

Expert Declaration In Support of Petitioner's Petition for *Inter Partes* Review of
U.S. Patent No. 11,175,680

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I. INTRODUCTION

A. Background and Qualifications

1. My name is Gary R. Wooley. I have been retained by the petitioner The Integration Group of Americas, Inc. (“TIGA”) 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 (“POSITA”) 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 1-3, 6-7, and 9-20 of the '680 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 \$720 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. 11,175,680
Ex 1002	Declaration of Dr. Gary Wooley
Ex 1003	The curriculum of Dr. Gary Wooley
Ex 1004	File Wrapper for U.S. Patent No. 8,649,909
Ex 1005	U.S. Patent No. 8,667,091 to Almadi

Exhibit	Description
Ex 1006	U.S. Patent Application No. 2015/0308244 to Cardamone
Ex 1007	U.S. Patent No. 9,709,995 to Gutierrez
Ex 1008	SCADA: Supervisory Control and Data Acquisition, 4 th Edition (2010)
Ex 1009	Claim Construction Order (Dkt. 93)

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. TIGA'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 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. 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.

21. I further understand 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

22. 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.

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

IV. LEVEL OF ORDINARY SKILL IN THE ART

24. 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.

25. 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 (mechanical, chemical, or electrical), computer science, or a related field and significant experience with remotely controlling fluid-handling devices, like SCADA systems. In view of the above-provided standard, I am considered a person of ordinary skill in the art.

V. TECHNICAL BACKGROUND OF THE CHALLENGED PATENTS

A. Background of the Relevant Technology

26. 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>.

27. 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%20lot%20about;> *see also*, <https://www.emerson.com/en-us/industries/automation/marine/marine-systems-solution/valve-remote-control-systems>.

B. The Alleged Invention

28. The ‘680 Patent, entitled, “Remote Control of Fluid-Handling Devices” describes a process for remotely controlling fluid-handling devices. The process includes receiving a command to change the state of a fluid-handling device to a target state and translating the received command into a translated command operative to cause the controller of the fluid-handling device to the target state. The controller of the fluid-handling device is responsive to the command and feedback from the fluid-handling device which indicates whether the fluid-handling device is in the target state; and sends the translated command to the local controller. Ex. 1001, Abstract.

C. Prosecution History Summary (Ex. 1004)

29. The application resulting in the ‘680 Patent was filed on October 17, 2019. The present application is a continuation of U.S. Patent Application

15/867,077 filed on January 10, 2018, and titled Remote Control of Fluid Handling Devices, which is a continuation of U.S. Patent Application 14/984,422 filed on December 30, 2015, and titled Remote Control of Fluid Handling Devices, which is a continuation of U.S. Patent Application 14/147,190, issued as U.S. Patent 9,342,078, filed on January 3, 2014, titled Remote Control of Fluid Handling Devices, which is a continuation of U.S. Patent Application 13/708,557, issued as U.S. Patent 8,649,909, filed on December 7, 2012, and titled Remote Control of Fluid Handling Devices. Ex. 1001, at Cover.

30. In a February 23, 2021 office action, the Examiner rejected Claims 1-20 are rejected on the ground of nonstatutory double patenting as being unpatentable over claims 1-23 of U.S. Patent No. 9,898,014 and claims 1-34 of U.S. Patent No. 10,488,871. Additionally, the examiner rejected claims 1, 5, 7-10, 12, and 18-20 under pre-AIA 35 U.S.C. 103(a) as being unpatentable over U.S. Patent Publication No. 2002/0161685 (Dwinnell) in view of U.S. Patent Publication No. 2002/0018399 (Schultz) and further in view of U.S. Patent Publication No. 2003/0052180 (Huhn). Claims 2, 11, and 17 were rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Dwinnell in view of Schultz and further in view of Huhn and U.S. Patent No. 6,967,589 (Peters). Claim 3 is rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Dwinnell in view of Schultz and further in view of Huhn and U.S. Patent No. 5,149,443 (Varnam). Claims 6 and 15 are rejected under pre-

AIA 35 U.S.C. 103(a) as being unpatentable over Dwinnell in view of Schultz and further in view of Huhn and U.S. Patent Publication No. 2002/0156837 (Batke). Claims 13-14 are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Dwinnell in view of Schultz and further in view of Huhn and U.S. Patent Publication No. 2005/0084988 (Huang). Claim 16 is rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Dwinnell in view of Schultz and further in view of Huhn and U.S. Patent Publication No. 2011/0051645 (Hong). Ex. 1004, at 424-76.

31. On June 23, 2021, in response to the double patenting and Section 103 rejections, the applicant canceled claims 1-20 and requested that new claims 21-40 be considered. *Id.*, at 253-66. On July 22, 2021, the USPTO issued a Notice of Allowability allowing pending claims 21-40. *Id.*, at 243-47.

