled into non-producing (i.e., no commercial oil and gas) that have high permeability, which allows the formation to accept large quantities of fluid. The produced water from the production facility (discussed above) is delivered to the saltwater disposal (SWD) facility either through pipelines or via tank trucks. The produced water typically contains trace amounts of oil which were not collected at the production facility, along with the waste brine (salt water). At the SWD facility, the produced water is pumped from the trucks (or the pipeline) into a series of separators and tanks where the skim of oil is collected and stored in oil storage tanks for sale. The remaining

saltwater is prepared for injection, typically by running the water stream through filters to process out any remaining sand or other solids. The remaining clean saltwater is then injected into the injection well using large injection pumps. These facilities are typically sized to handle 100,000 bbl. of liquid a day and more.¹⁷ A typical SWD facility is shown in Figure 2, with the primary components of the facility labeled.

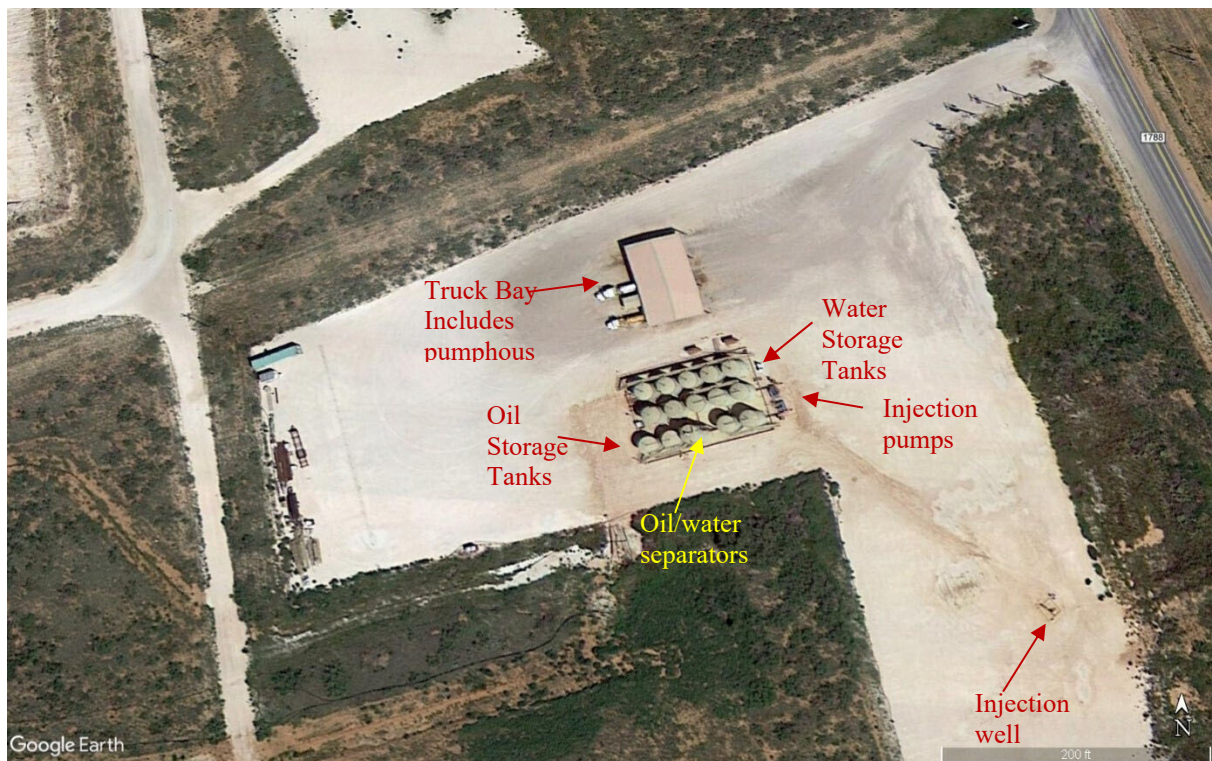


Figure 2- 1788 SWD Facility 31.861538 °N, 102.201746 °W (Aug 2017)

¹⁷ A barrel (bbl.) is 42 gallons

E. PETROLEUM PUMPING STATIONS

68. As discussed above, when oil and/or produced water are collected at the production facility, they are stored on-site and then sent off-site for either sale (oil) or disposal (produced water). In many locations, the transportation of these liquids is performed using tank trucks, which collect the liquid at the production facility and then are driven to a SWD facility (for produced water) or a commercial LACT (lease automatic custody transfer) facility.

69. However, in areas of highly concentrated production (e.g., some parts of the Permian Basin), there is sufficient volume of liquid flow to justify the installation of pipeline gathering systems, rather than relying on over-the-road tank trucks. In these locations, the liquid is transported through pipelines via a series of petroleum pumping stations, which handle oil, produced water, or both. These pumping stations, sometimes co-located with storage facilities, add energy to the liquid through the use of pumps and direct the liquid to its proper destination using valves. In these locations, as well as at the production and disposal facilities, sensors are used to determine the properties of the fluid, such as pressure, flow rate, tank

level, temperature, and viscosity, allowing the operator to pressurize and direct the flow appropriately. A typical pumping station is shown in Figure 3.¹⁸

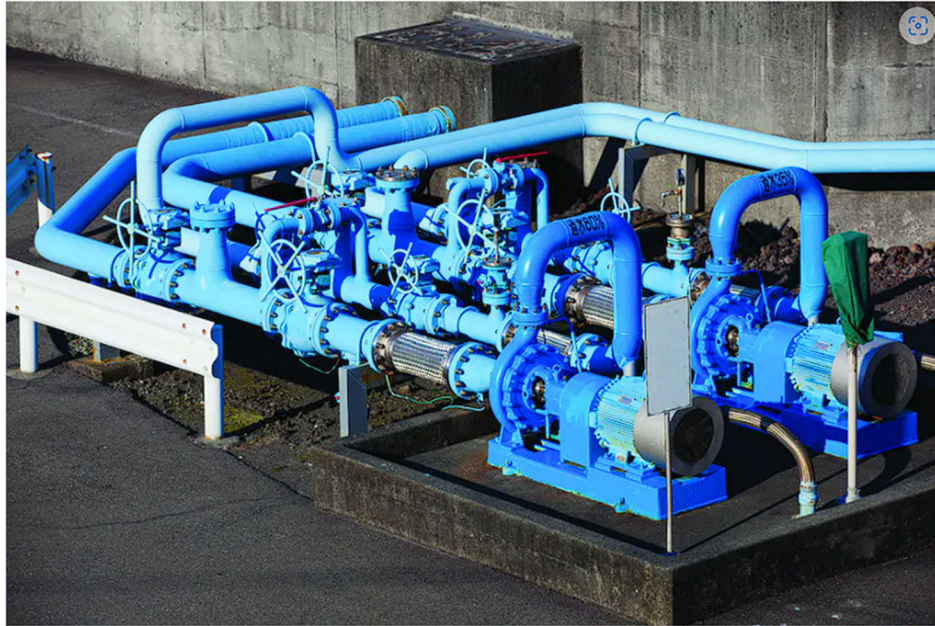


Figure 3 - Petroleum Pump Station

F. FLUID HANDLING

70. In each of the locations described above, and in many others, proper operation of the facilities depends on proper handling of the fluids. As mentioned above, many facilities handle as much as 500,000 gallons of fluid every day, or more. Proper operation of these facilities requires the coordination of a system of pumps,

¹⁸ Source: <https://www.processingmagazine.com/process-control-automation/instrumentation/article/15586455/fit-the-pumping-technology-to-the-task>

valves, storage tanks, and piping systems to move the liquid to its desired destination without damaging the system or creating environmental hazards, such as spills.

71. While the basics of fluid handling (pumps, valves, tanks, pipes) have existed since antiquity, by the time of the '909 Patent, pumps were typically electrically operated, and valves were manually, pneumatically, or electrically operated. Tanks and pipes were constructed of materials suitable for the fluid they were handling (steel for oil, fiberglass, or various plastics for produced or salt water).

72. By the time the '909 Patent was filed, facilities had little to no automation. Production facility pumps were operated continuously or on a timer-based system. Production levels and the overall condition of the facility were typically checked daily by a “pumper,” who would physically drive to each production site within their area of responsibility. Valve positions were usually set manually (or by simple level switches) by the pumper, and tank levels were “gauged” daily to determine production. A SWD facility typically had an on-site operator (e.g., “pumper”) either 24 hours a day or at least daily. This operator would be responsible for starting and stopping pumps as necessary, monitoring tank levels, pressures, and flow rates, and adjusting valves as needed. Some supervisory control and data acquisition (SCADA) systems were available to enable off-site monitoring of equipment; however, these were of limited value due to the lack of

communication facilities at the often remote and isolated production and SWD facilities.

IX. CLAIM CONSTRUCTION

73. 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 '909 Patent, for all claim terms.

X. GROUND 1: CARDAMONE DOES NOT ANTICIPATE THE CLAIMS, NOR DOES IT RENDER THE CLAIMS OBVIOUS

74. After review of the evidence submitted in support of the Petition, including the Prior Art relied on and the declaration of Dr. Wooley, it is my opinion that *Cardamone* does not anticipate nor render Claims 1-8, 12, 14, 16, 17, and 19-21 the '909 Patent obvious. Claim elements are missing from *Cardamone* that neither Dr. Wooley nor the Petitioner shows are disclosed or obvious over *Cardamone*.

