

**UNITED STATES PATENT AND TRADEMARK OFFICE**

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**BEFORE THE PATENT TRIAL AND APPEAL BOARD**

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TANKLOGIX, LLC,  
Petitioner v.

SITEPRO, INC.,  
Patent Owner

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Case No. IPR 2025-00648

Expert Declaration in Support of Petitioner's Petition for *Inter Partes* Review of  
U.S. Patent No. 8,649,909

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**DECLARATION OF GARY R. WOOLEY, Ph.D.**

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## I. INTRODUCTION

### A. Background and Qualifications

1. My name is Gary R. Wooley. I have been retained by the petitioner TankLogix, LLC (“TankLogix”) in this *Inter Partes* Review (“IPR”) as an independent expert in the relevant art.

2. I have been asked to provide my opinions and views on the materials I have reviewed in the IPRs related to U.S. Patent Nos. 8,649,909 (“the ‘909 patent”); 9,342,078 (“the ‘078 patent”); 9,898,014 (“the ‘014 patent”); 10,488,871 (“the ‘871 patent”); 11,175,680 (“the ‘680 patent”); 11,294,403 (“the ‘403 patent”); and 11,726,504 (“the ‘504 patent”)(collectively, “the Challenged Patents”) and the scientific and technical knowledge regarding the same subject matter. I have been asked to consider what one of ordinary skill in the art would have understood from the Challenged Patents. I have also considered whether certain references disclose or suggest the features recited in the claims of the Challenged Patents. My opinions are set forth below.

3. My opinions are guided by my appreciation of how a person of ordinary skill in the art would have understood the claims of the Challenged Patents at the time of the alleged invention, which I have been asked to initially assume is December 7, 2012, the earliest claimed priority date of the Challenged Patents.

4. Based on my experience and expertise, it is my opinion that the

references discussed in detail below disclose or suggest all of the features recited in claims 1-17 and 19-21 of the '909 Patent and that it would have been obvious to combine the features in the manner described below to arrive at the claimed invention. Nothing in any of the challenged claims is new or operates in a manner that would have been unexpected by a person of ordinary skill in the art.

5. I am currently the President of Wooley & Associates, Inc. Attached as Appendix A is my current resumé. I earned a Bachelor of Science degree in Mechanical Engineering, a Master of Science degree in Engineering Mechanics, and a Ph.D. in Engineering Sciences from Louisiana State University. I worked for four major oil companies (Shell, Chevron (twice), Exxon, and Arco) and have been providing petroleum and mechanical engineering consulting services to the petroleum industry since 1978. I served as Vice-President of Enertech Engineering and Research Company from 1978 to 1986 and have been President of Wooley & Associates, Inc. since 1986. I have been a member, invited speaker, and technical committee chair for various professional societies such as ASME, SPE, API, and ASM. I have published numerous peer-reviewed articles in the professional literature and have served as a reviewer of technical articles for SPE and ASME. I am a member of the LSU ME Alumni Achievement Lecture Club, the LSU Engineering Hall of Distinction, the LSU Alumni Association Hall of Distinction, and Alumnus of the Year, and I currently serve as chair of the LSU College of

Engineering Dean's Advisory Council.

6. With respect to the specific subject matter at issue in this IPR—remotely controlling fluid-handling devices at petroleum facilities—I have extensive experience. My early oilfield experience with four major oil companies exposed me to remote control of fluid handling at gas processing plants, drill sites, production facilities, and offshore platforms. Analog devices to remotely control fluid handling were used early on and are still in use. More recently, digital devices were introduced to remotely control fluid handling and have added many new capabilities. Recently I have worked on consulting projects that involve analog and digital control of drilling mud in wellbores for onshore and offshore wells. Digital remote control of fluid handling has significantly expanded recently during fracture stimulation of horizontally drilled oil and gas wells in shale formations. I have provided engineering consulting services on fracture stimulation using digital remote fluid handling, including well-site visits and patent infringement evaluation.

**B. Compensation.**

7. In consideration for my services, my work on this case is being billed to Petitioner at an hourly rate of \$840 per hour, independent of the outcome of this proceeding. I am also being reimbursed for reasonable expenses I incur in relation to my services provided for this proceeding.

## **II. METHODOLOGY AND MATERIALS CONSIDERED**

8. My opinions expressed herein are based on my review of the Challenged Patents, their respective prosecution histories (including several patents listed within those prosecution histories), extrinsic evidence relating to the technology of the Challenged Patents, and other evidence cited in this declaration.

9. I further understand that the application resulting in the '909 Patent was filed on December 7, 2012 and that the remaining Challenged Patents are continuations of the '909 Patent and as such, share the same specification. My opinions are also based on my technical experience, knowledge, and expertise in the area of remotely controlling fluid-handling devices at petroleum facilities and saltwater disposal facilities.

10. More specifically, for this work, I have been asked to review the Challenged Patents including the specifications and claims, and the Challenged Patents' prosecution histories. In developing my opinions related to the Challenged Patents, I have considered the materials cited herein, including those items itemized in the Exhibit Table below.

| Exhibit | Description                                           |
|---------|-------------------------------------------------------|
| Ex 1001 | U.S. Patent No. 8,649,909                             |
| Ex 1002 | Declaration of Dr. Gary Wooley                        |
| Ex 1003 | Curriculum Vitae of Dr. Gary Wooley                   |
| Ex 1004 | File Wrapper for U.S. Patent No. 8,649,909            |
| Ex 1005 | U.S. Patent Application No. 2015/0308244 to Cardamone |

| Exhibit | Description                                          |
|---------|------------------------------------------------------|
| Ex 1006 | U.S. Patent No. 8,667,091 to Almadi                  |
| Ex 1007 | U.S. Patent Application No. 2008/0316048 to Abdallah |

11. This declaration contains my opinions with respect to the subject matter of this proceeding and with the understandings as set forth herein. I specifically reserve the right to formulate and offer additional or supplemental opinions based on any additional information, depositions, discovery, or evidence that may be provided or derived, future court rulings, or agreements between the parties, to the extent permitted by the Board.

### **III. OVERVIEW OF LEGAL CONSIDERATIONS.**

12. My understanding of the law is based on information provided by counsel for Petitioner.

13. I do not have any formal legal training, and I am not an attorney. TankLogix's counsel has informed me of certain legal principles that I applied in my analysis. Those legal principles are summarized below.

14. The following section summarizes the law as I have been instructed to apply it in formulating and rendering my opinions found later in this declaration. I understand that, in an *inter partes* review proceeding, patent claims may be deemed unpatentable if it is shown that they were anticipated or rendered obvious in view of the prior art. I understand that prior art in an *inter partes* review is limited to patents or printed publications that predate the priority date of the patent at issue.

**A. Person of Ordinary Skill in the Art**

15. I was asked to provide my opinion as a person of skill in the art (“POSITA”) as it relates to the Challenged Patents during the period leading up to the earliest claimed priority date. I considered several factors, including the types of problems encountered in the art, the solutions to those problems, the pace of innovation in the field, the sophistication of the technology, and the education level of active workers in the field. I provide that level below in Section IV.

**B. Anticipation**

16. I understand that when determining whether a claim is anticipated is based on underlying factual issues including the content of the prior art and the level of ordinary skill in the art. I further understand that for a single reference to anticipate a claim, “the four corners of [that] document describes every element of the claimed invention, either expressly or inherently, such that a person of ordinary skill in the art could practice the invention without undue experimentation.” *In re Hodges*, 882 F.3d 1107, 1111 (Fed. Cir. 2018) (citing *Spansion, Inc. v. Int’l Trade Comm’n*, 629 F.3d 1331, 1356 (Fed. Cir. 2010)).

17. Invalidity for anticipation requires that “[t]he identical invention must be shown in as complete detail as contained in the patent claim.” *TF3 Ltd v. Tre Milano, LLC*, 894 F.3d 1366, 1374 (Fed. Cir. 2018).

**C. Obviousness**

18. I understand that, when determining whether a claim is “obvious,” the analysis is based on underlying factual issues including the content of the prior art and the level of ordinary skill in the art. I further understand that for a single reference or a combination of references to render the claimed invention obvious, a POSITA must have been able to arrive at the claims by modifying or combining the references.

19. I have further been informed and understand that a claim is unpatentable as obvious if the difference between the subject matter sought to be patented and the prior art is such that the subject matter as a whole would have been obvious at the time the invention was made to a POSITA.

20. I also have been informed and understand that the combination of familiar elements according to known methods is obvious when it does no more than yield predictable results.

21. However, I further understand that a patent claim composed of several elements is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art. I understand that, to prove a claim would have been obvious, one must demonstrate that a POSITA would have been motivated to combine or modify the prior art to achieve the claimed invention while having a reasonable expectation of success in doing so.

22. I further understand that a claim may be obvious if common sense directs one to combine multiple prior art references or add missing features to reproduce the alleged invention recited in the claims. I also understand that if a POSITA could implement a predictable variation, then the claim is likely unpatentable. For the same reason, if a technique has been used to improve one device and a POSITA would recognize that it would improve similar devices in the same way, then using the technique is obvious. I further understand that a claim can be obvious if it combines old elements with no change to their respective functions, or alters prior art by merely substituting one element for another known in the field to yield a predictable result.