D. Overview of the Prior Art

1. Almadi (Ex. 1005)

32. 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).

33. 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. 1005, 2:64-31.

34. 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). *Id.*, 3:10-20.

2. Cardamone (Ex. 1006)

35. 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).

36. 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. 1006, Abstract.

3. Gutierrez (Ex. 1007)

37. U.S. Patent No. 9,709,995 to Gutierrez was filed on December 22, 2014, and published on April 16, 2015. Gutierrez is a continuation of U.S. Patent Application No. 12/794,898 filed on June 7, 2010, published on December 9, 2010, and claiming the benefit of Provisional U.S. Patent Application No. 61/184,890 filed on June 8, 2009. Gutierrez is prior art under pre-AIA § 102(a).

38. Gutierrez teaches a chemical injection system that includes a pump connected to a chemical reservoir and pipeline that can all be controlled using a local motor controller connected to a central controller and remote computing device. Ex. 1007, Abstract. The controller in Gutierrez includes translator capabilities that allow the remote computing device to send commands that can be translated into the protocol required to control the local pump operations. *Id.*

4. SCADA (Ex. 1008)

39. SCADA: Supervisory Control and Data Acquisition, 4th Edition was published in 2010 and is prior art under pre-AIA § 102(a). SCADA teaches enabling a human operator, in a location central to a widely distributed process-such as a pipeline system, oil or gas field, hydroelectric generating complex, or irrigation network to make set point changes on distant process controllers, to open or close valves or switches, to monitor alarms, and to gather measurement information. Ex. 1007, at 397.

VI. SUMMARY OF MY OPINIONS

40. Having reviewed the Challenged Patents and the prior art discussed herein, I have formed the following opinions:

- Almadi Anticipates Claims 1-3, 6, 9-12, 14, 17, and 19-20, or would be obvious to a POSITA in view of Almadi.
- Cardamone Anticipates Claims 1, 9-13, 15-18, and 20, or would be obvious to a POSITA in view of Cardamone.
- Gutierrez Anticipates Claims 1, 7, and 20, or would be obvious to a POSITA in view of Gutierrez.
- SCADA Anticipates Claims 1-3, 9-10, 17 and 20, or would be obvious to a POSITA in view of SCADA.

A. Opinions Regarding the ‘680 Patent

1. **Ground 1: Almadi Anticipates Claims 1-3, 6, 9-12, 14, 17, and 19-20 Or Would Be Obvious To A POSITA In View of Almadi.**

41. Independent Claims 1 and 20 and dependent Claims 2-3, 6, 9-12, 14, 17, and 19 are anticipated by U.S. Patent No. 8,887,901 (“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**

[1.1] A non-transitory, machine-readable medium comprising instructions to effectuate operations, the operations comprising:

42. Almadi discloses a tangible, non-transitory machine-readable medium storing instructions that when executed by a data processing apparatus cause the data

processing apparatus to perform operations. A POSITA would recognize that Almadi discloses a non-transitory machine-readable medium. Ex. 1005, FIGS. 8-11.

[1.2] receiving, with a server, a command comprising a target value of a fluid-handling device from a computing device via a control interface, wherein the command is received in association with a record stored on a datastore;

43. 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. See <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. See <https://www.techopedia.com/definition/3333/command-cmd>.

44. A target value 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.

45. A POSITA would understand that Almadi discloses the recited receiving commands from the server to control specific fluid handling devices of the ‘680 Patent through its disclosure of receiving commands from a user through remote host 110, which connects through integrated node 100 to individually addressable remote subsystems 120 for controlling operation of well site components. Ex. 1005, 12:10-15. A POSITA that Almadi discloses the recited receiving commands from the server comprising a target value to control specific fluid handling devices of the ‘680 Patent through its disclosure of receiving commands from a user through remote host 110, which connects through integrated node 100 to individually addressable remote subsystems 120 for controlling operation of well site components. Ex. 1005, 11:51-63; *see also* 22:32-36 (“The DVRM 164 enhances the accuracy of data acquired by the integrated node 100, which also enhances the effectiveness of the integrated node 100 in controlling the plurality of remote subsystems 120.”)

[1.3] determining, with the server, a network address of a network based on the record, wherein the network address identifies a controller of the fluid-handling device, and wherein the controller accesses a sensor to measure a fluid being handled by the fluid-handling device and an actuator of the fluid-handling device;

46. A Process Control Network (PCN) is a communications network layer that is a part of the Industrial Automation networks in Process Industries. This network is used to transmit instructions and data between control and measurement units and Supervisory Control and Data Acquisition (SCADA) equipment. See <https://www.infosecinstitute.com/resources/scada-ics-security/process-control-network-pcn-evolution/>.