75. As an initial issue, I note that throughout the declaration of Petitioner's expert, Dr. Wooley relies on certain references that fall after the time of the '909 Patent, i.e., later than December 2012. Dr. Wooley does not attempt to show these references are prior art, and in some cases are clearly not prior art on their face, as they have a publication date that postdates the priority date of the '909 Patent.

76. It is my understanding that, when analyzing the patentability of any claim, the person doing the analysis must look at the claims through the lens of a POSITA at the time of the invention (i.e., the priority date). Accordingly, when analyzing the claims of the '909 Patent, Dr. Wooley and I must both look to what a POSITA would have known as of the priority date of the '909 Patent. Despite this, Dr. Wooley points to several pieces of art in his declaration that are not prior art references. In at least some examples, the cited information is substantially belated and would not have been understood by a POSITA at the time of the '909 Patent, which raises questions regarding Dr. Wooley's analysis. The references will be addressed with regard to each claim or limitation for which they are used.

A. INDEPENDENT CLAIM 1

77. It is my opinion that *Cardamone* neither anticipates Claim 1 nor renders it obvious. There are key elements of Claim 1 that are missing from the disclosure of *Cardamone* that (1) preclude anticipation and (2) would not have been obvious to a POSITA based on *Cardamone*'s disclosure, as discussed in the subsections below.

78. Claim 1 contains the following limitations, which have been subdivided in the same manner that Dr. Wooley and Petitioner subdivided them:

1[p] A system for remotely controlling a fluid-handling device of an oil well, a petro water disposal or re-injection facility, or a petroleum pumping station, the system comprising

1[a] a command-center server having a data store storing multiple user accounts, each user account corresponding to a set of one or more oil wells, petro water disposal or re-injection facilities, or petroleum pumping stations, or a combination thereof, each set being operated by a different entity corresponding to the respective user account; and

1[b] a plurality of geographically distributed site master controllers, each site master controller corresponding to a respective one of the oil wells, petro water disposal or re-injection facilities, or petroleum pumping stations, each site master controller comprising:

1[c] a communication module operable to communicate with a plurality of fluid-handling devices;

1[d] a network interface;

1[e] memory; and

1[f] one or more processors communicatively coupled to the communication module, the network interface, and the memory, wherein the memory stores instructions that when executed by the processors cause the processors to effectuate steps comprising:

1[g] receiving, via the network interface, from the command center server, a plurality of commands encoded in a first protocol to control the fluid-handling devices from a user corresponding to one of the user accounts, different commands among the plurality of commands being directed to different fluid handling devices among the plurality of fluid-handling devices;

1[h] for at least some of the plurality of commands, determining a plurality of different target states of a given one of the fluid-handling devices over time, wherein the respective site-master controller is operative to maintain control of the fluid-handling devices in the absence of a network connection to the command-center server;

1[i] translating the plurality of commands into translated commands encoded in a plurality of protocols different from the first protocol, each translated command being translated into a protocol among the plurality of protocols suitable for a fluid-handling device to which the respective command is

directed, the at least some of the translated command being operative to cause a local controller of the given fluid-handling device to drive the given fluid-handling device to the plurality of different target states, the local controller being responsive to the translated commands and feedback from the given fluid-handling device indicative of whether the given fluid-handling device is in a targeted state; and

1[j] sending the translated commands to respective local controllers of the respective fluid-handling devices to which the respective commands are directed.

79. My opinion is in disagreement with Dr. Wooley. I note that Dr. Wooley makes a conclusory statement in ¶73 that “Claim 1 is anticipated by *Cardamone*, or would be obvious to a POSITA in view of *Cardamone*.” However, there is no rationale or analysis anywhere in Dr. Wooley’s declaration regarding Claim 1 as to *why* the elements not disclosed by *Cardamone* would have been obvious to a POSITA.

1. **1[a]: “a command-center server having a data store storing multiple user accounts, each user account corresponding to a set of one or more oil wells, petro water disposal or re-injection facilities, or petroleum pumping stations, or a combination thereof, each set being operated by a different entity corresponding to the respective user account; and”**

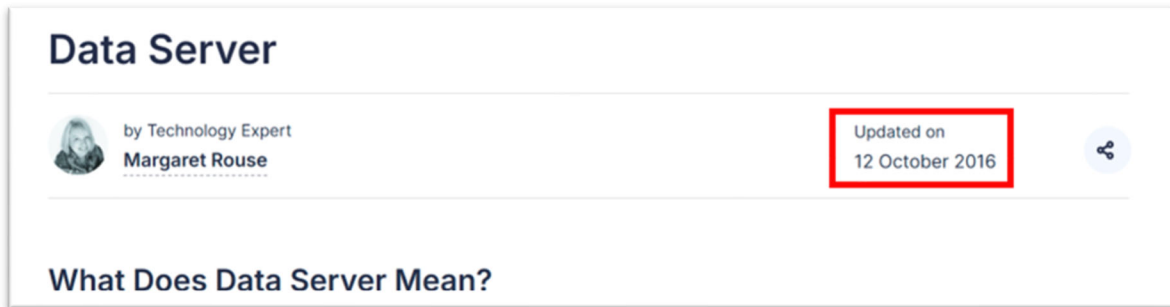
80. In my opinion, the Petition and Dr. Wooley do not show that *Cardamone* discloses or teaches 1[a]. Dr. Wooley’s analysis does not go to the claimed element and limitations. Limitation 1[a] does not merely claim a “command-center server” as Dr. Wooley appears to believe. It claims “a command-

center server having a data store storing multiple user accounts, each user account corresponding to a set of one or more oil wells, petro water disposal or re-injection facilities, or petroleum pumping stations, or a combination thereof, each set being operated by a different entity corresponding to the respective user account.” Dr. Wooley’s referenced portion of *Cardamone* does not disclose or even suggest a command center server with, for example, multiple user accounts, much less accounts corresponding to a set of facilities, or that any facilities would be operated by multiple entities. Further, nowhere in *Cardamone* is there such a disclosure.¹⁹ Neither Dr. Wooley nor Petitioner makes any attempt to show that these limitations are disclosed or suggested by *Cardamone*.

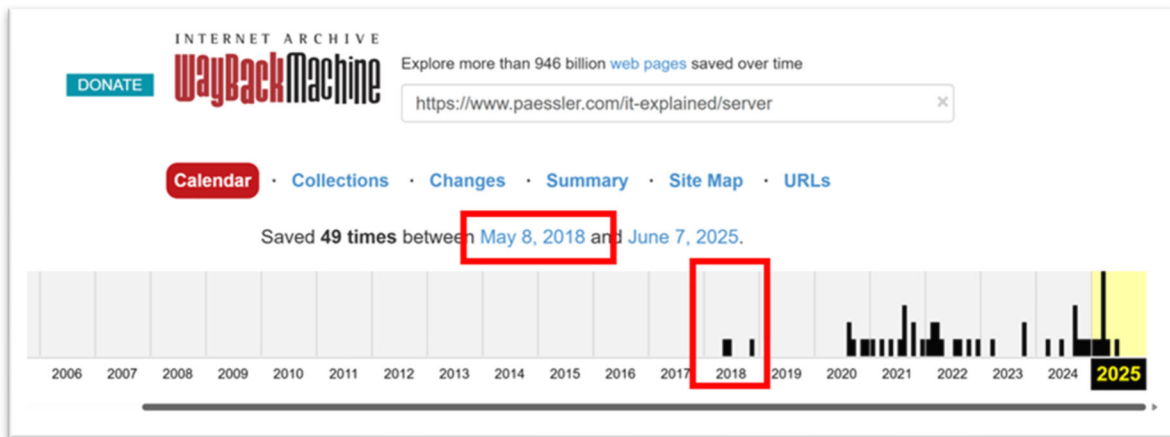
81. Further still, Dr. Wooley points to references that are not prior art in an attempt to show that this limitation is “disclosed” by *Cardamone*. However, these are not prior art references, and Dr. Wooley makes no attempt to show that they are. In ¶50, Dr. Wooley points to <https://www.techopedia.com/definition/4192/data-server-ds>.²⁰ However, a visit to the site referenced shows that the site was “Updated on 12 October, 2016,” long after the ’909 Patent.

¹⁹ See Ex. 1005 (*Cardamone*) generally.

²⁰ <https://www.techopedia.com/definition/4192/data-server-ds> (accessed June 17, 2025).



As another example, in ¶51, Dr. Wooley points to <https://www.paessler.com/it-explained/server>.²¹ A visit to the site referenced shows that this is a current reference, rather than a historical one. Furthermore, an examination of the Internet Archive for this web page reveals that it was not published until May 8, 2018. An analysis should look through the lens of a POSITA at the time of the invention, not current references.



²¹ <https://www.paessler.com/it-explained/server> (accessed June 17, 2025).