**D. Claim Construction**

23. I have been advised that “in an inter partes review proceeding, a claim of a patent ... shall be construed using the same claim construction standard that would be used to construe the claim in a civil action ..., including construing the claim in accordance with the ordinary and customary meaning of such claim as is understood by” a POSITA. 37 C.F.R. § 42.100(b). Each claim term challenged by this Petition should be construed in accordance with its ordinary and customary meaning for the purposes of resolving the issues raised in this Petition.

24. I have followed these principles in my analysis throughout this declaration.

#### **IV. LEVEL OF ORDINARY SKILL IN THE ART**

25. In determining the characteristics of a person of ordinary skill in the art at the time of the claimed invention, several things should be considered, including the factors discussed below, as well as (1) the levels of education and experience of the inventor and other persons actively working in the relevant field; (2) the types of problems encountered in the field; (3) prior art solutions to these problems; (4) the rapidity in which innovations are made; and (5) the sophistication of the relevant technology.

26. All of the opinions that I provide herein are provided through the lens of a person having ordinary skill at the relevant time (prior to 2012, which I understand is the priority date claimed by the Challenged Patents). In my opinion, a POSITA at the time of the alleged invention 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. I am a person of ordinary skill in the art in view of the above-recited standard.

#### **V. TECHNICAL BACKGROUND OF THE CHALLENGED PATENTS**

##### **A. Background of the Relevant Technology**

27. The Challenged Patents relate to the remote operation of fluid-handling devices. In the oil and gas industry, fluid handling systems direct, measure, display, and control the flow of fluids—liquid chemicals or condensed gases—across a

manufacturing plant or factory. Because of the potential hazards posed by the fluids they manage, where possible, industrial oil and gas producers manage operations remotely to keep personnel out of harm's way. To enhance operational performance and improve worker safety, the oil and gas industry long ago adopted technologies for remote monitoring and control of fluid handling systems. <https://www.bakerhughes.com/oilfield-services-and-equipment-digital/remote-operations>.

28. The typical operation of industrial fluid handling systems places sensor and actuator functions on-site, supported by a remote controller that receives information from the sensors and transmits instructions to the actuators. *See e.g.* <https://www.eetimes.com/industrial-sensors-and-control-the-basics-part-i/>. The on-site sensors detect operational information such as flow rate, temperature, pressure, pH, or other fluid properties, and deliver that information to associated controller devices. <https://www.sciencedirect.com/topics/materials-science/sensor-system>. The fluid handling components also include actuator functions that allow for electronic control of the components, thus enabling remote operation of system components, for example, motors, pumps, or valves, based on commands received from a controller device. *See e.g.*, <https://www.fluidcontrols.co.uk/what-does-an-actuator-do/#:~:text=Actuators%20are%20the%20unsung%20heroes,we%20know%20a%2>

0lot%20about; see also, <https://www.emerson.com/en-us/industries/automation/marine/marine-systems-solution/valve-remote-control-systems>.

## **B. The Alleged Invention**

29. The '909 Patent, entitled "Remote Control of Fluid-Handling Devices," describes a remote data collection and control system for fluid-handling devices found in oil wells, water disposal or re-injection facilities, or petroleum pumping stations, which the command center control systems manage as separate user accounts. Ex. 1001, Claim 1. The command center system sends commands to an on-site controller, configured to operate whether or not continuously connected to the command center system, to specify the target state of a fluid-handling device. *Id.* The on-site controller system translates the received command into an operative command for a fluid-handling device controller to drive the fluid-handling equipment to the target state and sends the translated command to the fluid-handling device controller. *Id.* The fluid-handling device controller in the claimed system both responds to the translated command and provides feedback to the on-site controller system indicating whether the connected fluid-handling device achieved the target state. *Id.*

### **C. Prosecution History Summary (Ex. 1004)**

30. The application that issued as the ‘909 Patent (US13/708,557) was filed on December 7, 2012, and issued on February 11, 2014. In a March 7, 2023 office action, the examiner rejected several claims as being anticipated by or obvious in view of: (1) U.S. Patent Publication No. 2004/0262008 (Deans et al.) and (2) the combination of Deans et al. and U.S. Patent Publication No. 2004/0231851 (“Silvers”), WO 2008/124765 (“Roberson et al.”), and U.S. Patent No. 5,149,443 (“Varnam”). Ex. 1004, at 325-58.

31. In response, Applicants amended claims 1, 3, 7, 13, and 15-20 and added new claims 21 and 22. Specifically, independent claim 1 was amended to add a command-center server having a data store for storing multiple user accounts and a plurality of geographically distributed site master controllers and to recite that the site master controller determines a plurality of different target states of fluid handling devices. Claim 3 was amended to recite that the remote data store receives a password corresponding to a selected one of the user accounts from a user device. Claim 13 was amended to recite that the fluid handling device includes opening a stuck valve. Claim 17 was amended to recite that at least one site master controller comprises a plurality of fluid-handling devices, and translating the command into a translated command comprises translating the command into different formats for different communication protocols for the different respective fluid-handling

devices. Claim 18 was amended to recite each user account corresponds to one or more user names, one or more user passwords, billing information, and identifiers of one or more of the site master controllers with which users under the corresponding account are authorized to interact. Claim 19 was amended to recite that a tangible, non-transitory machine-readable medium determines a plurality of different target states of the fluid-handling device over time such that control of the fluid-handling device is maintained in the absence of a network connection with the remote user device. Independent claim 20 was amended to recite that the method includes the step of determining a plurality of different target states of the fluid-handling device over time such that control of the fluid-handling device is maintained in the absence of a network connection with the remote user device. Ex. 1004, at 171-86.

32. New claim 21 was added to claim that the system has a first layer of control in which targeted states of the fluid handling device are determined by a respective site master controller in response to the received command and a second layer of control in which, for each targeted state specified by the first layer of control, the fluid-handling device exercises feedback control to drive the fluid-handling device to the respective targeted state. New claim 22 was added to recite that the system is operative to provide web-based control and monitoring of oil and gas wells

to multiple account holders corresponding to the user accounts. Ex. 1004, at 171-86.

33. In a second (Final) Office Action, the Examiner maintained its rejection of the pending claims view of Deans et al. and the combination of Deans et al. and U.S. Patent Publication No. 2002/0161685 (“Dwinnell”), Silvers, Roberson et al., U.S. Patent Publication No. 2001/0032518 (“Boger et al.”) and Varnam. Ex. 1004, at 105-48.

34. In response to the second office action, the Applicant argued, without amending claims, that the cited references taken alone or in hypothetical combination, fail to teach or suggest features of independent claims or their dependent claims. On October 3, 2013, the Applicant participated in an Examiner’s interview to discuss the 35 U.S.C. § 103 rejections. Applicant's representative discussed how the prior art was directed to standardized communication to wells and the present invention is directed to translating and sending commands for control of devices at the wells. Ex. 1004, at 76, 81-96.

35. On October 10, 2013, the Applicant filed a Request for Continued Examination which further narrowed the pending claims. For example, Claim 1 was further amended to recite that the 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. Ex. 1004, at 61-74.

36. Claim 1 further included different commands among the plurality of commands being directed to different fluid-handling devices among the plurality of fluid-handling devices. Finally, claim 1 was amended to recite sending the translated commands to respective local controllers of the respective fluid-handling devices to which the respective commands are directed. Ex. 1004, at 61-74.

37. Claims 5, 9, 10, and 15 were amended to note that a fluid handling device is one of a plurality of fluid handling devices. Claim 19 was amended to recite that a plurality of commands to control a plurality of different fluid-handling devices, each of the plurality of commands being directed to a different one of the plurality of fluid-handling devices, and the plurality of commands being encoded in a first protocol and translating the plurality of commands into a plurality of translated commands operative to cause [[a]] local controllers of the fluid-handling devices to drive the respective fluid-handling devices to the plurality of different target states

among the plurality of different target states, the plurality of translated commands including translated commands encoded in a plurality of different protocols, and the local controllers being responsive to the translated commands and feedback from a corresponding fluid-handling device among the plurality of different fluid handling devices, the feedback being indicative of whether the corresponding fluid-handling device is in a targeted state. Claim 20 was amended to note that the translating commands include translating commands that are encoded in a plurality of different protocols different from the shared protocol, each translated command being encoded in a protocol among the plurality of different protocols suitable for a fluid-handling device to which the respective command is directed. Ex. 1004, at 61-74.

38. A Notice of Allowance was mailed on November 29, 2013, which allowed pending claims 1-16 and 18-21. Ex. 1004, at 41-53.

#### **D. Overview of the Prior Art**

##### **1. Cardamone (Ex. 1005)**

39. U.S. Patent Application No. 2015/0308244 to Cardamone was filed on November 26, 2013, and claims the benefit of Provisional Patent Application No. 61/729,815 filed on November 26, 2012. Cardamone is prior art under pre-AIA § 102(e).

40. Cardamone is directed to a deep well linear motor pump system comprising a pump motor driver system configured to provide drive commands to

the pump motor, a surface control computer connected with the motor drive system and configured to control the pump motor, a sensor system communicating with the control computer and configured to sense operating parameters of the pump motor, including the position of the motor shaft and the temperature of the motor. Ex. 1005, Abstract.

## **2. Almadi (Ex. 1006)**

41. U.S. Patent No. 8,667,091 to Almadi was filed on July 22, 2011, published on April 5, 2012, and claims priority to Provisional Patent Application No. 61/367,207 filed on July 25, 2010. Almadi issued March 4, 2014. Almadi is prior art under pre-AIA § 102(a).