47. The Ethernet MAC (media access control) address is a unique identifier assigned to a network interface controller (NIC) for use as a network address in communications within a network segment. This use is common in most IEEE 802 networking technologies. The address typically includes a manufacturer's organizationally unique identifier (OUI). MAC addresses are formed according to the principles of two numbering spaces based on Extended Unique Identifiers (EUI) managed by the Institute of Electrical and Electronics Engineers (IEEE): EUI-48. A device that has an Ethernet MAC address can also have its own Bluetooth MAC address. See <https://www.maplesystems.com/supportcenter/faq?qid=201&q=Define+Media+Access+Control+Address+%28+MAC+%29%3F>.

48. MAC addresses are primarily assigned by device manufacturers and are therefore often referred to as the burned-in address, or as an Ethernet hardware address, hardware address, or physical address. Each address can be stored in the interface hardware, such as its read-only memory, or by a firmware mechanism.

Many network interfaces, however, support changing their MAC addresses. *See e.g.*, <https://www.techtarget.com/searchnetworking/definition/MAC-address>.

49. Network nodes with multiple network interfaces, such as routers and multilayer switches, must have a unique MAC address for each network interface in the same network. However, two network interfaces connected to two different networks can share the same MAC address.

50. It is well known that sensors at the well site can measure several parameters including the volume of fluid handled by fluid-handling devices. A controller can be used to retrieve sensory data and can be used to control fluid-handling devices including actuators.

51. 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 '680 Patent. Ex. 1005, 1:53-57; 15:62-67. 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 '680 Patent. Ex. 1005, 1:53-57; 12:40-43.

[1.4] sending, with the server, the target value to the network address via the network;

52. 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. See <https://docs.oracle.com/javase%2Ftutorial%2F/networking/nifs/definition.html#:~:text=A%20network%20interface%20is%20the,can%20be%20implemented%20in%20software.>

53. A POSITA would understand that the protocol translator working with the integrated node 100 can send a target value via a network as claimed in the '680 Patent. Ex. 1005, 3:13-17; *see also id.*, FIGS. 8-11. Thus, Almadi discloses sending, with the server, the target value to the network address via the network.

[1.5] receiving, with the controller, a measurement of the fluid by the sensor;

54. 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>.

55. 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>.

56. 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§ion=ControlPID>.

57. 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.

58. 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, motor drive systems, and pump systems including actuators. Ex. 1005, 1:28-57.

59. A POSITA would understand Almadi's disclosure of a data verifier and a data reconciler (which is programmed into the controller) that determines the operating state of the remote sub-systems are verified measurements are equivalent to receiving fluid measurements by a sensor. Ex. 1005, 9:1-7. Thus, Almadi discloses this claim element.

[1.6] determining, with the controller, whether the measurement satisfies the target value;

60. A POSITA would understand from Almadi's disclosure of a data verifier that can substitute out-of-bounds measurements is equivalent to determining

whether the measurement satisfies the target value. *See supra*, ¶¶ 39, 54-59 (above discussion of controllers); Ex. 1005, 9:1-7. Thus, Almadi discloses determining, with the controller, whether the measurement satisfies the target value.

[1.7] in response to a determination that the measurement does not satisfy the target value, obtaining, with the controller, a set point based on the command; and

61. A POSITA would further understand that in order to verify measurements and determine whether a measurement was out-of-bounds, a set point would have to be obtained and compared. *See supra*, ¶¶ 39, 54-59 (above discussion of controllers); Ex. 1005, 1:45-49; *see also id.*, 25:26-37 (“switching a pump off if the flow is below a certain limit or activating some bounds or streams based on some readings/conditions”). Thus, Almadi discloses in response to a determination that the measurement does not satisfy the target value, obtaining, with the controller, a set point based on the command.

[1.8] controlling, with the controller, the actuator based on the set point.

62. A POSITA would understand that Almadi discloses the controlling of the actuator based on the set point of the ‘680 Patent through its disclosure of the intelligent field systems and the data verifier and reconciler. *See supra*, ¶¶ 39, 54-59 (above discussion of controllers being able to control fluid-handling devices); Ex. 1005, 1:45-49; *see also id.*, 25:26-37 (“switching a pump off if the flow is below a certain limit or activating some bounds or streams based on some

readings/conditions”). A POSITA would understand that the data is verified and reconciled and that a command can be sent by the controller to control any number of intelligent field systems which includes actuators. Almadi discloses the controlling, with the controller, the actuator based on the set point. Thus, Almadi anticipates claim 1 or would be obvious to a POSITA in view of Almadi.

b. Claim 2

[2.1] The medium of claim 1, wherein: the controller is a site master controller;

63. A POSITA would understand that Almadi discloses the site master controller of the ‘680 Patent through its disclosure of the plurality of remote sub-systems that can perform tasks including the processing of measurement and control data and signal conversion. *See supra*, ¶ 57 (above discussion of site master controllers); Ex. 1005, 1:18-57, 12:27-59. Thus, Almadi discloses this claim element.