82. Accordingly, *Cardamone* does not disclose limitation 1[a], nor would limitation 1[a] have been obvious based on the teachings of *Cardamone* as claimed by Dr. Wooley and Petitioner.

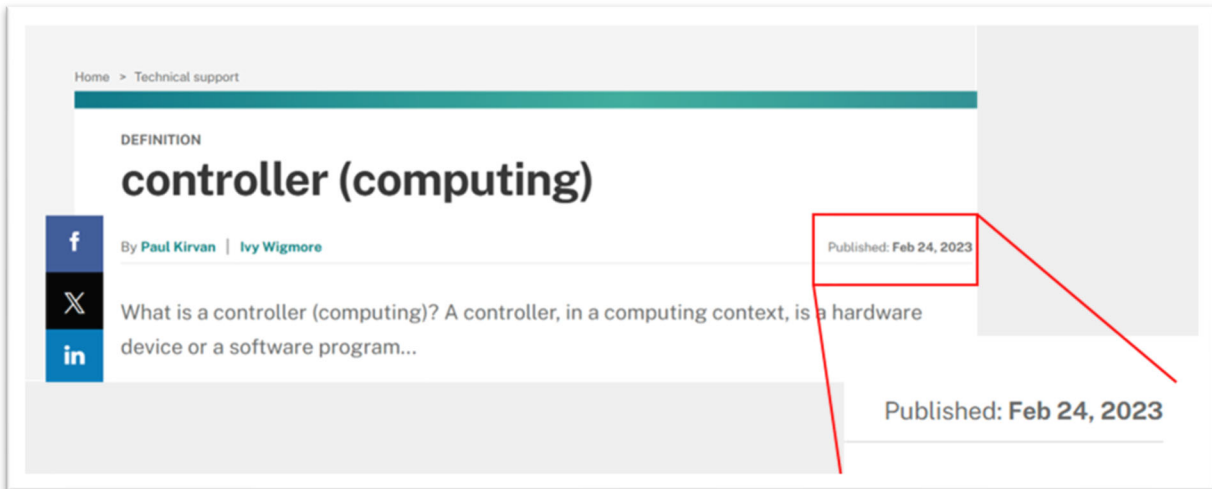
2. **1[b]: “a plurality of geographically distributed site master controllers, each site master controller corresponding to a respective one of the oil wells, petro water disposal or re-injection facilities, or petroleum pumping stations, each site master controller comprising:”**

83. Dr. Wooley attempts to map the site master controller to “control and communications computer 126.”²² However, *Cardamone*’s control and communications computer 126 does not provide all of the functionality of a “site master controller” as described and claimed in the ’909 Patent. As will be discussed in the subsections below, *Cardamone* fails to disclose or suggest key elements of the site master controller, such as, for example, sending commands to a plurality of fluid handling devices. *Cardamone*’s teachings, at most, demonstrate that control and communications computer 126 acts as a local controller, not the claimed “site master controller” as described in Claim 1.

84. And again, Dr. Wooley points to references that are not prior art in an attempt to show that this limitation is “disclosed” by *Cardamone*. However, these

²² Ex. 1002 ¶58.

are not prior art references, and Dr. Wooley makes no attempt to show that they are. In ¶53 and ¶56, Dr. Wooley points to a webpage <https://www.techtarget.com/whatis/definition/controller>.²³ A visit to the site referenced shows that this is a current reference, with a publication date of Feb 24, 2023, long after the '909 Patent. An analysis should look through the lens of a POSITA at the time of the invention, not current references.

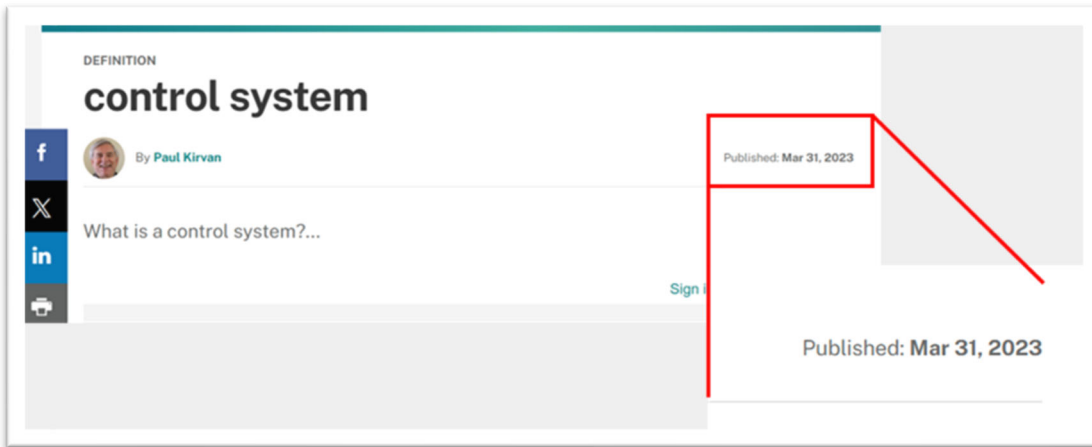


85. Further, in ¶54, Dr. Wooley points to <https://www.techtarget.com/whatis/definition/control-system>.²⁴ A visit to the site referenced shows that this is a current reference, with a publication date of March

²³ <https://www.techtarget.com/whatis/definition/controller> (accessed June 17, 2025).

²⁴ <https://www.techtarget.com/whatis/definition/control-system> (accessed June 17, 2025).

31, 2023, again long after the '909 Patent. An analysis should look through the lens of a POSITA at the time of the invention, not current references.



86. Accordingly, *Cardamone* does not disclose limitation 1[b], nor would limitation 1[b] have been obvious based on the teachings of *Cardamone* as claimed by Dr. Wooley and Petitioner.

3. **1[g]: “receiving, via the network interface, from the command center server, a plurality of commands encoded in a first protocol to control the fluid-handling devices from a user corresponding to one of the user accounts, different commands among the plurality of commands being directed to different fluid handling devices among the plurality of fluid-handling devices;”**

87. There are key limitations of the claim that are missing from *Cardamone*. As discussed above in **Section X.A.3**, the “control and communication computer 126” cannot be the site master controller. Further, limitation 1[g] claims “the plurality of commands being directed to different fluid handling devices among

the plurality of fluid-handling devices”. *Cardamone* only discloses one “fluid handling device” that can receive commands, i.e., the “motor”. Neither Dr. Wooley nor the Petitioner makes any attempt to show a plurality of commands being directed to a plurality of fluid handling devices because they cannot.

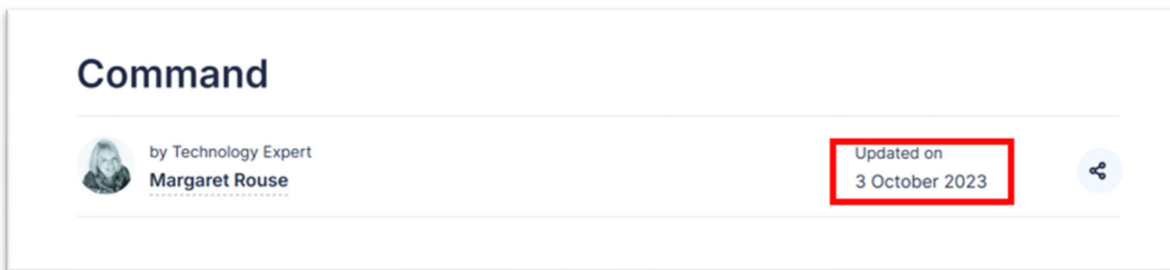
88. Further, limitation 1[g] requires receiving commands “from a user corresponding to one of the [plurality of] user accounts” which were claimed in 1[a]. As *Cardamone* does not disclose or suggest a plurality of user accounts, this element is also missing from limitation 1[g].

89. And yet again, Dr. Wooley points to references that are not prior art in an attempt to show that this limitation is “disclosed” by Kahn. However, these are not prior art references, and Dr. Wooley makes no attempt to show that they are. In ¶64, Dr. Wooley points to <https://www.lenovo.com/us/en/glossary/command/>.²⁵ A visit to the referenced site confirms that this is an active reference. Furthermore, an examination of the Internet Archive for this web page reveals that it was not published until July 21, 2024.

²⁵ <https://www.lenovo.com/us/en/glossary/command/> (accessed June 18, 2025).