42. Almadi teaches an integrated node used to interface between a remote host server and a plurality of remote subsystems in a process automation environment to provide, in turn, for a single point of control for data collection, monitoring, and restoration. Ex. 1006, 2:64-31.

43. The claimed node integrates the functions of controller units, communications networking devices, and data storage servers into one unit. Embodiments of an integrated node can also, for example, support networking over multiple communication interfaces and transmit process data to a remote host server over TCP/IP (transmission control protocol and the internet protocol, also referred to as the internet protocol suite). Ex. 1006, 3:10-20.

### **3. Abdallah (Ex. 1007)**

44. U.S. Patent Application No. 2008/0316048 to Abdallah was filed on March 26, 2008, and claims the benefit under 35 U.S.C. § 120 and is a continuation-in-part of co-pending U.S. Patent Application No. 60/920,434 filed Mar. 28, 2007 and U.S. Patent Application No. 11/931,842 filed on Oct. 31, 2007. Abdallah was published on December 25, 2008, and is prior art under pre-AIA § 102(a).

45. Abdallah teaches a well-site data communication system and method including a communication terminal that receives information using a first communication protocol; a transmitter coupled to the first communication terminal that sends information from the first communication terminal to a second communication terminal located at a well site using a second communication protocol; and a processor coupled to the first communication terminal configured as a protocol translator to change the received information from the first communication protocol to the second communication protocol. Ex. 1007, claim 1.

## **VI. SUMMARY OF MY OPINIONS**

46. Having reviewed the Challenged Patents and the prior art discussed herein, I have formed the following opinions regarding the '909 Patent:

- Cardamone Anticipates Claims 1-2, 4-6, 8, 12, 14-17, and 19-21 or would be obvious to a POSITA in view of Cardamone.
- Almadi Anticipates Claims 1, 5, 6, 10-11, 14, and 19-21 or would be obvious to a POSITA in view of Almadi.

- Abdallah Anticipates Claims 1, 20, and 21 or would be obvious to a POSITA in view of Abdallah.

#### **A. Opinions Regarding the '909 Patent**

##### **1. Ground 1: Cardamone Anticipates Claims 1-12, 14, 16, 17, and 19-21, Or Would Be Obvious To A POSITA In View Of Cardamone.**

47. Independent claims 1, 20, and 21 and dependent claims 2-12, 14, 16, 17, and 19 are anticipated by U.S. Patent Application No. 2015/0308244 ("Cardamone") under 35 U.S.C. § 102, or would be obvious to a POSITA in view of Cardamone under 35 U.S.C. § 103.

##### **a. Claim 1**

*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*

48. The process of oil and gas production creates "saltwater," which is considered hazardous waste because of its high salt content, hydrocarbons, and industrial compounds. Hydraulic fracturing of shale gas well sites produces millions of gallons of this saltwater, also known as "produced water" or "oilfield brine." See <https://www.wef.org/globalassets/assets-wef/direct-download-library/public/03---resources/wsec-2017-fs-013-iwwc-og-glossary---final---5.21.18.pdf> The water brings oil and gas to the earth's surface where impurities are chemically removed, resulting in a leftover liquid that must then be safely discarded. Companies can recycle the water, injecting it back into working reservoirs for reuse in gathering any

remaining oil or gas, or they can discard it at a saltwater well disposal site. *See, e.g.*, <https://kimray.com/training/brief-guide-water-management-oil-and-gas-industry>

49. Cardamone discloses a deep well linear pump station that includes, among other devices, at least one downhole pump. Ex. 1005, Abstract. Downhole pumps are used at oil wells, water disposal sites, re-injection facilities, or petroleum pumping stations. These pumps and pump systems are monitored and controlled from Remote Operating Centers (“ROC”). Therefore, Cardamone discloses 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.

*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*

50. A data server (DS) is a software program/platform used to provide database services like storing, processing, and securing data. These database services are consumed by other software programs or components. The computer hardware, where the database is running, is also referred to as a database server. Therefore, the data server can be seen as the combination of software and hardware platforms that run the installed database and provide relevant services. *See* <https://www.techopedia.com/definition/4192/data-server-ds>.

51. A server is a computer or system that provides resources, data, services, or programs to other computers, known as clients, over a network. See <https://www.paessler.com/it-explained/server>. A command center server is simply a server disposed at a command center or a central place for executing orders and supervising tasks. Common to every command center are three general activities: inputs, processes, and outputs.

52. A POSITA would further recognize that data server 134 is the command center server because they perform the same functions in substantially the same way. Ex. 1005, ¶ 0011. Therefore, Cardamone discloses a command-center server having a data store.

*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:*

53. A controller, in a computing context, is a hardware device or a software program that manages or directs the flow of data between two entities. In computing, controllers may be cards, microchips, or separate hardware devices for the control of a peripheral device. In general, a controller can be thought of as something or someone that interfaces between two systems and manages communications between them. See <https://www.techtarget.com/whatis/definition/controller>.

54. Controllers are capable of sending commands, instructions, target values, target states, etc., to different components in the well site, including other fluid-handling devices. Controllers can also receive measurement data, commands, instructions, target values, and target states from different fluid-handling devices. Finally, controllers can also make a determination about whether measured values fall within preset parameters. Controllers can also collect data from sensors and fluid-handling devices either by queried sampling to immediately read all enabled digital and analog input pins or automatic sampling to transmit the sensor data periodically or whenever a digital pin changes. See <https://www.techtargot.com/whatis/definition/control-system>.

55. In the context of PID controllers, the setpoint represents the reference or goal for the controlled process variable. It serves as the benchmark against which the actual process variable (PV) is continuously compared. The PID controller calculates an error signal by taking the difference between the setpoint and the current value of the process variable. The PID controller uses this error signal to determine how to adjust the control output to bring the process variable as close as possible to the setpoint while maintaining stability and minimizing overshoot. See, e.g., <https://ctms.engin.umich.edu/CTMS/index.php?example=Introduction&section=ControlPID>.

56. A site master controller is a controller that is disposed at a well site to control a device or devices located at the site. See <https://www.techtarget.com/whatis/definition/controller>. A POSITA would understand that more than one site master controller could be disposed at a well site depending on the physical site layout and the number of devices present.

57. A target state is the particular operating condition that a device is in at a particular time. Determining the target state of the fluid-handling devices is necessary to understand whether a fluid-handling device is operating within the proper device parameters or whether the operating condition of the fluid-handling device should be changed. It is well known in certain device configurations at fluid handling sites that fluid handling devices will continue to operate based on the last received commands in the event a connection to the server is lost.

58. A POSITA would understand that Cardamone discloses the site master controller of the '909 Patent through its disclosure of control and communication computer 126. Thus, Cardamone discloses a plurality of geographically distributed site master controllers.

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

59. A communication module is a hardware device that facilitates communication between different systems or devices. It can be wired or wireless and is used to exchange data and enable devices to work together. These modules come

in various types, including wireless, wired, RF, IoT, Ethernet, CAN, and fiber optic modules, each designed for specific communication needs. They are crucial in industries like automotive, telecommunications, and IoT, enabling efficient data exchange and connectivity. See [https://www.ntchip.com/electronics-](https://www.ntchip.com/electronics-news/communication-)

module#:~:text=These%20modules%20come%20in%20various,efficient%20data%20exchange%20and%20connectivity. I understand that the wifi access port, satcom modem, ethernet, and RS-485 transducer interface are types of communication modules. Thus, Cardamone discloses a communication module. Ex. 1005, ¶¶ 0008, 0024, 0027, 0033, FIGS. 1, 4.

*1[d] - a network interface;*

60. A network interface is the point of interconnection between a computer and a private or public network. A network interface is generally a network interface card (NIC) but does not have to have a physical form. Instead, the network interface can be implemented in software. <https://docs.oracle.com/javase%2Ftutorial%2F/networking/nifs/definition.html#:~:text=A%20network%20interface%20is%20the,can%20be%20implemented%20in%20software.>

61. A POSITA would understand that the wifi access port and Ethernet Port allow connections between devices and a public or private network, and as such, are

network interfaces. Thus, Cardamone discloses a network interface. Ex. 1005, ¶¶ 0008, 0024, 0027, 0033, FIGS. 1, 4.

*1[e] - memory; and*

62. Computer memory is a device that is used to store data or programs (sequences of instructions) on a temporary or permanent basis for use in an electronic digital computer. See <https://www.techtarget.com/whatis/definition/memory>. A POSITA would understand that Cardamone discloses the memory of the '909 Patent. Ex. 1005, ¶¶ 0008, 0024, 0034, FIG. 4. Thus, Cardamone discloses a memory.

*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:*

63. Communicational coupling occurs when two or more modules share a common communication mechanism such as a shared message queue, programs, or databases. A POSITA would understand that in remote oil fields and fluid-handling management systems, CPUs are often coupled together with communication modules, network interface, and memory and that such a configuration has been known in the industry for decades. Thus, Cardamone discloses one or more processors communicatively coupled to the communication module, the network interface, and the memory.

*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;*

64. A command, in the context of technology and computing, is an instruction given by a user to a computer or software to perform a specific task. It can be a single word, a line of code, or a series of instructions that tell the computer what to do. <https://www.lenovo.com/us/en/glossary/command/>. A command is a specific action assigned to a program to perform a specific task. It commonly refers to a specific word or phrase that tells the computer what to do through a command line interface or shell, depending on what kind of system is being used. Programming languages also refer to lines of code that initiate specific processes or statements as commands. <https://www.techopedia.com/definition/3333/command-cmd>.