[2.2] the site master-controller controls a plurality of local controllers, the plurality of local controllers comprising a first local controller in communication with the actuator;

64. A POSITA would understand that permanent downhole monitoring systems, electrical submersible pump systems, and smart well completion systems have actuators that can be remotely controlled by a computer. *See supra*, ¶ 57 (above discussion of site master controllers); Ex. 1005, 1:18-57, 12:27-59. Additionally, a

POSITA would understand that Almadi discloses a first local controller in communication with an actuator of the '680 Patent through its disclosure of the functionality of remote subsystems 120. Ex. 1005, 12:27-59. Thus, Almadi discloses the site master-controller controls a plurality of local controllers, the plurality of local controllers comprising a first local controller in communication with the actuator.

[2.3] controlling the actuator with the controller based on the set point comprises: sending the set point from the site master-controller to the first local controller; and

65. A POSITA would understand that Almadi discloses sending a set point from a site-master controller to the first local controller through its disclosure that field devices can obtain operational information and variables and deliver that information to system-level controller devices. Ex. 1005, 1:35-41; *see also id.*, 1:45-49; 25:26-37 (“switching a pump off if the flow is below a certain limit or activating some bounds or streams based on some readings/conditions”)

[2.4] actuating, with the first local controller, the actuator based on the set point.

66. A POSITA would understand that Almadi discloses controlling the actuator based on the set point through its disclosure that field devices can obtain operational information and variables and deliver the operational information to system-level controller devices. Ex. 1005, 1:45-52. The controller then returns a

control signal back to the field device based on the operational information and parameters.

67. Thus, Almadi discloses this claim element and anticipates Claim 2 or would be obvious to a POSITA in view of Almadi.

c. Claim 3

[3.1] The medium of claim 1, wherein: obtaining the set point comprises determining a sequence of set points based on the command; and

68. A POSITA would understand that Almadi discloses determining a sequence of set points based on a command through its disclosure of field devices that are connected to controllers that perform sensor functions to sense operational information and variables such as temperature, pressure, pH, or flow rate and deliver that information to the system-level controller devices. Ex. 1005, 1:39-41; 1:45-52. The operational information and variables represent a sequence of set points. Thus, Almadi discloses this claim element.

[3.2] controlling the actuator comprises controlling the actuator to a plurality of different states based on the sequence of set points.

69. A POSITA would understand from the above disclosure that Almadi discloses centrally the actuator to a plurality of different states based on the sequence of set points through its disclosure of the field devices being capable of collecting operational information (plurality of different states) and variables (set points) and

perform actuator functions. Ex. 1005, 1:45-52. Thus, Alamdi anticipates claim 3 or would be obvious to a POSITA in view of Almadi.

d. Claim 6

[6.1] The medium of claim 1, wherein: the set point is a first set point;

70. A POSITA would recognize that Almadi discloses that the set point is a first point through its disclosure that field devices monitor and collect data, such as measurements of fluid pressure, temperature, or flow, reflective of the operations of the automated process. Ex. 1005, 1:32-35, 25:26-37 (“switching a pump off if the flow is below a certain limit or activating some bounds or streams based on some readings/conditions”). A POSITA would further recognize that Almadi further discloses that field devices perform sensor functions to sense operational information and variables such as temperature, pressure, pH, or flow rate and deliver that information to the system-level controller devices. Ex. 1005, 1:41-45. Thus, Almadi discloses this claim element.

[6.2] the command comprises the first set point and a second set point;

71. A POSITA would recognize that Almadi discloses the command comprises the first set point and a second set point through its disclosure that field devices use multiple data streams, such as measurements of fluid pressure, temperature, or flow, reflective of the operations of the automated process to control

said process. Ex. 1005, 1:32-35, 25:26-37 (“switching a pump off if the flow is below a certain limit or activating some bounds or streams based on some readings/conditions”). Almadi further discloses that field devices perform sensor functions to sense operational information and variables such as temperature, pressure, pH, or flow rate and deliver that information to the system-level controller devices. Ex. 1005, 1:41-45. Thus, Almadi discloses this claim element.

[6.3] obtaining the first set point comprises obtaining the first set point and the second set point from the command;

72. A POSITA would recognize that Almadi discloses obtaining the first set point and the second set point from the command through its disclosure that field devices use multiple data streams to control automated processes, including measurements of fluid pressure, temperature, or flow, reflective of the operations of the automated process. Ex. 1005, 1:32-35; 25:26-37 (“switching a pump off if the flow is below a certain limit or activating some bounds or streams based on some readings/conditions”). Thus, Almadi discloses this claim element.