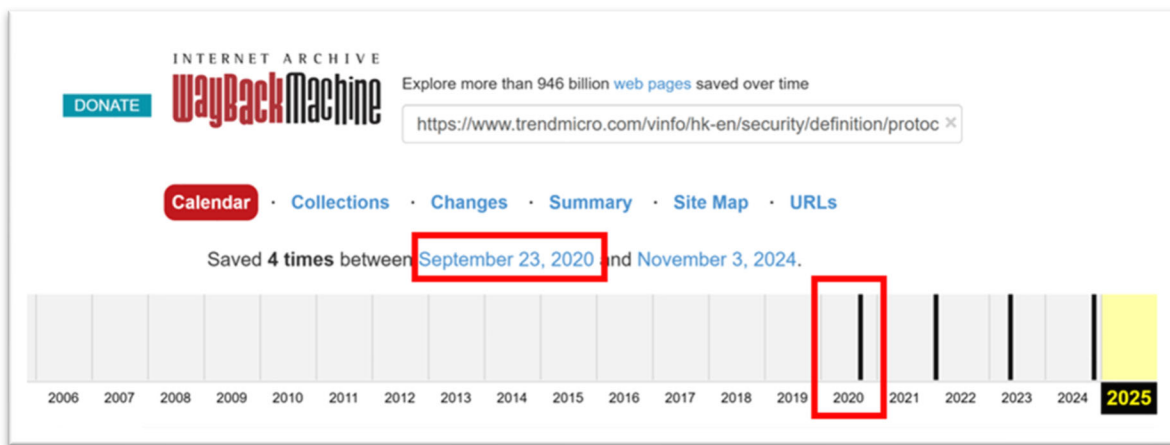


Furthermore, in ¶64, Dr. Wooley cites <https://www.techopedia.com/definition/3333/command-cmd>.²⁶ A visit to the referenced site shows that this is a current reference, dated October 3, 2023, which is again long after the '909 Patent. An analysis should look through the lens of a POSITA at the time of the invention, not current references.



²⁶ <https://www.techopedia.com/definition/3333/command-cmd> (accessed June 18, 2025).

90. In ¶65, Dr. Wooley points to <https://www.trendmicro.com/vinfo/hk-en/security/definition/protocol-gateway>.²⁷ An examination of the Internet Archive of this web page shows that it was not published until September 23, 2020, again long after the '909 Patent. An analysis should look through the lens of a POSITA at the time of the invention, not current references.



91. Accordingly, *Cardamone* does not disclose limitation 1[g], nor would limitation 1[g] have been obvious based on the teachings of *Cardamone* as claimed by Dr. Wooley and Petitioner.

²⁷ <https://www.trendmicro.com/vinfo/hk-en/security/definition/protocol-gateway> (accessed June 18, 2025).

4. 1[i]: “translating the plurality of commands into translated commands encoded in a plurality of protocols different from the first protocol, each translated command being translated into a protocol among the plurality of protocols suitable for a fluid-handling device to which the respective command is directed, the at least some of the translated command being operative to cause a local controller of the given fluid-handling device to drive the given fluid-handling device to the plurality of different target states, the local controller being responsive to the translated commands and feedback from the given fluid-handling device indicative of whether the given fluid-handling device is in a targeted state; and”

92. Dr. Wooley and Petitioner do not show how each element of limitation 1[i] is disclosed or obvious based on the teachings of *Cardamone*. Dr. Wooley merely points to a section of *Cardamone* (¶¶0030 – 0031) that discusses various protocols and then makes a conclusory statement that “Cardamone discloses translating the plurality of commands into translated commands encoded in a plurality of protocols different from the first protocol.”²⁸ Dr. Wooley provides no explanation of how the disclosure of various protocols (e.g., digital, analog, DeviceNet, Modbus, etc.) also discloses translating the commands “into translated commands encoded in a plurality of protocols different from the first protocol.” The mere use of a protocol does not disclose translating between the protocols. Such a

²⁸ Ex. 1002 (*Wooley Declaration*) ¶71.

disclosure is not provided in *Cardamone*. Further, the disclosure of options of different protocols does not render translating commands into a plurality of protocols which are different from the first protocol, as opposed to, as *Cardamone* suggests, using the same protocol for all the respective functions. For example, *Cardamone* discloses that “digital interface bus 126” is used to communicated in several ways such as:²⁹

- To interface between Motor drive unit 318 and control and communication computer 126
- To communicate between sensors and computer 126
- To relay drive commands to motor drive unit 318.

93. A POSITA reading this disclosure of *Cardamone* would expect that bus 126 uses the same protocol for all of these functions as *Cardamone* only discloses a single bus 126. A POSITA would further recognize that *Cardamone* was not teaching translation between the different protocols, but merely providing a list of protocols that *Cardamone* found acceptable, and then goes on to teach “other similar protocols may also be used as alternatives”.³⁰ In other words, *Cardamone* did not want its invention to be limited to a single protocol.

²⁹ Ex. 1005 (*Cardamone*) [0031].

³⁰ Ex. 1002 (*Wooley Declaration*) [0031].

94. Although Dr. Wooley does not point to ¶[0029] of *Cardamone* to teach this limitation, Petitioner does. It is unclear why Petitioner points to this paragraph. To the extent that Petitioner is relying on the disclosure of a “synchronous serial interface (SSI) encoder” to teach this limitation, that structure is incapable of performing the translation protocol claimed in 1[i]. An SSI encoder is simply a sensor that senses “the position of the linear motor shaft” and relays that information to the motor drive so that the motor drive knows the position of the motor shaft. This is similar to other sensors that are part of sensor package 224, such as temperature, inclinometer, and a circuit fault detector. Furthermore, these sensors are “arranged near the bottom of an oil well”.³¹ As such, the encoder would not receive commands, nor translate commands, it would simply provide sensed data.

95. Dr. Wooley’s analysis comes with additional flaw. Dr. Wooley begins his analysis with a list of references to websites that are not prior art, as discussed more fully below. Dr. Wooley then states, in ¶71, “**Thus**, *Cardamone* discloses translation the plurality of commands into translated commands encoded in a plurality of protocols different from the first protocol.”³² This statement directly ties Dr. Wooley’s conclusory analysis to the postdated references, not looking at the

³¹ See, e.g., Ex. 1005 (*Cardamone*) [0029].

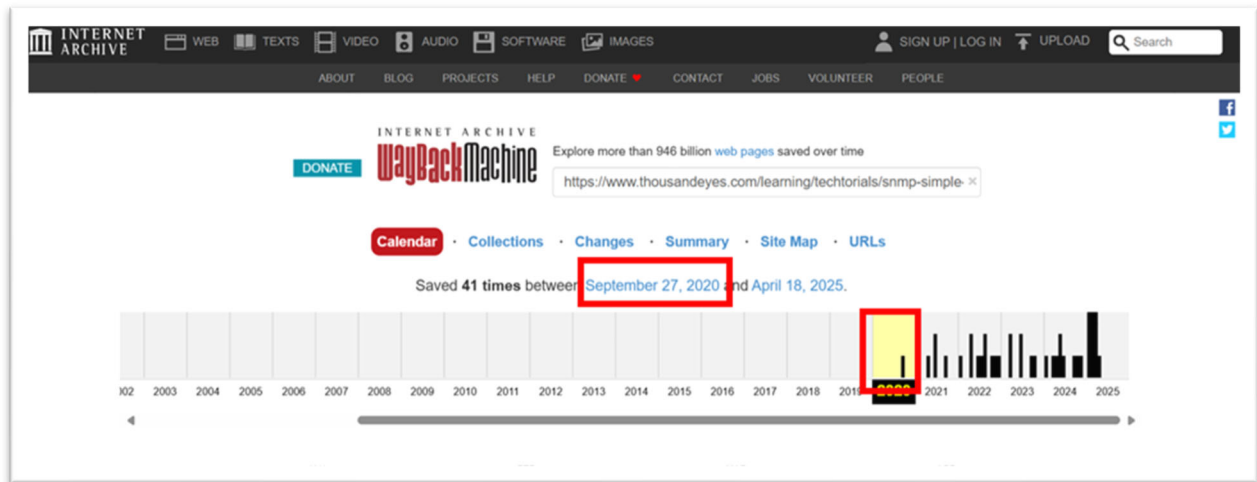
³² Ex. 1002 (*Wooley Declaration*) ¶71.

claim language and references through the lens of a POSITA at the time of the filing of the '909 Patent.

96. The references that Dr. Wooley relies on include <https://www.trendmicro.com/vinfo/hk-en/security/definition/protocol-gateway> which was discussed above regarding limitation 1[g] and has a publication date of September 23, 2020, long after the '909 patent priority date.

97. Additionally, Dr. Wooley references <https://www.thousandeyes.com/learning/techtorials/snmp-simple-network-management-protocol#:~:text=What%20is%20SNMP%3F>. A visit to the internet archive for this webpage shows that this page was not published until September 27, 2020.³³

³³ https://web.archive.org/web/20200901000000*/https://www.thousandeyes.com/learning/techtorials/snmp-simple-network-management-protocol (accessed July 11, 2025).



98. Accordingly, *Cardamone* does not disclose limitation 1[i], nor would limitation 1[i] have been obvious based on the teachings of *Cardamone* as claimed by Dr. Wooley and Petitioner.

5. **1[j]: “sending the translated commands to respective local controllers of the respective fluid-handling devices to which the respective commands are directed.”**

99. Neither Dr. Wooley nor Petitioner even attempt to show that *Cardamone* discloses the actual claim language of 1[j]. There is no attempt to show a plurality of “local controllers” in *Cardamone*’s system to which the control and communication computer 126 sends commands. This is because the control and communication computer 126 acts as a local controller, and there is only one fluid handling device disclosed in *Cardamone* that can receive commands (i.e., the motor).

100. Accordingly, *Cardamone* does not disclose limitation 1[j], nor would limitation 1[j] have been obvious based on the teachings of *Cardamone* as claimed by Dr. Wooley and Petitioner.