65. Controllers that are used at fluid-handling sites and able to communicate with each device at the site no matter the type of device or device manufacturer, each device has its distinct protocol. See, e.g., <https://www.eetimes.com/industrial-sensors-and-control-the-basics-part-i/>. In order for the CPU to communicate with each device, the protocol of the device must be translated to a protocol that can be understood by the CPU and the other devices at the well site. A protocol translator is often disposed at the well site to translate

protocols. See e.g. <https://www.trendmicro.com/vinfo/hk-en/security/definition/protocol-gateway>.

66. A POSITA would understand that the site master controller, control and communication computer 126, receives from the command center server, data server 134, a plurality of commands (retrieval of various data or various control adjustments) encoded in a first protocol (an internet, network, or cellular protocol) from a user of GUI computer 130. Ex. 1005, ¶¶ 0005, 0011, 0021, 0024, 0026, FIG. 1. Thus, Cardamone discloses 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.

*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;*

67. A POSITA would understand that establishing a movement profile or adjusting operating function based upon the receipt of sensory data is a plurality of different target states where the sensory data includes the target operational status of the sensory devices of a given one of the fluid-handling devices over time. Further, a POSITA would understand that establishing the movement profile or operating function of fluid-handling devices based on received data causes can cause a CPU to maintain control of the fluid-handling devices in the absence of a network

connection to a server because the operating parameters have already been locally established. Thus, Cardamone discloses determining a plurality of different target states of a given one of the fluid-handling devices over time, where the site-master controller is operative to maintain control in the absence of a network connection to the command server. Ex. 1005, ¶¶ 0009, 0021, 0022, 0025, 0026, 0029, 0036, 0044.

*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*

68. Protocol translation is a method for transforming pieces of information from a source protocol into relevant target protocol formats in order to communicate between heterogeneous legacy systems in interoperability environments, such as fluid-handling sites. See <https://www.sciencedirect.com/science/article/abs/pii/S0164121212001720#:~:text=Protocol%20translation%20is%20a%20method,legacy%20systems%20in%20interoperability%20environments>. A protocol translator is a device used to convert standard or proprietary protocol of one device to the protocol suitable for the other device or tools to achieve the desired

interoperability. Protocols are software installed on the routers, which convert the data formats, data rate, and protocols of one network into the protocols of the network in which data is navigating. There are varieties of protocols used in different fields like power generation, transmission and distribution, oil and gas, automation, utilities, and remote monitoring applications. The major protocol translation messages involve the conversion of data messages, events, commands, and time synchronization. Protocol converters are generally used for transforming data and commands from one device or application to another. This necessarily involves the transformation of data, commands, their representation, encoding, and framing to achieve the conversion. See <https://www.trendmicro.com/vinfo/hk-en/security/definition/protocol-gateway>.

69. Translation of protocols is required to support communication between different fluid-handling devices, controllers, IPCs, etc. I understand that the claimed translation of protocols is required to permit the data interface and bus to operate and communicate with various types of devices using multiple different types of protocols. See <https://www.trendmicro.com/vinfo/hk-en/security/definition/protocol-gateway> Protocol translation allows devices running dissimilar protocols to communicate. The translation of virtual terminal protocols allows connectivity to devices running different protocol stacks.

70. A POSITA would understand that Simple Network Management Protocol (“SNMP”) is an internet standard protocol used to monitor and manage network devices connected over an IP. See <https://www.thousandeyes.com/learning/techtutorials/snmp-simple-network-management-protocol#:~:text=What%20is%20SNMP%3F,devices%20in%20Internet%20Protocol%20networks>. A POSITA would also understand that SNMP is used for communication between routers, switches, firewalls, load balancers, servers, CCTV cameras, and wireless devices. The simplest and most commonly used conversion is protocol conversion between Modbus RTU and Modbus TCP. In this conversion, there is no change in the overall framing. Hence, it is easy to take the Serial Modbus RTU frame and encapsulate it in a TCP/UDP socket, and send it over Ethernet. Since both the protocol framings are the same, except for the actual physical layer transmission, both the application layers will interpret data similarly as long as the communication interfaces are made transparent.

71. Thus, Cardamone discloses translating the plurality of commands into translated commands encoded in a plurality of protocols different from the first protocol. Ex. 1005, ¶¶ 0030-31.

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

72. A POSITA would understand that sending translated commands, i.e., commands in the computing language of the respective fluid handling device is required to program control computer 126 to drive the pump according to the user-provided specifications. Ex. 1005, ¶ 0031; *see also* ¶¶ 0029-31. Thus, Cardamone discloses sending the translated commands to respective local controllers of the respective fluid-handling devices.

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73. As such, Claim 1 is anticipated by Cardamone, or would be obvious to a POSITA in view of Cardamone.

**b. Claim 2**

74. Claim 2 depends from independent Claim 1. Cardamone discloses Claim 1 for the reasons discussed above and incorporated herein.

75. It is known in the art that CPUs can store data received from fluid-handling devices. The received data includes but is not limited to, data indicative of the operation of a fluid handling device. Further, it is well known that a controller/CPU can send the respective fluid handling device data to a data server, a remote data store, or other devices. Therefore, a POSITA would understand that Cardamone discloses the element recited in Claim 2. Ex. 1005, ¶¶ 0008, 0021. As

such, Claim 2 is anticipated by Cardamone, or would be obvious to a POSITA in view of Cardamone.

**c. Claim 3**

76. Claim 3 depends from independent Claim 1 and dependent Claim 2. Cardamone discloses Claim 1 and Claim 2 for the reasons discussed above and incorporated herein.

77. A POSITA would understand that Cardamone discloses a GUI computer that serves as a web server. A GUI is a form of user interface that allows users to interact with electronic devices through graphical icons and visual indicators such as secondary notation. In many applications, GUIs are used instead of text-based UIs, which are based on typed command labels or text navigation. GUIs were introduced in reaction to the perceived steep learning curve of command-line interfaces (CLIs), which require commands to be typed on a computer keyboard. *See* <https://www.computerhope.com/jargon/g/gui.htm>, *see also* <https://www.computerhope.com/issues/ch000619.htm>. A GUI is a type of user interface that allows a user to interact with fluid-handling devices via visual indication representatives. It is well known that a GUI is a type of control interface. The GUI computer can be portable or desktop and can access the control computer via the web. Applications on the GUI computer query a user for a username and password which are authenticated by the control computer. The GUI computer

permits a user to view sensor data and set operating parameters and algorithms. *See, e.g.,* <https://www.ibm.com/docs/en/ioc/5.2.0?topic=source-configuring-display-sensor-data>.

78. Therefore, Cardamone discloses the limitations of Claim 3. Ex. 1005, ¶ 0042. As such, Claim 3 is anticipated by Cardamone, or would be obvious to a POSITA in view of Cardamone.

**d. Claim 4**

79. Claim 4 depends from independent Claim 1, and dependent Claims 2 and 3. Cardamone discloses Claims 1-3 for the reasons discussed above and incorporated herein. A POSITA would understand that Cardamone discloses providing access to view live and stored sensor data. Ex. 1005, ¶ 0041. The data includes varying types of data found in oil field and saltwater disposal operations including inlet pressure and pump frequency. Ex. 1005, ¶¶ 0029-30, 0044-45, 0049.

80. A POSITA understands that Cardamone discloses the element recited in Claim 4. Ex. 1005, ¶¶ 0029-30, 0044-45, 0049. Therefore, Cardamone discloses the limitations of Claim 4. As such, Claim 4 is anticipated by Cardamone, or would be obvious to a POSITA in view of Cardamone.

**e. Claim 5**

81. Claim 5 depends from independent Claim 1, and dependent Claims 2 and 3. Cardamone discloses Claims 1-3 for the reasons discussed above and incorporated herein.

82. A POSITA would understand that Cardamone discloses the element recited in Claim 5. A POSITA would understand that Cardamone discloses warnings and alarms, for example, when devices operate outside of operating parameters. Ex. 1005, ¶ 0036 Therefore, Cardamone discloses the limitations of Claim 5. As such, Claim 5 is anticipated by Cardamone, or would be obvious to a POSITA in view of Cardamone.

**f. Claim 6**

83. Claim 6 depends from independent Claim 1, and dependent Claims 2 and 3. Cardamone discloses Claims 1-3 for the reasons discussed above and incorporated herein.

84. A POSITA would understand that Cardamone discloses that the control computer issues warnings and adjusts the operation of devices in response to the alarms. Ex. 1005; ¶¶ 0009, 0036. This is well-known in the industry. Therefore, Cardamone discloses the limitations of Claim 6. As such, Claim 6 is anticipated by Cardamone, or would be obvious to a POSITA in view of Cardamone.

**g. Claim 7**

85. Claim 7 depends from independent Claim 1, and dependent Claim 2. Cardamone discloses Claims 1-2 for the reasons discussed above and incorporated herein.

86. A web server is software and hardware that uses HTTP (Hypertext Transfer Protocol) and other protocols to respond to client requests made over the World Wide Web. A web server displays website content through storing, processing, and delivering web pages to users. Besides HTTP, web servers also support SMTP (Simple Mail Transfer Protocol) and FTP (File Transfer Protocol), used for email, file transfer, and storage.

87. Web server hardware is connected to the internet and allows data to be exchanged with other connected devices, while web server software controls how a user accesses hosted files. The web server process is an example of the client/server model. See <https://www.techtarget.com/whatis/definition/Web-server>.