[6.4] the measurement is a first measurement;

73. A POSITA would recognize that Almadi discloses the measurement is a first measurement. For example, Almadi discloses that these field devices monitor and collect data, such as **measurements** of fluid pressure, temperature, or flow, reflective of the operations of the automated process. Ex. 1005, 1:32-35. Thus, Almadi discloses this claim element.

[6.5] the operations further comprises: receiving, with the controller, a second sensor measurement after controlling the actuator based on the first set point;

74. A POSITA would recognize Almadi discloses a first point through its disclosure of monitoring and collection, measurement, operational information, and variables. A POSITA would further understand that a first set point is included in the data collected. Thus, Almadi discloses this claim element.

[6.6] determining, with the controller, whether the second sensor measurement satisfies a criterion based on the first set point; and

75. A POSITA would recognize Almadi discloses determining, with the controller, whether the second sensor measurement satisfies a criterion based on the first set point through its disclosure that these field devices monitor and collect data, such as measurements of fluid pressure, temperature, or flow, reflective of the operations of the automated process. Ex. 1005, 1:32-35. These field devices are connected to machines known as controllers that operate at the system level to process the data collected and issue commands back to the field devices, or other field devices, in response to processing the collected data. Ex. 1005, 1:35-39; 25:26-37 (“switching a pump off if the flow is below a certain limit or activating some bounds or streams based on some readings/conditions”). Thus, Almadi discloses this claim element.

[6.7] in response to a determination that the first set point is satisfied, controlling the actuator based on the second set point.

76. A POSITA would recognize discloses in response to a determination that the first set point is satisfied, controlling the actuator based on the second set point through its disclosure that 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. Ex. 1005, 1:41-45; 25:26-37 (“switching a pump off if the flow is below a certain limit or activating some bounds or streams based on some readings/conditions”). Almadi discloses this claim element. Thus, Almadi anticipates Claim 6 or would be obvious to a POSITA in view of Almadi.

e. Claim 14

[14] The medium of claim 1, wherein the sensor comprises a level sensor of a separation tank to indicate a level at which a first fluid phase meets a second fluid phase.

77. A POSITA would understand that Almadi discloses the sensor comprises a level sensor of a separation tank to indicate a level at which a first fluid phase meets a second fluid phase the tanks disclosed in Almadi could be a separation tank through its disclosure of the change in the level of tanks and allocation of tanks (i.e. change in use). Ex. 1005, 25:11-16; 25:22-25; 23:51-24:53. Thus, Almadi anticipates claim 14 or would be obvious to a POSITA in view of Almadi.

f. Claim 17

[17] The medium of claim 1, wherein controlling the actuator based on the set point comprise steps for controlling the actuator

78. A POSITA would recognize that Almadi discloses controlling the actuator based on the set point comprises steps for controlling the actuator through its disclosure that the sensor and actuator functions, at the process level, are supported by a controller or a number of controllers, at the system level, which receive information from the sensors and transmit information to the actuators. Ex. 1005, 1:45-49; *see also id.*, 25:26-37 (“switching a pump off if the flow is below a certain limit or activating some bounds or streams based on some readings/conditions”). Thus, Almadi anticipates Claim 17 or would be obvious to a POSITA in view of Almadi.

g. Claim 19

[19] The medium of claim 1, wherein the controller is communicatively coupled to the fluid-handling device via a frame-based carrier-sense multiple access protocol.

79. For the controller 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 supra*, ¶¶ 43-45 (above discussion of controllers). *See, e.g.*, <https://www.trendmicro.com/vinfo/hk-en/security/definition/protocol-gateway>.

80. Protocol translation is a method for transforming pieces of information from a source protocol into relevant target protocol formats 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>

81. Translation of protocols is required to support communication between different fluid-handling devices, controllers, IPCs, etc. A POSITA would 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. <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. A POSITA would 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.

82. Whenever a sender and receiver have a radical link to transmit data/information packets, the data link management handles the channel. Where there is no committed path to communicate the data between two devices with multiple access protocols, the channel transmits the information over the channel simultaneously. In this case, the simultaneously transmitted data will produce concussion and cross-talk. Therefore, multiple access protocols are needed to avoid data collision and disturbance within the channels.

83. An example implementation of using multiple access links and protocols in the context of the network link layer is a network that uses both wired

and wireless connections to connect devices to the internet. In this network, different devices may have different types of network interfaces, such as Ethernet ports or Wi-Fi adapters. *See, e.g.*, <https://www.javatpoint.com/multiple-access-protocols>.