B. DEPENDENT CLAIMS 2-8, 12, 14, 16, 17, AND 19-21

101. Claims 2-8, 12, 14, 16, 17, and 19-21 all depend on Claim 1. Since there are multiple limitations from Claim 1 that are not disclosed, taught, or suggested by *Cardamone*, none of the dependent claims are anticipated by *Cardamone* or rendered obvious by *Cardamone*.

C. INDEPENDENT CLAIM 20

102. It is my opinion that *Cardamone* neither anticipates Claim 20 nor renders it obvious. There are key elements of Claim 20 that are missing from the disclosure of *Cardamone* and would not have been obvious to a POSITA based on the disclosure of *Cardamone*, as discussed below.

103. According to Dr. Wooley, “Claim 20’s preamble is analogous to limitation 1[p], limitation 20[a] is analogous to limitation 1[g], limitation 20[b] is analogous to limitation 1[h], limitation 20[c] is analogous to limitation 1[i] and limitation 20[d] is analogous to limitation 1[j].”³⁴ No additional analysis regarding

³⁴ Ex. 1002 ¶100.

the limitations of Claim 20 is offered in the Petition or by Dr. Wooley, other than that already discussed regarding Claim 1. As there are elements of, at least, limitations 1[g], 1[h], and 1[j] missing from the disclosure of *Cardamone*, as discussed above in **Sections X.A.4, X.A.5 and X.A.6**, respectively, these elements would also be missing from Claim 20 as well. Accordingly, *Cardamone* fails to anticipate Claim 20, and fails to render Claim 20 obvious.

D. INDEPENDENT CLAIM 21

104. It is my opinion that *Cardamone* neither anticipates Claim 21 nor renders it obvious. There are key elements of Claim 21 that are missing from the disclosure of *Cardamone* and would not have been obvious to a POSITA based on the disclosure of *Cardamone*, as discussed below.

105. According to Dr. Wooley, “Claim 21’s preamble is analogous to limitation 1[p], limitation 21[a] is analogous to limitation 1[g], limitation 21[b] is analogous to limitation 1[h], limitation 20[c] is analogous to limitation 1[i] and limitation 21[d] is analogous to limitation 1[j].”³⁵ No additional analysis regarding the limitations of Claim 21 is offered other than those already discussed regarding Claim 1. As there are elements of at least limitations 1[p], 1[g], and 1[j] missing from the disclosure of *Cardamone*, as discussed above in **Sections X.A.1, X.A.4,**

³⁵ Ex. 1002 ¶101.

and X.A.5, these elements would be missing from Claim 21 as well. Accordingly, *Cardamone* fails to anticipate Claim 21, and fails to render Claim 21 obvious.

XI. GROUND 2: *ALMADI* DOES NOT ANTICIPATE THE CLAIMS, NOR DOES IT RENDER THE CLAIMS OBVIOUS

106. After review of the evidence submitted in support of the Petition, including the Prior Art relied on and the declaration of Dr. Wooley, it is my opinion that *Almadi* does not anticipate nor render Claims 1, 5, 6, 9-11, 14-16, and 18-21 of the '909 Patent obvious. There are claim elements missing from *Almadi* that neither Dr. Wooley nor the Petitioner shows are disclosed or obvious in *Almadi*.

A. INDEPENDENT CLAIM 1

107. It is my opinion that *Almadi* neither anticipates Claim 1 nor renders it obvious. There are key elements of Claim 1 that are missing from the disclosure of *Almadi* that (1) preclude anticipation and (2) would not have been obvious to a POSITA based on *Almadi*'s disclosure, as discussed in the subsections below.

108. Claim 1 contains the following limitations, which have been subdivided in the same manner that Dr. Wooley and Petitioner subdivided them:

1[p] A system for remotely controlling a fluid-handling device of an oil well, a petro water disposal or re-injection facility, or a petroleum pumping station, the system comprising

1[a] a command-center server having a data store storing multiple user accounts, each user account corresponding to a set of one or more oil wells,

petro water disposal or re-injection facilities, or petroleum pumping stations, or a combination thereof, each set being operated by a different entity corresponding to the respective user account; and

1[b] a plurality of geographically distributed site master controllers, each site master controller corresponding to a respective one of the oil wells, petro water disposal or re-injection facilities, or petroleum pumping stations, each site master controller comprising:

1[c] a communication module operable to communicate with a plurality of fluid-handling devices;

1[d] a network interface;

1[e] memory; and

1[f] one or more processors communicatively coupled to the communication module, the network interface, and the memory, wherein the memory stores instructions that when executed by the processors cause the processors to effectuate steps comprising:

1[g] receiving, via the network interface, from the command center server, a plurality of commands encoded in a first protocol to control the fluid-handling devices from a user corresponding to one of the user accounts, different commands among the plurality of commands being directed to different fluid handling devices among the plurality of fluid-handling devices;

1[h] for at least some of the plurality of commands, determining a plurality of different target states of a given one of the fluid-handling devices over time, wherein the respective site-master controller is operative to maintain control of the fluid-handling devices in the absence of a network connection to the command-center server;

1[i] translating the plurality of commands into translated commands encoded in a plurality of protocols different from the first protocol, each translated command being translated into a protocol among the plurality of protocols suitable for a fluid-handling device to which the respective command is directed, the at least some of the translated command being operative to cause a local controller of the given fluid-handling device to drive the given

fluid-handling device to the plurality of different target states, the local controller being responsive to the translated commands and feedback from the given fluid-handling device indicative of whether the given fluid-handling device is in a targeted state; and

1[j] sending the translated commands to respective local controllers of the respective fluid-handling devices to which the respective commands are directed.

109. Further, I note that Dr. Wooley makes a conclusory statement in ¶116 that “*Almadi* anticipates Claim 1 or would be obvious to a POSITA in view of *Almadi*.” However, there is no discussion or analysis anywhere in Dr. Wooley’s declaration regarding Claim 1 as to *why* the elements not disclosed by *Almadi* would have been obvious to a POSITA.

1. **1[a]: “a command-center server having a data store storing multiple user accounts, each user account corresponding to a set of one or more oil wells, petro water disposal or re-injection facilities, or petroleum pumping stations, or a combination thereof, each set being operated by a different entity corresponding to the respective user account; and”**

110. The Petition and Dr. Wooley do not show that *Almadi* discloses or teaches 1[a]. As an initial point, Dr. Wooley maps the “command-center server” to *Almadi*’s “integrated node 100”. Thus, in the subsections below about Claim 1, each time the term “command center server” is referenced, it must be tied to disclosure of the “integrated node 100.”

111. Dr. Wooley’s analysis of limitation 1[a] does not go to the claimed element and limitations. Limitation 1[a] does not merely claim a “command center server” as Dr. Wooley appears to believe. It claims “a command center server having a data store storing multiple user accounts, each user account corresponding to a set of one or more oil wells, petro water disposal or re-injection facilities, or petroleum pumping stations, or a combination thereof, each set being operated by a different entity corresponding to the respective user account.” Dr. Wooley’s referenced portion of *Almadi* does not disclose or even suggest a command center server with, for example, multiple user accounts, much less accounts corresponding to a set of facilities, or that any facilities would be operated by multiple entities. Further, nowhere in *Almadi* is there such a disclosure.³⁶ Neither Dr. Wooley nor Petitioner makes any attempt to show that these limitations are disclosed or suggested by *Almadi*, and instead provide merely conclusory statements of what a POSITA would understand without supporting rationale.

112. Accordingly, *Almadi* does not disclose limitation 1[a], nor would limitation 1[a] have been obvious based on the teachings of *Almadi* as claimed by Dr. Wooley and Petitioner.

³⁶ See Ex. 1006 (*Almadi*) generally.

2. **1[b]: “a plurality of geographically distributed site master controllers, each site master controller corresponding to a respective one of the oil wells, petro water disposal or re-injection facilities, or petroleum pumping stations, each site master controller comprising:”**

113. Dr. Wooley, in his analysis of limitation 1[b], maps *Almadi*’s “remote subsystems 120” to the site master controller. In order for limitation 1[b] to be disclosed by *Almadi*, or obvious in light of *Almadi*’s teachings, each and every element that comprises the claimed site master controller must be disclosed and/or obvious. As discussed in the subsections below, there are elements that comprise the claimed site master controller that are missing and not shown to be obvious based on *Almadi*.

114. Accordingly, *Almadi* does not disclose the claimed site master controller introduced in limitation 1[b], nor would the claimed site master controller have been obvious based on the teachings of *Almadi* as claimed by Dr. Wooley and Petitioner.

3. **1[c]: “a communication module operable to communicate with a plurality of fluid-handling devices;”**

115. Dr. Wooley does not demonstrate how *Almadi* discloses, or renders obvious, a communication module as part of remote subsystems 120 that is operable to communicate with a plurality of fluid handling devices. As discussed above, Dr.

Wooley maps “integrated node 100” to the command-center server and “remote subsystems 120” to the claimed site master controller, of which limitation 1[c] comprises. Instead of looking to the alleged “site master controller” to determine if *Almadi* discloses a communication module, *Dr. Wooley* looks to the “command center server.” Dr. Wooley points to “input output 104” as disclosing a “communication module”.³⁷ However, the claim requires more.