88. A POSITA would understand that Cardamone discloses web-server operative to receive commands from a user device, where the commands include changing a specific fluid-handling device known from the network address of the respective site master controller of the '909 Patent through its disclosure of control and communication computer 126 its interface with GUI Computer 130 that communications with "known pumps." Ex. 1005, ¶ 0041. Thus, Cardamone

discloses the limitations of Claim 7. As such, Claim 7 is anticipated by Cardamone, or would be obvious to a POSITA in view of Cardamone.

**h. Claim 8**

89. Claim 8 depends from independent Claim 1. Cardamone discloses Claim 1 for the reasons discussed above and incorporated herein.

90. A POSITA would understand that Cardamone discloses the element recited in Claim 8. A POSITA would understand that in remote oil fields and fluid-handling management systems controllers are often coupled together with communication modules, network interface, and memory and that such a configuration has been known in the industry for decades. Controllers are used in remote oil fields and fluid-handling management systems to control fluid-handling services, such as pumps, valves, filters, tanks, etc. Therefore, Cardamone discloses the limitations of Claim 8. Ex. 1005, ¶¶ 0024, 0044-45, 0049. As such, Claim 8 is anticipated by Cardamone, or would be obvious to a POSITA in view of Cardamone.

**i. Claim 12**

91. Claim 12 depends from independent Claim 1. Cardamone discloses Claim 1 for the reasons discussed above and incorporated herein.

92. A POSITA would understand that Cardamone discloses the element recited in Claim 12. A POSITA would understand that Cardamone discloses various protocols, including the Modbus protocol and analog and digital signals. Therefore,

Cardamone discloses the limitations of Claim 12. *See, e.g.*, Ex. 1005, ¶ 0007. As such, Claim 12 is anticipated by Cardamone, or would be obvious to a POSITA in view of Cardamone.

**j. Claim 14**

93. Claim 14 depends from independent claim 1. Cardamone discloses Claim 1 for the reasons discussed above and incorporated herein.

94. A POSITA would understand that Cardamone discloses the element recited in Claim 14. Deep oil well pumps can be used at oil wells, saltwater disposal sites, pump stations, and the like. Therefore, Cardamone discloses the limitations of Claim 14. Ex. 1005, ¶¶ 0021-22, 0024, 0026. As such, Claim 14 is anticipated by Cardamone or would be obvious to a POSITA in view of Cardamone.

**k. Claim 17**

95. Claim 17 depends from independent claim 1. Cardamone discloses Claim 1 for the reasons discussed above and incorporated herein.

96. A POSITA would understand that Cardamone discloses the element recited in Claim 17. A POSITA would understand that Cardamone discloses that Applications query a user for a username and password to authorize access to the system. Therefore, Cardamone discloses the limitations of Claim 17. Ex. 1005, ¶ 0042. As such, claim 17 is anticipated by Cardamone, or would be obvious to a POSITA in view of Cardamone.

## **I. Claim 18**

97. Claim 18 depends from independent claim 1. Cardamone discloses Claim 1 for the reasons discussed above and incorporated herein. Cardamone discloses that the “control algorithm may control the motor drive system and/or pump as a function of sensory data.” EX1005, ¶0009. Cardamone further discloses application 131 also allows the user to adjust the operating parameters of control and communication computer 126 through “a command interface” to specify the “movement profile” for the pump system, including through a distance versus time curve, or a force versus time curve for an operation cycle of the pump. EX1005, ¶0044. Cardamone further discloses control and communication computer 126 providing motor driver 124 with command signals to properly drive pump system 122. A POSITA would understand establishing a movement profile, or adjusting operating function based upon the receipt of sensory data described above, determines a plurality of different target states of a given one of the fluid-handling devices over time. See ¶67 above. A POSITA would further understand establishing—on control and communication computer 126—the movement profile or operating function based upon certain data causes control and communication computer 126 to maintain the control of the fluid handling devices. Thus, a POSITA would understand Cardamone discloses exercising two layers of control to drive the

respective fluid-handling device to the respective targeted state, in the manner described in dependent claim 18.

**m. Claim 19**

98. Claim 19 depends from independent claim 1. Cardamone discloses Claim 1 for the reasons discussed above and incorporated herein.

99. A POSITA would understand that Cardamone discloses web-based control of and monitoring of oil and gas wells through its disclosure of a web application and GUI computer which provides graphical views and the ability to set control parameters to a user. A POSITA would understand that Cardamone discloses the element recited in Claim 19. Ex. 1005, ¶¶ 0046, 0048. Therefore, Cardamone discloses the limitations of Claim 19. As such, claim 19 is anticipated by Cardamone, or would be obvious to a POSITA in view of Cardamone.

**n. Claim 20**

100. Cardamone discloses each limitation of Claim 20, anticipating Claim 20. 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]. Each of Claim 20's limitations are disclosed by Cardamone for reasons provided above, and incorporated here. Cardamone anticipates Claim 20 or would be obvious to a POSITA in view of Cardamone.

**o. Claim 21**

101. Cardamone discloses each limitation of Claim 21, anticipating Claim 21. 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]. Each of Claim 21's limitations are disclosed by Cardamone for reasons provided above, and incorporated here. Cardamone anticipates Claim 21 or would be obvious to a POSITA in view of Cardamone.

**2. Ground 2: Almadi Anticipates Claims 1, 5-6, 9-11, 14-16, and 18-21, Or Would Be Obvious To A POSITA In View Of Almadi.**

102. Independent claims 1, 20, and 21 and dependent claims 5, 6, 9-11, 14, 18, and 19 of the '909 Patent are anticipated by U.S. Patent No. 8,887,091 ("Almadi") under 35 U.S.C. § 102, or would be obvious to a POSITA in view of Almadi under 35 U.S.C. § 103.

**a. Claim 1**

- i. *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*

103. A POSITA would recognize that the system disclosed by Almadi remotely monitors and controls a fluid handling device pump at oil wells, water disposal sites, re-injection facilities, or petroleum pumping stations. *See, e.g.,* Ex. 1006, Abstract, 1:28-35 Therefore, Almadi discloses 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.

*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*

104. A POSITA would further understand command servers have memory. *See supra*, ¶¶ 29, 51-52 (above discussion of command center server). A POSITA would further understand that Almadi discloses user accounts that correspond to oil wells, pumping stations, water disposal systems, etc. A POSITA understands that Almadi discloses the command-center server of the '909 Patent through its disclosure of the integrated node 100. Ex. 1006, 11:18-12:59; *see also* Abstract; 1:18-22, 1:28-35. Thus, Almadi discloses the 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.

*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:*

105. A POSITA would understand that fluid-handling sites such as oil wells, petro water disposals, and re-injection facilities, can employ multiple site master controllers of a site and that the site master controllers can be located in geographically diverse locations. *See supra*, ¶¶ 31-32, 53-58, 66 (above discussion of site master controllers). A POSITA would understand that Almadi discloses a plurality of geographically distributed site master controllers where the site master controller corresponds to an oil well, petro water disposal or re-injection facilities, or petroleum pumping station of the '909 Patent through its disclosure of remote subsystems 120. Ex. 1006, 12:27-59. Thus, Almadi discloses a plurality of geographically distributed site master controllers.

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

106. A POSITA would understand that Almadi discloses the communication module of the '909 Patent through its disclosure of input/output unit 104 that provides communications capabilities between remote subsystems 120 and integrated node 100. *See supra*, ¶¶ 59, 63 (above discussion of communication modules); Ex. 1006, 13:47-14:9. Thus, Almadi discloses a communication module.

*1[d] - a network interface;*

107. A POSITA would understand that Almadi discloses a network interface of the '909 Patent through its disclosure of various communication links which include wired or wireless interfaces for remote subsystems 120 to connect to integrated node 100. *See supra*, ¶¶ 61-63 (above discussion of network interfaces); Ex. 1006, 13:47-14:9. Thus, Almadi discloses a network interface.

*1[e] - memory; and*

108. From Almadi's disclosure that measurements or values can be output to any other computer or interface in communication with the integrated node 100 over the input/output unit, and calling such systems intelligent field devices, a POSITA would understand that requires remote subsystems 120 to have a memory. *See supra*, ¶¶ 62-63 (above discussion of memory); Ex. 1006, 27:2-10.

109. A POSITA would understand that Almadi discloses a memory for the site master controller of the '909 Patent through its disclosure of remote subsystems 120 and explicit disclosure of a memory. Ex. 1006, 13:47-51; see also Ex. 1006, 1:18-57, 11:18-12:59. Thus, Almadi discloses a memory.

*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*

110. A POSITA would understand that Almadi's disclosure of the ability to process data, self-monitor, self-regulate, and self-calibrate by remote subsystems 120 indicates the presence of a processor. *See supra*, ¶¶ 45, 63 (above discussion of communicatively coupled); Ex. 1006, 11:18-12:59. A POSITA would further understand because remote subsystems 120 can also adapted to be programmed to communicate with other field devices that a processor is required.

*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;*

111. Almadi discloses 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. *See supra*, ¶ 69 (above discussion of translation of protocols); Ex. 1006, 12:10-15; 12:55-59.

*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;*

112. It is well known that the controller can maintain control of fluid-handling devices in the instance the network connection is lost. *See supra*, ¶ 67 (above discussion of target states and site master controllers). For example, in systems having separate IPCs and PLCs for controlling certain devices at the well site, the PLCs (site master controller) would still continue to control whatever fluid-handling devices are connected to it based on the last set of received control instructions.