84. The network link layer protocol would need to support multiple access links and protocols to manage the different types of network interfaces and ensure efficient data transmission. For instance, in a wired Ethernet network, devices are connected to a switch, and the switch uses the Ethernet protocol to manage data transmission between devices. On the other hand, in a wireless network, devices communicate with an access point, and the access point uses the Wi-Fi protocol to manage data transmission. *See, e.g.*, <https://www.sciencedirect.com/topics/engineering/link-layer-protocol>

85. The network link layer protocol would need to support both Ethernet and Wi-Fi protocols and manage the different access links efficiently. This could be achieved using a protocol such as the IEEE 802.11 standard, which defines the protocol for wireless LANs, or the IEEE 802.3 standard, which defines the protocol for wired Ethernet LANs. In addition, the network link layer protocol would need to handle issues such as collisions, packet loss, and network congestion that can occur when multiple devices are accessing the network simultaneously. This could be accomplished using techniques such as carrier sense multiple access with collision detection (CSMA/CD) for wired networks or carrier sense multiple access with

collision avoidance (CSMA/CA) for wireless networks. See, e.g., <https://www.sciencedirect.com/topics/engineering/link-layer-protocol>

86. Overall, the implementation of multiple access links and protocols in the network link layer is essential for managing the different types of network interfaces and ensuring efficient data transmission in a modern network that uses both wired and wireless connections.

87. The data link layer combines data bits into entities called frames. Network topologies like Ethernet exist at the data link layer. Network switches are the most common data link layer devices.

88. A POSITA would understand the controller could be coupled to a fluid-handling device via frame-based carrier-sense multiple access protocol which is programmed into the controller. See, e.g., Ex. 1005, 12:60-13:25. Thus, Almadi anticipates Claim 19 or would be obvious to a POSITA in view of Almadi.

h. Claim 20

89. Almadi discloses each limitation of Claim 20, anticipating Claim 20. Claim 20's preamble is analogous to limitation 1.1, limitation 20.2 is analogous to limitation 1.2, limitation 20.3 is analogous to limitation 1.3, limitation 20.4 is analogous to limitation 1.4, limitation 20.5 is analogous to limitation 1.5, limitation 20.6 is analogous to limitation 1.6, limitation 20.7 is analogous to limitation 1.7, and limitation 20.8 is analogous to limitation 1.8. Each of Claim 20's limitations is

disclosed by Almadi for the reasons provided above. Almadi anticipates Claim 20 or would be obvious to a POSITA in view of Almadi.

2. Ground 2: Cardamone Anticipates Claims 1, 9-13, 15-18, and 20, Or Would Be Obvious To A POSITA In View Of Cardamone.

a. Claim 1

[1.1] A non-transitory, machine-readable medium comprising instructions to effectuate operations, the operations comprising:

90. A POSITA would understand that Cardamone discloses a tangible computer-readable medium from its disclosure of software applications. Ex. 1006, ¶ 0041-42. Thus, Cardamone discloses a tangible, non-transitory machine-readable medium. As such, Claim 1 is anticipated by Cardamone, or would be obvious to a POSITA in view of Cardamone.

[1.2] receiving, with a server, a command comprising a target value of a fluid-handling device from a computing device via a control interface, wherein the command is received in association with a record stored on a datastore;

91. It is well known that a GUI is a type of control interface. A POSITA would understand that the Cardamone discloses the receiving target status of a fluid handling device from a computing device through its disclosure of a data server that can receive sensory data from fluid handling devices and acts as data storage for sensory data. *See supra*, ¶¶ 43-45 (above discussion of target values and controllers, respectively); Ex. 1006, ¶ 0027; *see also id.*, Claim 30, ¶ 0041. Thus, Cardamone

discloses receiving, receiving, with a server, a command comprising a target value of a fluid-handling device from a computing device via a control interface, wherein the command is received in association with a record stored on a datastore.

[1.3] determining, with the server, a network address of a network based on the record, wherein the network address identifies a controller of the fluid-handling device, and wherein the controller accesses a sensor to measure a fluid being handled by the fluid-handling device and an actuator of the fluid-handling device;

92. See *supra*, ¶¶ 46-53 (above discussion of network addresses to identify controllers in a fluid-handling device); *id.* ¶ 59. A POSITA would understand that determining the network address of a controller and measuring a fluid is disclosed by Cardamone in its disclosure of using a local area network of the controller computer to view sensory data and adjust the operating parameters of the control computer. Ex. 1006, ¶ 0031. Thus, Cardamone discloses determining, with the server, a network address of a network based on the record, wherein the network address identifies a controller of the fluid-handling device, and wherein the controller accesses a sensor to measure a fluid being handled by the fluid-handling device and an actuator of the fluid-handling device.

[1.4] sending, with the server, the target value to the network address via the network;

93. A POSITA would understand that setting a new operating frequency is the sending a target value. See *supra*, ¶¶ 39, 54-59 (above discussion of controllers);

Ex. 1006, ¶¶ 0044-0045. Thus, Cardamone discloses sending, with the server, the target value to the network address via the network.