116. Limitation 1[c] requires that the communication module not only be part of the “site master controller”—not the command center server—but also be operable to communicate with a plurality of fluid-handling devices. Input output 104 meets neither requirement. Input Output 104 is part of the “command center server” as mapped by Dr. Wooley. Further, even according to Dr. Wooley, input output 104 “provides communications capabilities between remote subsystems 120 [site master controller] and integrated node 100 [command center server]”³⁸, not between the site master controller and a plurality of fluid handling devices, as the claim requires.

117. Accordingly, *Almadi* does not disclose limitation 1[c], nor would limitation 1[c] have been obvious based on the teachings of *Almadi* as claimed by Dr. Wooley and Petitioner.

³⁷ Ex. 1002 ¶106.

³⁸ Ex. 1002 ¶106.

4. **1[g]: “receiving, via the network interface, from the command center server, a plurality of commands encoded in a first protocol to control the fluid-handling devices from a user corresponding to one of the user accounts, different commands among the plurality of commands being directed to different fluid handling devices among the plurality of fluid-handling devices;**

118. Limitation 1[g] requires receiving commands “from a user corresponding to one of the [plurality of] user accounts” which were claimed in 1[a]. As *Almadi* does not disclose or suggest a plurality of user accounts, this element is also missing from limitation 1[g].

119. Accordingly, *Almadi* does not disclose limitation 1[g], nor would limitation 1[g] have been obvious based on the teachings of *Almadi* as claimed by Dr. Wooley and Petitioner.

5. 1[i]: “translating the plurality of commands into translated commands encoded in a plurality of protocols different from the first protocol, each translated command being translated into a protocol among the plurality of protocols suitable for a fluid-handling device to which the respective command is directed, the at least some of the translated command being operative to cause a local controller of the given fluid-handling device to drive the given fluid-handling device to the plurality of different target states, the local controller being responsive to the translated commands and feedback from the given fluid-handling device indicative of whether the given fluid-handling device is in a targeted state; and”

1[j]: “sending the translated commands to respective local controllers of the respective fluid-handling devices to which the respective commands are directed.”

120. Limitations 1[i] and 1[j] are discussed here together, as they are related through the “translated commands.” Both limitations further describe actions taken by the site master controller regarding the commands received by the site master controller from the command center server (“the plurality of commands”).

121. Limitation 1[i] claims “translating the plurality of commands” that were received from the command center server via the network interface as claimed in 1[g]. Further, the translating function claimed in 1[i] comprises part of the site master controller, which Dr. Wooley maps to remote subsystems 120. *Almadi* does not disclose this element, nor does Dr. Wooley show that it would be obvious over the teachings of *Almadi*. Dr. Wooley points to a section of *Almadi* that discusses

“protocol translation or translation server 102,” which is part of integrated node 100 (command center server) and not remote subsystems 120 (site master controller). Dr. Wooley does not explain the rationale for *why* and *how* this disclosure discloses or even suggests translating the commands at the remote subsystem 120.

122. Further, limitation 1[j] requires the commands to be sent to “a local controller” with several specific functions. Dr. Wooley points to no disclosure of *Almadi* that shows, or suggests, a local controller that remote subsystem 120 sends the command to, much less that the local controller is “responsive to the translated commands and feedback from the given fluid-handling device indicative of whether the given fluid-handling device is in a targeted state.”

123. Accordingly, *Almadi* does not disclose limitations 1[i] or 1[j], nor would limitations 1[i] or 1[j] have been obvious based on the teachings of *Almadi* as claimed by Dr. Wooley and Petitioner.

B. DEPENDENT CLAIMS 5, 6, 9-11, 14-16, AND 18-21

124. Claims 5, 6, 9-11, 14-16, and 18-21 all depend on Claim 1. Since multiple limitations from Claim 1 are not disclosed, taught, or suggested by *Almadi*, none of the dependent claims are anticipated by *Almadi* or rendered obvious by *Almadi*.

C. INDEPENDENT CLAIM 20

125. It is my opinion that *Almadi* neither anticipates Claim 20 nor renders it obvious. There are key elements of Claim 20 that are missing from the disclosure of *Almadi* and would not have been obvious to a POSITA based on the disclosure of *Almadi*, as discussed below.

126. According to Dr. Wooley, “Claim 20’s preamble is analogous to limitation 1[p], limitation 20[a] is analogous to limitation 1[g], limitation 20[b] is analogous to limitation 1[h], limitation 20[c] is analogous to limitation 1[i] and limitation 20[d] is analogous to limitation 1[j].”³⁹ No additional analysis regarding the limitations of Claim 20 is offered, other than that already discussed regarding Claim 1. As there are elements of at least limitations 1[g], 1[i] and 1[j] missing from the disclosure of *Almadi*, as discussed above in **Sections XI.A.4 and XI.A.5** above, these elements would be missing from Claim 20 as well. Accordingly, *Almadi* fails to anticipate Claim 20 and fails to render Claim 20 obvious.

D. INDEPENDENT CLAIM 21

127. It is my opinion that *Almadi* neither anticipates Claim 21 nor renders it obvious. There are key elements of the Claim that are missing from the disclosure

³⁹ Ex. 1002 ¶149.

of *Almadi* and would not have been obvious to a POSITA based on the disclosure of *Almadi*, as discussed below.

128. According to Dr. Wooley, “Claim 21’s preamble is analogous to limitation 1[p], limitation 21[a] is analogous to limitation 1[g], limitation 21[b] is analogous to limitation 1[h], limitation 20[c] is analogous to limitation 1[i] and limitation 21[d] is analogous to limitation 1[j].”⁴⁰ No additional analysis regarding the limitations of Claim 21 is offered other than those already discussed regarding Claim 1. As there are elements of at least limitations 1[g], 1[i] and 1[j] missing from the disclosure of *Almadi*, as discussed above in **Sections XI.A.4 and XI.A.5**, these elements would be missing from Claim 21 as well. Accordingly, *Almadi* fails to anticipate Claim 21 and fails to render Claim 21 obvious.

XII. GROUND 3: ABDALLAH DOES NOT ANTICIPATE THE CLAIMS, NOR DOES IT RENDER THE CLAIMS OBVIOUS

129. After review of the evidence submitted in support of the Petition, including the Prior Art relied on and the declaration of Dr. Wooley, it is my opinion that *Abdallah* does not anticipate nor render Claims 1, 9-11, and 20-21 of the '909 Patent obvious. There are claim elements missing from *Abdallah* that neither Dr. Wooley nor the Petitioner shows are disclosed or obvious in *Abdallah*.

⁴⁰ Ex. 1002 ¶150.

A. INDEPENDENT CLAIM 1

130. It is my opinion that *Abdallah* neither anticipates Claim 1 nor renders it obvious. There are key elements of Claim 1 that are missing from the disclosure of *Abdallah* and are not shown to be obvious to a POSITA based on the disclosure of *Abdallah*, as discussed in the subsections below.

131. Claim 1 contains the following limitations, which have been subdivided in the same manner that Dr. Wooley and Petitioner subdivided them:

1[p] A system for remotely controlling a fluid-handling device of an oil well, a petro water disposal or re-injection facility, or a petroleum pumping station, the system comprising

1[a] a command-center server having a data store storing multiple user accounts, each user account corresponding to a set of one or more oil wells, petro water disposal or re-injection facilities, or petroleum pumping stations, or a combination thereof, each set being operated by a different entity corresponding to the respective user account; and

1[b] a plurality of geographically distributed site master controllers, each site master controller corresponding to a respective one of the oil wells, petro water disposal or re-injection facilities, or petroleum pumping stations, each site master controller comprising:

1[c] a communication module operable to communicate with a plurality of fluid-handling devices;

1[d] a network interface;

1[e] memory; and

1[f] one or more processors communicatively coupled to the communication module, the network interface, and the memory, wherein the memory stores instructions that when executed by the processors cause the processors to effectuate steps comprising:

1[g] receiving, via the network interface, from the command center server, a plurality of commands encoded in a first protocol to control the fluid-handling devices from a user corresponding to one of the user accounts, different commands among the plurality of commands being directed to different fluid handling devices among the plurality of fluid-handling devices;

1[h] for at least some of the plurality of commands, determining a plurality of different target states of a given one of the fluid-handling devices over time, wherein the respective site-master controller is operative to maintain control of the fluid-handling devices in the absence of a network connection to the command-center server;

1[i] translating the plurality of commands into translated commands encoded in a plurality of protocols different from the first protocol, each translated command being translated into a protocol among the plurality of protocols suitable for a fluid-handling device to which the respective command is directed, the at least some of the translated command being operative to cause a local controller of the given fluid-handling device to drive the given fluid-handling device to the plurality of different target states, the local controller being responsive to the translated commands and feedback from the given fluid-handling device indicative of whether the given fluid-handling device is in a targeted state; and

1[j] sending the translated commands to respective local controllers of the respective fluid-handling devices to which the respective commands are directed.