113. A POSITA would understand that Almadi's disclosure of monitoring and collecting data, such as measurements of fluid pressure, temperature, or flow determines a plurality of different target states of a given one of the fluid-handling devices over time as claimed in the '909 Patent. Ex. 1006, 1:28-57. A POSITA would further understand from Almadi's disclosure that "intelligent field devices" process data, self-monitor, self-regulate, self-calibrate, etc., means that intelligent field devices maintain control of the fluid handling devices without requiring network connectivity to a command center server as claimed in the '909 Patent. Ex. 1006, 1:18-57.

114. Thus, Almadi discloses determining a plurality of different target states

of a given one of the fluid-handling devices over time, where the local node device is operative to maintain control in the absence of a network connection to the central communication device gateway.

*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*

115. A POSITA would understand that the use of different protocols by the protocol translator requires that the protocols be translated as claimed in the '909 Patent. *See supra*, ¶¶ 68-71 (above discussion of translated commands/protocol translator and target states); Ex. 1006, 14:17-28. Systems that use different protocols require that the protocols be translated to facilitate communication. Translation enables users on one network to access a host on another network, despite differences in the native protocols associated with the originating device and target host. Thus, Almadi discloses translating the plurality of commands into translated commands encoded in a plurality of protocols different from the first protocol.

*1[j] - sending the translated commands to respective local controllers of the respective fluid-handling devices to*

*which the respective commands are directed.*

116. Because the integrating node can include a protocol translator, I understand that integrated node 100 sending translated communications to each of the remote subsystems 120 requires sending the translated commands as claimed in the '909 Patent. Thus, Almadi anticipates Claim 1 or would be obvious to a POSITA in view of Almadi.

**b. Claim 5**

117. Claim 5 depends from dependent Claim 3, which depends from dependent Claim 2. Almadi discloses the elements of Claim 1 for the reasons discussed above and incorporated herein.

118. A POSITA would understand that Almadi discloses the elements of Claim 5 of the '909 Patent through its disclosure of exemption and alarm reporting. Ex. 1006, 17:1-28. Almadi also discloses requiring a username and password in order to access the systems. Ex. 1006, 12:10-15. Thus, Almadi discloses the limitations of Claim 5. As such, Claim 5 is anticipated by Almadi, or would be obvious to a POSITA in view of Almadi.

**c. Claim 6**

119. Claim 6 depends from independent Claim 1, and dependent Claims 2 and 3. Almadi discloses Claim 1 for the reasons discussed above and incorporated

herein. Almadi further discloses Claims 2 and 3 for the reasons discussed above for Claim 5 and incorporated herein.

120. A POSITA would understand that Almadi discloses the element recited in Claim 6. Almadi discloses that the remote host can then execute instructions responsive to a received alarm. Ex. 1006, 5:21-39. Therefore, Almadi discloses the limitations of Claim 6. As such, Claim 6 is anticipated by Almadi, or would be obvious to a POSITA in view of Almadi.

**d. Claim 9**

121. Claim 9 depends from dependent Claim 1. Almadi discloses Claim 1 for the reasons discussed above and incorporated herein.

122. Claim 9 discloses a remote terminal unit through which the one or more processes communicate with a fluid-handling device among the plurality of fluid-handling devices, wherein translating the received commands comprises: identifying an address on a serial bus corresponding to a component of the fluid-handling device responsive to the received command; identifying a command code operative to cause the component to execute the received command; and sending to the address on the serial bus the command code.

123. Almadi discloses identifying an address on a serial bus corresponding to a component of the fluid-handling device responsive to the received command through its disclosure that the protocol translator or translation server 102 can be

configured by a user to support communications according to various protocols, including serial and Ethernet physical interfaces, for example, Serial Modbus. Ex. 1006, 14:17-28; *see also* FIG. 2D.

124. Similarly, Almadi discloses identifying a command code operative to cause the component to execute the received command through its disclosure that the protocol translator or translation server 102 can be configured by a user to support communications according to the Serial Modbus protocol. Ex. 1006, 14:17-28; *see also* FIG. 2D.

125. Finally, Almadi discloses sending to the address on the serial bus the command code that the input/output unit 104 provides both serial and Ethernet interfaces over communication links 115 and 125, which can be any type of serial or Ethernet links. Ex. 1006, 13:47-14:9.

126. A POSITA would understand from the above disclosure that Almadi discloses identifying an address on a serial bus such as a Serial Modbus, identifying a command code operative to cause the component to execute the received command using the protocol translator or translation server 102, and sending to the address on the serial bus such as the command code that the input/output unit 104 provides both serial and Ethernet interfaces communication links 115 and 125. Ex. 1002, ¶ 68, 69, 70, 125. As such, Claim 9 is anticipated by Almadi or would be obvious to a POSITA in view of Almadi.

**e. Claim 10**

127. Claim 10 depends from dependent Claim 1. Almadi discloses Claim 1 for the reasons discussed above and incorporated herein.

128. Claim 10 recites the system of Claim 1, comprising a digital-to-analog converter, wherein a fluid-handling device among the plurality of fluid-handling devices comprises a valve responsive to an output signal of the digital-to-analog converter, and wherein translating the received commands comprises changing an output signal of the digital-to-analog converter responsive to a received command among the plurality of received commands.

129. Almadi discloses that the input/output unit 104 can support, for example, any analog inputs, analog outputs, digital inputs, digital outputs, pulse inputs, and pulse outputs for both wired and wireless instrumentation interfaces (analog, digital, and wireless ISA 100.11a/WHART/Zigbee). Ex. 1006, 13:64-14:1.

130. A POSITA would understand that analog and digital inputs and outputs disclosed in Almadi are the changing of an output signal of the digital-to-analog converter responsive to a received command among the plurality of received commands of Claim 10. As such, Claim 10 is anticipated by Almadi or would be obvious to a POSITA in view of Almadi.

**f. Claim 11**

131. Claim 11 depends from dependent Claim 1. Almadi discloses Claim 1 for the reasons discussed above and incorporated herein. *See supra*, ¶¶ 60-66, 109 (above discussion of network interface).

132. It is well known that controllers at well sites can receive commands via one network socket and send commands via a second different network socket. Ex. 1006, 13:47-14:9. A POSITA would understand that receiving the commands via a serial interface is done via a first network socket, and sending the translated command using an Ethernet interface is done via a second network socket. As such, claim 11 is anticipated by Almadi, or would be obvious to a POSITA in view of Almadi.

**g. Claim 14**

133. Claim 14 depends from independent Claim 1. Almadi discloses Claim 1 for the reasons discussed above and incorporated herein.

134. A POSITA would understand that Almadi discloses the element recited in Claim 14. Almadi discloses that the invention can serve disparate networking environments such as oil and gas well sites. Ex. 1006, 11:18-12:59; *see also* Abstract; 1:18-22, 1:28-35. Thus, Almadi discloses the limitations of Claim 14. As such, Claim 14 is anticipated by Almadi, or would be obvious to a POSITA in view of Almadi.

**h. Claim 15**

135. Claim 15 depends from independent claim 1. Cardamone discloses Claim 1 for the reasons discussed above and incorporated herein.

136. A POSITA would understand that Almadi discloses the element recited in Claim 1. A POSITA would understand that a process chamber as recited in the '909 Patent is the same as the "process unit" disclosed by Almadi. Ex. 1006, 23:51-24:53. A POSITA would recognize an oil/water separation tank as a standard process unit/chamber in oil processing streams. Ex. 1001, at 5:30-34.

137. A POSITA would understand that the balancing calculations and inventory at industrial plants include process streams at plants for oil and water separation units that adjust the level of water in a tank to change the interface level to remove oil through valves placed above the water level. As such, Claim 15 is anticipated by Cardamone or would be obvious to a POSITA in view of Cardamone.

**i. Claim 16**

138. Claim 16 depends from independent claim 15. Almadi discloses Claim 1 for the reasons discussed above and incorporated herein.

139. Claim 16 recites the system of Claim 15, wherein the separation unit comprises a pump having a variable-frequency drive, and wherein the local controller is operative to adjust the frequency of the variable-frequency drive until the level of the separation unit reaches a target level corresponding to the target state.

140. A POSITA would understand that switching off a pump and activating

some bounds, such as adjusting a frequency in a variable drive motor, based on readings and conditions to reach a target level, at least in part because this approach would decrease the risk of spilling oil or waste products. Ex. 1006, 25:26-26:19. As such, Claim 16 is anticipated by Almadi or would be obvious to a POSITA in view of Almadi.

**j. Claim 18**

141. Claim 18 depends from independent claim 1. Almadi discloses Claim 1 for the reasons discussed above and incorporated herein.

142. Claim 16 recites the system of Claim 1, wherein the system is operative to exercise two layers of control, the two layers of control including: a first layer of control in which targeted states of the fluid handling devices are determined by a respective site master controller in response to some of the received commands; and a second layer of control in which, for each targeted state specified by the first layer of control, the respective fluid-handling device exercises feedback control to drive the respective fluid-handling device to the respective targeted state.