[1.5] receiving, with the controller, a measurement of the fluid by the sensor;

94. A POSITA would understand that sensor output disclosed in Cardamone is the measurement of fluid by a sensor. *See supra*, ¶¶ 39, 54-59 (above discussion of controllers); Ex. 1006, ¶¶ 0029-30, 0044-45, 0049. Thus, Cardamone discloses receiving with the controller, a measurement of the fluid by the sensor.

[1.6] determining, with the controller, whether the measurement satisfies the target value;

95. A POSITA understand that Cardamone's disclosure of viewing and setting control parameters is equivalent to determining whether a measurement satisfies the target value. *See supra*, ¶¶ 39, 54-59 (above discussion of controllers); Ex. 1006, ¶¶ 0044-45. Thus, Cardamone discloses determining, with the controller, whether the measurement satisfies the target value.

[1.7] in response to a determination that the measurement does not satisfy the target value, obtaining, with the controller, a set point based on the command; and

96. A POSITA would understand that the control algorithm operating on the control computer can determine a set point in response to a sensor data measurement not satisfying a target value. *See supra*, ¶¶ 39, 54-59 (above discussion of controllers); Ex. 1006, Claim 4. Thus, Cardamone discloses this claim limitation.

[1.8] controlling, with the controller, the actuator based on the set point.

97. A POSITA understand that motor drive systems and pump systems include actuators. *See supra*, ¶ 27 (above discussion of controllers operable to control actuators). *See, e.g.*, Ex. 1006, ¶¶ 0009, 0044-0045. Thus, Cardamone anticipates claim 1 or would be obvious to a POSITA in view of Cardamone.

b. Claim 9

[9] The medium of claim 1, wherein the measurement comprises at least one of a fluid flow rate, a fluid temperature, or a fluid pressure.

98. A POSITA would understand that Cardamone discloses a measurement comprising at least one of a fluid flow rate, a fluid temperature, or a fluid pressure through its disclosure of a temperature sensor 225 for providing the temperature. Ex. 1006, ¶ 0030. Thus, Cardamone anticipates Claim 9 or would be obvious to a POSITA in view of Cardamone.

c. Claim 10

[10.1] The medium of claim 1, wherein the fluid-handling device is a first fluid-handling device of a plurality of fluid-handling devices, the operations further comprising: polling, with the controller, the plurality of fluid-handling devices to collect a set of data comprising the measurement; and

99. A POSITA would understand that the collecting of raw sensor signals disclosed in Cardamone is equivalent to polling fluid handling devices to collect a set of measurement data. *See supra*, ¶¶ 39, 54-59 (above discussion of controllers);

Ex. 1006, ¶ 0042, *see also id.*, ¶¶ 0011, 0021, 0026, 0041. Thus, Cardamone discloses polling with the controller the plurality of fluid-handling devices to collect a set of data comprising the measurements.

[10.2] sending the set of data from the controller to the server.

100. A POSITA would understand that Cardamone discloses sending the set of data from the controller to the server through its disclosure of a control computer 126 sends daily data logs to a data server. *See supra*, ¶¶ 39, 54-59 (above discussion of controllers); Ex. 1006, ¶ 0027. Thus, Cardamone discloses sending the set of data from the controller to the server and anticipates claim 10 or would be obvious to a POSITA in view of Cardamone.

d. Claim 11

[11] The medium of claim 1, wherein the network comprises a wireless network, and sending the command comprises sending the command via a wireless signal.

101. A POSITA would recognize that Cardamone explicitly discloses a wireless network, and sending the command comprises sending the command via a wireless signal through its disclosure of a GSM modem and GPS. Ex. 1006, ¶ 0027. Thus, Cardamone anticipates claim 11 or would be obvious to a POSITA in view of Cardamone.

e. Claim 12

[12.1] The medium of claim 1, wherein: the measurement is a first measurement of a plurality of measurements of the sensor;

102. A POSITA would recognize that Cardamone discloses that the measurement is a first measurement of a plurality of measurements of the sensor through its disclosure of the raw sensor signals collected by control and communication computer 126 are forwarded to application 131 including motor output force, motor position, motor temperature, pump inlet and outlet pressure, inlet temperature, pump inclination, motor driver state, motor driver output current, power distribution system state and temperature, and power distribution system. Ex. 1006, ¶ 0044-0045. Thus, Cardamone discloses this claim element.

[12.2] wherein the target value is a value of a pattern of values; and

103. A POSITA would understand that Cardamone discloses the target value is a value of a pattern of values through its disclosure of the movement profile used to drive the pump system. Ex. 1006, ¶ 0044-0045. Thus, Cardamone discloses this claim element.