132. Further, I note that even though Dr. Wooley makes a conclusory statement in ¶170 that “Claim 1 is anticipated by *Abdallah* or would be obvious to a POSITA in view of *Abdallah*.” However, there is no discussion or analysis anywhere in Dr. Wooley’s declaration regarding Claim 1 as to *why* the elements not disclosed by *Abdallah* would have been obvious to a POSITA.

1. 1[a]: “a command-center server having a data store storing multiple user accounts, each user account corresponding to a set of one or more oil wells, petro water disposal or re-injection facilities, or petroleum pumping stations, or a combination thereof, each set being operated by a different entity corresponding to the respective user account; and”

133. As he did with his analysis of *Cardamone* and *Almadi* regarding limitation 1[a], Dr. Wooley ignores portions of the claim language and focuses, instead, on a single piece, a “command center server.” Dr. Wooley maps the “command-center server” to *Abdallah*’s “central communication device gateway.” Thus, in the subsections below, each time the term “command center server” is referenced, it must be tied to disclosure of the “central communication device gateway.”

134. Dr. Wooley’s analysis of limitation 1[a] does not go to the claimed element and limitations. Limitation 1[a] does not merely claim a “command center server” as Dr. Wooley appears to believe. It claims “a command center server having a data store storing multiple user accounts, each user account corresponding to a set of one or more oil wells, petro water disposal or re-injection facilities, or petroleum pumping stations, or a combination thereof, each set being operated by a different entity corresponding to the respective user account.” Dr. Wooley’s referenced portion of *Abdallah* does not disclose or even suggest a command center server with,

for example, multiple user accounts, much less accounts corresponding to a set of facilities, or that any facilities would be operated by multiple entities. Further, nowhere in *Abdallah* is there such a disclosure.⁴¹ Neither Dr. Wooley nor the Petitioner attempts to show that these limitations are disclosed or suggested by *Almadi*.

135. Accordingly, *Abdallah* does not disclose limitation 1[a], nor would limitation 1[a] have been obvious based on the teachings of *Abdallah* as claimed by Dr. Wooley and Petitioner.

2. **1[b]: “a plurality of geographically distributed site master controllers, each site master controller corresponding to a respective one of the oil wells, petro water disposal or re-injection facilities, or petroleum pumping stations, each site master controller comprising:”**

136. Dr. Wooley attempts to map the site master controller to “well site sensor nodes.”⁴² The term “well site sensor nodes” does not appear in *Abdallah*. Based on Dr. Wooley’s referenced paragraphs and figure, I understand his analysis ties the site master controller to “sensor node 224” as shown in Fig. 2 and discussed in ¶[0058], which Dr. Wooley cites. See ¶¶156-157 of Dr. Wooley’s declaration. However, there is no discussion in *Abdallah* that sensor node 224 is a “controller”,

⁴¹ See Ex. 1007 (*Abdallah*) generally.

⁴² Ex. 1002 ¶157.

much less a “site master controller” as claimed. Sensor node 224 is described as “sensor node 224 may include a single sensor, or as shown, several sensors 228 configured as a sensor cluster with each sensor 228 in communication with a local node 226.”⁴³ *Abdallah* goes on to describe how sensor node 224 communicates with various sensors and communicates to other network nodes, but there is no description of sensor node 224 having any control functionality.⁴⁴

137. Further, sensor node 224 does not provide all of the functionality of a “site master controller” as described and claimed in the ’909 Patent. As will be discussed in the subsections below, *Abdallah* fails to disclose or suggest key elements of the site master controller.

138. Accordingly, *Abdallah* does not disclose limitation 1[b], nor would limitation 1[b] have been obvious based on the teachings of *Abdallah* as claimed by Dr. Wooley and Petitioner.

⁴³ Ex. 1007 (*Abdallah*) [0058].

⁴⁴ See, e.g., Ex. 1007 (*Abdallah*) [0058], [0063] and generally.

3. 1[f]: “one or more processors communicatively coupled to the communication module, the network interface, and the memory, wherein the memory stores instructions that when executed by the processors cause the processors to effectuate steps comprising:”

139. Dr. Wooley’s analysis again focuses on a single element of limitation 1[f], the “processors”. However, the limitation does not merely require processors, but processors that effectuate specific steps as outlined further in limitations 1[g] – 1[j]. These steps all discuss different actions taken regarding commands being directed to control a plurality of fluid handling devices. As discussed further in the subsections below, there is no disclosure of the processors, which must be part of the site master controller (i.e., sensor node 224) receiving commands to control any fluid handling devices, much less the specific steps taken in 1[g]–1[j] below. Accordingly, the processors pointed to by Dr. Wooley as part of “processors in the local node” (sensor node 224) cannot be the claimed processors of 1[f].

140. Accordingly, *Abdallah* does not disclose limitation 1[f], nor would limitation 1[f] have been obvious based on the teachings of *Abdallah* as claimed by Dr. Wooley and Petitioner.

4. 1[g]: “receiving, via the network interface, from the command center server, a plurality of commands encoded in a first protocol to control the fluid-handling devices from a user corresponding to one of the user accounts, different commands among the plurality of commands being directed to different fluid handling devices among the plurality of fluid-handling devices;”

141. Limitation 1[g] requires receiving commands to control fluid handling devices “from a user corresponding to one of the user accounts”. As discussed above regarding limitation 1[a], *Abdallah* does not disclose or suggest the plurality of user accounts to which this element points. Therefore, *Abdallah* cannot disclose “receiving commands to control the fluid handling devices from a user corresponding to one of the user accounts”.

142. Furthermore, there is no indication that sensor node 224, which Dr. Wooley identifies as the “site master controller,” has the ability to receive commands to control the fluid-handling devices. As discussed above regarding limitation 1[b], sensor node 224 is just that, a sensor node, not a controller of fluid handling devices of any kind.

143. Accordingly, *Abdallah* does not disclose limitation 1[g], nor would limitation 1[g] have been obvious based on the teachings of *Abdallah* as claimed by Dr. Wooley and Petitioner.

5. 1[h]: “for at least some of the plurality of commands, determining a plurality of different target states of a given one of the fluid-handling devices over time, wherein the respective site-master controller is operative to maintain control of the fluid handling devices in the absence of a network connection to the command-center server;”

144. This limitation requires at least that the “respective site-master controller is operative to maintain control of the fluid handling devices in the absence of a network connection to the command-center server.” As discussed above regarding limitations 1[b] and 1[g], there is no disclosure or suggestion that the “site master controller” identified by Dr. Wooley in the *Almadi* reference, i.e., the “well site sensor nodes,” has any control function for fluid handling devices, much less one that can maintain control in the absence of a network connection.

145. Further, I disagree with Dr. Wooley’s analysis that a “target state” is simply a sensed parameter.⁴⁵ This is not the plain and ordinary meaning of the term, nor is it consistent with its use in the ’909 Patent. A sensed parameter, as Dr. Wooley describes, may be the “present state” of a fluid handling device, but it is not a target state. A “target state” is a state that a fluid handling device should be in, which can include but is not limited to a valve position, tank level, or a motor speed.⁴⁶ The

⁴⁵ Ex. 1002 (*Wooley* declaration) ¶¶165-166.

⁴⁶ See, e.g., ’909 Patent 11:15 – 27.

claim language requires determining a plurality of target states, not sensed parameters, based on at least some of the plurality of commands, not on a sensor value. Thus, *Abdallah*'s description of sensing parameters does not disclose or suggest determining a target state based on at least some of the plurality of commands.

146. Further, the site master controller must determine a “plurality of target states” based on the command. This is simply missing from any disclosure or suggestion of *Abdallah*.

147. Accordingly, *Abdallah* does not disclose limitation 1[h], nor would limitation 1[h] have been obvious based on the teachings of *Abdallah* as claimed by Dr. Wooley and Petitioner.

6. 1[i]: “translating the plurality of commands into translated commands encoded in a plurality of protocols different from the first protocol, each translated command being translated into a protocol among the plurality of protocols suitable for a fluid-handling device to which the respective command is directed, the at least some of the translated command being operative to cause a local controller of the given fluid-handling device to drive the given fluid-handling device to the plurality of different target states, the local controller being responsive to the translated commands and feedback from the given fluid-handling device indicative of whether the given fluid-handling device is in a targeted state; and”

1[j]: “sending the translated commands to respective local controllers of the respective fluid-handling devices to which the respective commands are directed.”

148. Limitations 1[i] and 1[j] are discussed together here, as they are related through the “translated commands.” Both limitations further describe actions taken by the site master controller with regard to the commands received by the site master controller from the command center server (“the plurality of commands”).

149. This claim does not just require translation of the commands between protocols, but that the translation occurs with the site master controller, and the commands being sent to a local controller which has specific features. There is no disclosure or suggestion of a “local controller” to which *Abdallah*’s sensor nodes would direct commands in *Abdallah*. Furthermore, there is certainly no disclosure

that the local controller has the features claimed. Dr. Wooley does not even attempt to show that this element is disclosed by *Abdallah* because he cannot.