143. Almadi discloses that field devices in use prior to the date of invention monitored and collected data, such as measurements of fluid pressure, temperature, or flow, reflective of the operations of the automated process. EX1006, 1:28-57. Almadi further discloses that modern field devices may be termed as “intelligent field devices” were in use prior to the date of invention, and that they incorporated more

robust functionality, such as the ability to process data, self-monitor, self-regulate, self-calibrate, or provide early warning with respect to malfunctions or predictive maintenance. EX1006, 1:18-57. Such “self-monitor” functions reflect the use of feedback control. Almadi discloses that remote subsystems 120 can include a variety of intelligent field systems. *See generally*, EX1006, 12:27-59.

144. A POSITA would understand Almadi’s disclosure of monitoring and collecting data, such as measurements of fluid pressure, temperature, or flow determines a plurality of different target states of a given one of the fluid-handling devices over time as claimed in the ‘909 Patent. EX1002, ¶¶111-113.

145. Almadi further discloses driving the fluid handling device to a particular target state: “field devices can perform actuator functions to receive information, such as commands, from the system level to thereby affect or control the operation of an automated process, for example, through motors and pumps.” EX1006, 1:45-49, 12:27-59; 25:26-37 (“switching a pump off if the flow is below certain limit or activating some bounds or streams based on some readings/conditions”).

146. As explained above, a POSITA would understand that switching off a pump and activating some bounds, such as adjusting a frequency in a variable drive motor, based on readings and conditions to reach a target level, at least in part because this approach would decrease the risk of spilling oil or waste products. Ex.

1006, 25:26-26:19. Almadi, therefore, discloses exercising two layers of control to drive the respective fluid-handling device to the respective targeted state. As such, Claim 18 is anticipated by Almadi or would be obvious to a POSITA in view of Almadi.

**k. Claim 19**

147. Claim 19 depends from independent claim 1. Almadi discloses Claim 1 for the reasons discussed above and incorporated herein.

148. A POSITA would understand that Almadi discloses the element recited in Claim 19. Almadi discloses that each set of facilities can be operated by different users corresponding to the respective user account. Ex. 1006, 11:18-12:59; *see also* Abstract; 1:18-22, 1:28-35. For example, a user account could be assigned to monitor and control an oil and gas site while another user could be assigned a user account to monitor and control a chemical injection plant or power grid. Thus, Almadi discloses the limitations of Claim 19. As such, Claim 19 is anticipated by Almadi, or would be obvious to a POSITA in view of Almadi.

**l. Claim 20**

149. Almadi discloses each limitation of claim 20, anticipating claim 20. 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]. Each

of Claim 20's limitations are disclosed by Almadi for reasons provided above, and incorporated here. Almadi anticipates Claim 20 or would be obvious to a POSITA in view of Almadi.

**m. Claim 21**

150. Almadi discloses each limitation of Claim 21, anticipating Claim 21. 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]. Each of Claim 21's limitations is disclosed by Almadi for reasons provided above, and incorporated here. Almadi anticipates Claim 21 or would be obvious to a POSITA in view of Almadi.

**3. Ground 3: Abdallah Anticipates Claims 1, 20 and 21, Or Would Be Obvious To A POSITA In View Of Abdallah.**

151. Independent claims 1, 20, and 21 anticipated by the disclosure, either express or inherent, in U.S. Patent Application No. 2008/0316048 ("Abdallah") under 35 U.S.C. § 102, or would be obvious to a POSITA in view of Abdallah under 35 U.S.C. § 103.

**a. Claim 1**

*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*

152. Horizontal drilling and fracture techniques have resulted in smaller environmental footprints for natural oil and gas production. It is possible to consolidate multiple wellheads in a small area. Instruments and sensors provide data for temperatures, flow rates, pressures, and levels for wellheads, tank storage, and separation equipment. See e.g. <https://www.progasllc.com/top-advantages-of-horizontal-directional-drilling/>. One RTU can frequently automate and control the whole well pad with multiple wellheads while communicating with a remote central control room connected to multiple well pads in the field.

153. The process of oil and gas production creates "saltwater," which is considered hazardous waste because of its high salt content, hydrocarbons, and industrial compounds. Hydraulic fracturing of shale gas well sites produces millions of gallons of this saltwater, also known as "produced water" or "oilfield brine." The water brings oil and gas to the earth's surface where impurities are chemically removed, resulting in a leftover liquid that must then be safely discarded. Companies can recycle the water, injecting it back into working reservoirs for reuse in gathering any remaining oil or gas, or they can discard it at a saltwater well disposal site.

154. A POSITA would recognize that the system disclosed by Abdallah

remotely monitors and controls a fluid handling device pump at oil wells, water disposal sites, re-injection facilities, or petroleum pumping stations. Ex. 1002, ¶ 146. Therefore, Abdallah discloses 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.

*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*

155. A command-center server was discussed above and is incorporated herein. A central communication device gateway is a hub that interconnects and transfers data across different networks. I understand that Abdallah discloses the command-center server of the '909 Patent through its disclosure of the central communication device gateway. Ex. 1007, ¶ 0056; *see also id.*, ¶ 0055. Thus, Abdallah discloses the command-center server.

*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:*

156. A POSITA would understand that oil field sites can have multiple controllers that are responsible for controlling different areas/devices. *See supra*, ¶¶

31-32, 55-58 (above discussion of site master controller). At a well site, a controller can be assigned to control devices present at an oil well, devices at petro water disposal or re-injection facilities, or petroleum pumping stations.

157. A POSITA would understand that Abdallah discloses a plurality of geographically distributed site master controllers where the site master controller corresponds to an oil well, petro water disposal or re-injection facilities, or petroleum pumping station of the '909 Patent through its disclosure of well site sensor nodes. Ex. 1007, ¶¶ 0055-0056, 0058, FIG. 2. Thus, Abdallah discloses a plurality of geographically distributed site master controllers.

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

158. A communication module is a hardware device that facilitates communication between different systems or devices. It can be wired or wireless and is used to exchange data and enable devices to work together. These modules come in various types, including wireless, wired, RF, IoT, Ethernet, CAN, and fiber optic modules, each designed for specific communication needs. They are crucial in industries like automotive, telecommunications, and IoT, enabling efficient data exchange and connectivity. [https://www.ntchip.com/electronics-news/communication-](https://www.ntchip.com/electronics-news/communication-module#:~:text=These%20modules%20come%20in%20various,efficient%20data%20exchange%20and%20connectivity.)

module#:~:text=These%20modules%20come%20in%20various,efficient%20data%20exchange%20and%20connectivity.

159. A POSITA would understand that Abdallah discloses the communication module of the '909 Patent through its disclosure of output control interfaces that couple to well-site tools. Ex. 1007, ¶ 0051; *see also, e.g.*, Ex. 1007, ¶¶ 0035-36. Thus, Abdallah discloses a communication module.

*1[d] - a network interface;*

160. A POSITA would understand that Abdallah discloses a network interface of the '909 Patent through its disclosure of various wired or wireless interfaces. *See supra*, ¶¶ 60-66, 106 (above discussion of network interfaces); Ex. 1007, ¶¶ 0055-56, 0058 (wired or wireless examples), 0060 (wired or wireless, short range or long range, and a mix of different methodologies disclosed including short-range wireless UCMP, long-range wireless UCMP short-range Modbus and long-range wireless Modbus). Thus, Abdallah discloses a network interface.

*1[e] - memory; and*

161. A POSITA would understand that Abdallah discloses the recited memory of the '909 Patent through its disclosure of memory in each node. Ex. 1007, ¶ 0056, FIG. 2. Thus, Abdallah discloses a memory.

*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:*

162. A POSITA understands that Abdallah discloses the recited processor

of the '909 Patent through its disclosure of processors in the local node, coupled to the well-site monitoring device. Ex. 1007, ¶ 0051-0056, FIG. 2. Thus, Abdallah discloses one or more processors coupled to the communication module network, interface, and memory.

*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;*

163. It is well known that a plurality of commands can be encoded in a first protocol to control the fluid-handling devices. The commands can be sent from a single user or multiple users each of which corresponding to a user account. It is also well known that different commands are needed to control the different fluid-handling devices at the well site and that different commands can be directed to different fluid-handling devices.

164. A POSITA understands that Abdallah discloses the recited receiving commands from the command center server to control specific fluid handling devices of the '909 Patent through its disclosure of individually addressable nodes for controlling the operation of well-site components. Ex. 1002, ¶ 157. Thus, Abdallah discloses 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.

*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;*

165. It is well known in certain device configurations at fluid handling sites that fluid handling devices will continue to operate based on the last received commands in the event a connection to the server is lost.

166. A POSITA would understand that the number of parameters corresponds to a plurality of different target states. A POSITA would further understand that the “sensing a signal change rate for an input signal from an oil field apparatus; selecting a real-time transmission mode when the signal change rate is less than a predetermined value” described in Abdallah determines a plurality of different target states of a given one of the fluid-handling devices over time, as recited in element 1[h] of the ’909 Patent. Ex 1007, ¶ 0010; *see also id.*, ¶¶ 0045, 0047. Thus, Abdallah discloses determining a plurality of different target states of a given one of the fluid-handling devices over time.

167. A POSITA would understand that the local node controller controlling at least some operations at an individually addressable well site requires determining from a set of target state parameters that are used to control the operations at the well site without active communications with the command 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*

168. See *supra*, ¶¶ 68-69 (above discussion of protocol translation). A POSITA would understand that the use of different protocols by the gateway 300 to communicate with other nodes and devices requires that the protocols must be translated for communication between the nodes and disparate devices. Ex. 1007, ¶ 0097; *see also* FIG. 6; Ex. 1007, ¶ 0098. Thus, Abdallah discloses translating the plurality of commands into translated commands encoded in a plurality of protocols different from the first protocol.