150. Further, there is no disclosure of translating the command with the site master controller (sensor node 224). Dr. Wooley makes an incorrect statement that “communicate with other nodes and devices requires that the protocols must be translated for communication between the nodes and disparate devices.”⁴⁷ Just because one device (gateway 300) may use different protocols, this does not imply that the individual nodes, such as sensor node 224, inherently must perform command translation to local controllers, as Dr. Wooley suggests. Based on the teachings of *Abdallah*, if there were some hypothetical local controller in *Abdallah* (there is not), and if the nodes were configured to send commands to the local controller (they are not), a POSITA would have understood that the node may receive a command in the same protocol as it passes it on to the local controller. There is simply no discussion in *Abdallah* regarding performing the translation command at the local sensor nodes and then passing the command on to any local controller.

⁴⁷ Ex. 1002 ¶168.

151. Accordingly, *Abdallah* does not disclose limitation 1[i], nor would limitation 1[i] have been obvious based on the teachings of *Abdallah* as claimed by Dr. Wooley and Petitioner.

B. DEPENDENT CLAIMS 2, 9-11, AND 20-12

152. Claims 2, 9-11, and 20-21 all depend on Claim 1. Since there are multiple limitations from Claim 1 that are not disclosed, taught, or suggested by *Abdallah*, none of the dependent claims are anticipated by *Abdallah* or rendered obvious by *Abdallah*.

C. INDEPENDENT CLAIM 20

153. It is my opinion that *Abdallah* neither anticipates Claim 20 nor renders it obvious. There are key elements of the Claim that are missing from the disclosure of *Abdallah* and would not have been obvious to a POSITA based on the disclosure of *Abdallah*, as discussed below.

154. According to Dr. Wooley, “Claim 20’s preamble is analogous to limitation 1[p], limitation 20[a] is analogous to limitation 1[g], limitation 20[b] is analogous to limitation 1[h], limitation 20[c] is analogous to limitation 1[i] and limitation 20[d] is analogous to limitation 1[j].”⁴⁸ No additional analysis regarding

⁴⁸ Ex. 1002 ¶183.

the limitations of Claim 20 is offered, other than that already discussed regarding Claim 1. As there are elements of at least limitations 1[g], 1[h], 1[i] and 1[j] missing from the disclosure of *Abdallah*, as discussed above in **Sections XII.A.4, XII.A.5 and XII.A.6**, above, these elements would be missing from Claim 20 as well. Accordingly, *Abdallah* fails to anticipate Claim 20 and fails to render Claim 20 obvious.

D. INDEPENDENT CLAIM 21

155. It is my opinion that *Abdallah* neither anticipates Claim 21 nor renders it obvious. There are key elements of the Claim that are missing from the disclosure of *Abdallah* and would not have been obvious to a POSITA based on the disclosure of *Abdallah*, as discussed below.

156. According to Dr. Wooley, “Claim 21’s preamble is analogous to limitation 1[p], limitation 21[a] is analogous to limitation 1[g], limitation 21[b] is analogous to limitation 1[h], limitation 20[c] is analogous to limitation 1[i] and limitation 21[d] is analogous to limitation 1[j].”⁴⁹ No additional analysis regarding the limitations of Claim 21 is offered other than those already discussed regarding Claim 1. As there are elements of at least limitations 1[g], 1[h], 1[i] and 1[j] missing from the disclosure of *Abdallah*, as discussed above in **Sections XII.A.4, XII.A.5**

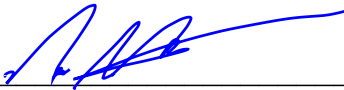
⁴⁹ Ex. 1002 ¶184.

and XII.A.6, these elements would be missing from Claim 21 as well. Accordingly, *Abdallah* fails to anticipate Claim 21 and fails to render Claim 21 obvious.

XIII. CONCLUSION

157. All statements made herein of my own knowledge are true, and all statements made on information and belief are believed to be true. I further understand that willful false statements and the like are punishable by fine or imprisonment, or both under Section 1001 of Title 18 of the United States Code. I declare under penalty of perjury that the foregoing is true and correct.

Executed on July 14, 2025.



Dr. Robert A. Durham

Dr. ROBERT A DURHAM, PhD, FIEEE

Resume
Specialization
Honors & Awards
Publications

Dr ROBERT A DURHAM, PhD, FIEEE

Robert A Durham is the Principal of D² Tech Solutions, a technology related firm concentrating on Mechanical and Electrical systems and energy conversions. He also serves as a Principal Scientist of THEWAY LABs, Tulsa, OK, an engineering and energy consulting firm that provides design and failure analysis of facilities and system installations.

Dr. Durham's work experience is broad and encompasses all areas of the energy industry. Dr. Durham spent 11 years with AEP/CSW, at the time the country's largest utility, in electrical engineering positions in the power generation and transmission planning departments. He then accepted a position as Manager of Electric Infrastructure for New Dominion, LLC., a major independent energy producer in Oklahoma. Dr. Durham then moved on to hold the position of Vice President of Engineering and Project Management for EDG Power Group, an Engineering Procurement and Construction company specializing in design and construction of small to medium size power generating facilities. Dr. Durham left EDG Power Group to accept his current positions. Dr. Durham has been accepted as an expert and offered testimony in several jurisdictions.

Dr. Durham's extensive client list includes the development of a broad spectrum of forensic, electrical and facilities projects for many companies. He has also taught University offered courses in electrical engineering review for board licensure. He has published five books, six magazine articles and over 40 other technical papers and articles. Dr. Durham's extensive work on standards and electrical systems has resulted in his elevation to Fellow of the IEEE, the highest grade of recognition in the electrical technology industry.

Dr. Durham received the B.S. in electrical engineering from the University of Tulsa in 1992 and the M.E. in Technology Management from The University of Tulsa in 1997. Tulsa, OK. In 2004, Dr. Durham received a PhD in Engineering Management from Kennedy Western University.

Degrees Earned

BSEE, with Honors, The University of Tulsa
 Master of Engineering, The University of Tulsa
 PhD , Kennedy Western University

Area of Specialization

lightning & grounding
 failure analysis & forensic engineering
 electrical power systems & safety
 economics & management
 petroleum & chemical industry
 drilling
 completion
 production
 transportation
 refining
 electrical / mechanical energy conversion

Registration

Professional Engineer - Oklahoma
 Professional Engineer – Texas
 Professional Engineer – California
 Professional Engineer – New Hampshire (Inactive)
 Professional Engineer – Kansas
 Professional Engineer – North Carolina (Inactive)
 Professional Engineer – Missouri
 Professional Engineer – Arkansas
 Professional Engineer – Virginia (Inactive)
 Professional Engineer – Illinois (Inactive)
 Electrical Contractor - Oklahoma

Work History

D ² Tech Solutions, Inc. Principal	2002 - 2025
THEWAY Corp. Principal Scientist	2004 - 2025

EDG Power Group, Inc. 2002 - 2004
Vice President Engineering & Project Management

New Dominion, LLC 2000 - 2002
Mgr Electric Infrastructure

Central & Southwest, Inc 1989 - 2000
Electrical Engineer

Professional Memberships

Fellow	Institute of Electrical and Electronic Engineers
Diplomate	American College of Forensic Examiners, International
Member	National Association of Fire Investigators
Voting Member	National Fire Protection Institute, Electrical Section
Executive Member	Petroleum and Chemical Industry Committee, IEEE
Diplomate,	
Past Board Member	American Board of Forensic Engineering and Technology
Member	IEEE Standards Association
Past Chair	Production Subcommittee, IEEE IAS/PCIC
CFC	American College of Forensic Examiners
Member	International Association of Arson Investigators
CFEI, CVFEI	National Association of Fire Investigators
Past Chair	Tulsa Section IEEE
Chair	IEEE RP1017.1 Working Group
Chair	IEEE RP1017.2 Working Group
Chair	IEEE RP1017.3 Working Group
Chair	IEEE RP1017.4 Working Group
Past Chair	IEEE PCIC Standards Subcommittee
Secretary	IEEE Petroleum and Chemical Industry Committee

Honors and Awards

Fellow of the IEEE

For contributions to submersible electrical equipment analysis and multi-point ground method in hazardous petroleum and chemical environments.

Honor Societies

Tau Beta Pi, national engineering honors

Eta Kappa Nu, national electrical engineering honors

Dr. Durham's publications have often successfully competed for outstanding paper awards from journals of the Institute of Electrical and Electronic Engineers (PCIC and IAS). This is an international competitive peer review and evaluation of papers that provide a significant contribution to the advancement and understanding of electrical applications.

IEEE Industry Applications Society, New Orleans, LA: Prize Article for "Data Quality and Grounding: Considerations in a Mixed Use Facility"

PCIC, Cincinnati, OH: Prize Paper for "Grounding and Bonding Conductors: Solid, Stranded, Bare or Insulated"

PCIC, New Orleans, LA: Prize paper for "Industrial Design Application for Power Distribution over Extra-Long Distances"

PCIC, Philadelphia, PA: Prize paper for "Paradigm Shifts and Impact on Engineers and Industry"

Transactions on Industry Applications, Orlando, FL: Prize Paper for "Lightning, Grounding, and Protection for Control Systems".

PCIC, Denver, CO: Prize Paper for "Grounding System Design for Isolated Locations and Plant Systems"

PCIC, St. Louis, MO: First place for "Lightning, Grounding, and Protection for Distributed Control and Communications Systems: A Retrofit".

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