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

169. Abdallah discloses that the translated commands described in Element 1[i] above are sent to the fluid handling device. *See, e.g.*, Ex. 1007, ¶¶ 0008; 0009 (“translating the received data from the first communication protocol to a second communication protocol”); Claim 12. Abdallah discloses that the signal

transmission functionality circuit 312 may be coupled to the controller 302 and the communication interface 310 via a radio transceiver 318. Ex. 1007, ¶ 0098; *see also id.*, ¶ 0097. FIG. 6. of Abdallah further discloses that the gateway is used to deliver the translated responses using the user-recognized protocol. *Id.*, ¶ 0209; FIG. 6. A POSITA would understand from the above disclosure and Figure 6 that Abdallah discloses sending the translated commands to respective local controllers for fluid handling devices.

170. As such, Claim 1 is anticipated by Abdallah, or would be obvious to a POSITA in view of Abdallah.

**b. Claim 9**

171. Claim 9 depends from independent claim 1. Abdallah discloses Claim 1 for the reasons discussed above and incorporated herein.

172. Claim 9 recites the system of Claim 1, comprising a remote terminal unit through which the one or more processes communicate with a fluid-handling device among the plurality of fluid-handling devices, wherein translating the received commands comprises: identifying an address on a serial bus corresponding to a component of the fluid-handling device responsive to the received command; identifying a command code operative to cause the component to execute the received command; and sending to the address on the serial bus the command code.

173. Almadi discloses that field devices in use prior to the date of invention monitored and collected data, such as measurements of fluid pressure, temperature, or flow, reflective of the operations of the automated process. EX1006, 1:28-57. Almadi further discloses that modern field devices may be termed as “intelligent field devices” were in use prior to the date of invention, and that they incorporated more robust functionality, such as the ability to process data, self-monitor, self-regulate, self-calibrate, or provide early warning with respect to malfunctions or predictive maintenance. EX1006, 1:18-57. Such “self-monitor” functions reflect the use of feedback control. Almadi discloses that remote subsystems 120 can include a variety of intelligent field systems. *See generally*, EX1006, 12:27-59.

174. Abdallah discloses that monitoring devices are strategically located at several locations of the well site 100 to monitor parameters relating to the produced products and/or well site tools. EX1007, ¶0051. Abdallah further discloses that the well site monitoring devices include nodes with “output control interfaces coupled to well site tools such as valves 128, 138 for controlling at least some operations at the well site.” EX1007, ¶0051; EX1007, ¶¶0035-36, FIG. 2.

175. Abdallah further discloses “a user or SCADA system in one example uses serial Modbus protocol to send commands to the gateway 300 or to any number of remote nodes via the gateway 300 using a single communication path. The Modbus command has a byte ID signifying the destination of the node that is to

respond to this command. The Modbus protocol imbedded in the controller includes instructions to operate as a router. When the gateway 300 receives a command, the gateway will respond if a command ID matches the gateway 300 ID. Where the command ID does not match the gateway ID, then the gateway protocol will operate to poll connected nodes for a node ID matching the command ID. Matching a command ID to a remote node ID results in the gateway protocol using a routing header to send the command or message to the appropriate node.” EX1007, ¶0105. In addition, Abdallah discloses “sensors in data communication with the first network node wherein the sensors are read and reported based on a command code received at the first network node ... the first network node receives a command code to execute a command selected from the group consisting of change modes, read sensor, report, and reconfigure” EX1007, ¶0034.

176. A POSITA would understand that Abdallah discloses translating the received commands. A POSITA would further understand Abdallah discloses identifying an address on a serial bus that corresponds to a fluid-handling device, and that it sends a command code that corresponds to the received command. That command code is sent to on the serial bus.

177. Thus, Abdallah discloses the serial Modbus protocol for communicating commands to gateway/nodes using a single communication path. Abdallah further discloses the command code to operate/control the sensors (e.g.,

change modes, read sensor, report, and reconfigure the sensors). As such, Claim 9 is anticipated by Abdallah, or would be obvious to a POSITA in view of Abdallah.

**c. Claim 10**

178. Claim 10 depends from independent claim 1. Abdallah discloses Claim 1 for the reasons discussed above and incorporated herein.

179. Claim 10 recites the system of Claim 1, comprising a digital-to-analog converter, wherein a fluid-handling device among the plurality of fluid-handling devices comprises a valve responsive to an output signal of the digital-to-analog converter, and wherein translating the received commands comprises changing an output signal of the digital-to-analog converter responsive to a received command among the plurality of received commands.

180. Abdallah discloses “In several embodiments, the gateway 500 operates using the processor 502 and instructions in the storage medium 504 for communication with sensor nodes 514.” EX1007, ¶0197. Abdallah further discloses “Any or all of these sensors may be analog or digital sensors. In the case of analog sensors, analog to digital converters may be employed at the well site or at the sensor location to aide in the transmission and processing of information obtained by the sensors.” EX1007, ¶0054.

181. Abdallah’s monitoring devices may be used in conjunction with interfaces to control valves. *Id.* at ¶0051. Abdallah discloses commands sent in

analog format. and also discloses an analog output “AO” device. *Id.* at ¶¶0028, 0211.

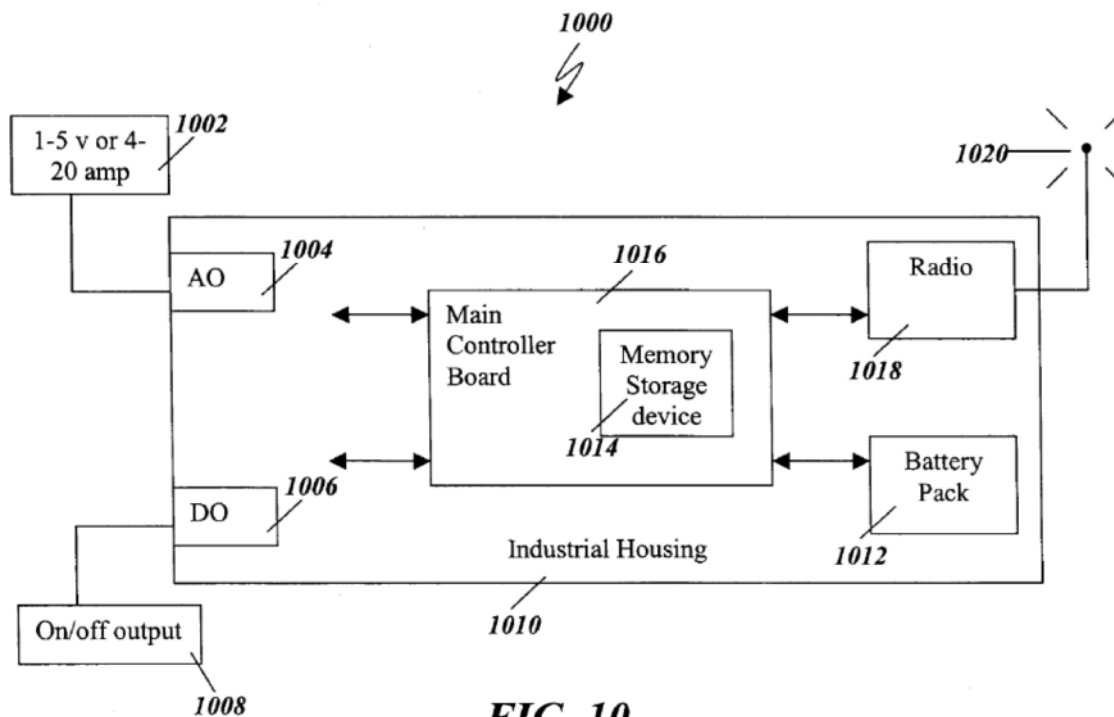


**FIG. 10**

182. A POSITA would understand that Abdallah discloses translating the received commands so that the command results in an analog output that is sent to a valve that receives analog control. As such, Claim 10 is anticipated by Abdallah, or would be obvious to a POSITA in view of Abdallah.

**d. Claim 20**

183. Abdallah discloses each limitation of Claim 20, anticipating Claim 20. 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]. Each

of Claim 20's limitations are disclosed by Abdallah for reasons provided above, and incorporated here. Abdallah anticipates Claim 20 or would be obvious to a POSITA in view of Abdallah.

**e. Claim 21**

184. Abdallah discloses each limitation of Claim 21, anticipating Claim 21. 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]. Each of Claim 21's limitations is disclosed by Abdallah for reasons provided above and incorporated here. As such, Claim 21 is anticipated by Abdallah, or would be obvious to a POSITA in view of Abdallah.

**VII. CONCLUSION**

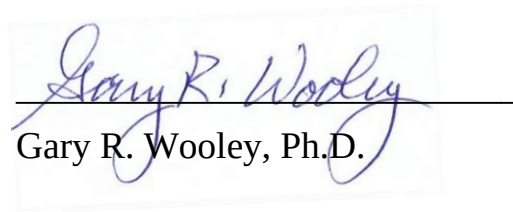
185. For the reasons set forth above, in my opinion, all of the limitations of claims 1-12, 14-17, and 19-21 of the '909 Patent are rendered unpatentable as anticipated or obvious by the above-cited prior art.

**VIII. OATH**

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

jeopardize the results of these proceedings.

Dated: February 27, 2025



Gary R. Wooley, Ph.D.