[12.3] determining whether the measurement satisfies the target value comprises determining whether the plurality of measurements satisfies the pattern of values.

104. A POSITA would understand that determining whether the plurality of measurements satisfies the pattern of values is based on analysis of a range of sensory inputs is determining whether the plurality of measurements satisfies the

pattern of values. Ex. 1006, ¶¶ 0044-0045. Thus, Cardamone discloses this claim element and anticipates claim 12 or would be obvious to a POSITA in view of Cardamone.

f. Claim 13

[13] The medium of claim 12, wherein the pattern of values comprises a pattern of valve configurations.

105. A POSITA would understand that the standard operating profiles disclosed in Cardamone are a pattern of valve configurations. Ex. 1006, ¶ 0009, Claim 17. Thus, Cardamone anticipates Claim 13 or would be obvious to a POSITA in view of Cardamone.

g. Claim 15

[15.1] The medium of claim 1, wherein: the server comprises a web server; and

106. 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. 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>.

107. Additionally, 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>. A GUI allows a user to interact with fluid-handling devices via visual indication representatives.

108. A POSITA would understand that Cardamone discloses the server comprising a web server through its disclosure of web server/web application 136. Thus, Cardamone discloses a web server. Ex. 1006, ¶ 0027.

[15.2] the controller comprises a site server distinct from the web server

109. A POSITA would recognize the control and communications computer of Cardamone can be a server and is distinct from the data server. Ex. 1006, ¶ 0024. Thus, Cardamone anticipates claim 15 or would be obvious to a POSITA in view of Cardamone.

h. Claim 16

[16.1] The medium of claim 15, wherein: the server communicates with a plurality of user devices via a first network port of the web server, wherein the plurality of user devices comprises the computing device; and

110. A POSITA would understand that Cardamone discloses a the server communicates with a plurality of user devices via a first network port of the web server, wherein the plurality of user devices comprises the computing device through its disclosure of the control and communication computer system including a wifi access port. Ex. 1006, ¶ 0026. Thus, Cardamone discloses a network port for communication with a plurality of user devices.

[16.2] the site server communicates with facilities via a second network port of the computing device, wherein the second network port being different from the first network port, and wherein a facility of the facilities comprises the

fluid-handling device.

111. A POSITA would understand that Cardamone discloses a second network port of the computing device, wherein the second network port being different from the first network port, and wherein a facility of the facilities comprises the fluid-handling device through its disclosure of a satcom modem or port. Ex. 1006, ¶ 0008. Thus, Cardamone anticipates claim 16 or would be obvious to a POSITA in view of Cardamone.

i. Claim 17

[17] The medium of claim 1, wherein controlling the actuator based on the set point comprise steps for controlling the actuator

112. A POSITA would understand that the adjusting control of the motor drives (which in turn operate actuators) as a function of recognizing operating regimes includes stops for controlling the actuator. Ex. 1006, ¶ 0009, 0044, 0045. Thus, Cardamone anticipates claim 17 or would be obvious to a POSITA in view of Cardamone.

j. Claim 18

[18] The medium of claim 1, wherein receiving the command comprises receiving the command via a web interface on the computing device.

113. A POSITA would recognize that Cardamone discloses receiving the command via a web interface on the computing device through its disclosure of a web application 134 which provides an interface to remote management computer

138. Ex. 1006, ¶ 0042, see also ¶¶ 0011, 0021, 0026, 0041. Thus, Cardamone anticipates Claim 18 or would be obvious to a POSITA in view of Cardamone.

k. Claim 20

114. Cardamone discloses each limitation of Claim 20, anticipating Claim 20. Claim 20's preamble is analogous to limitation 1.1, limitation 20.2 is analogous to limitation 1.2, limitation 20.3 is analogous to limitation 1.3, limitation 20.4 is analogous to limitation 1.4, limitation 20.5 is analogous to limitation 1.5, limitation 20.6 is analogous to limitation 1.6, limitation 20.7 is analogous to limitation 1.7, and limitation 20.8 is analogous to limitation 1.8. Each of Claim 20's limitations is disclosed by Cardamone for the reasons provided above. Thus, Cardamone anticipates Claim 20 or would be obvious to a POSITA in view of Cardamone.

3. Ground 3: Gutierrez Anticipates Claims 1, 7, and 20 Or Would Be Obvious In View Of Gutierrez.

a. Claim 1

[1.1] A non-transitory, machine-readable medium comprising instructions to effectuate operations, the operations comprising:

115. Gutierrez discloses a non-transitory, machine-readable medium comprising instructions to effectuate operations. Ex. 1007, 8:39-42. Thus, Gutierrez discloses this claim element.

[1.2] receiving, with a server, a command comprising a target value of a fluid-handling device from a computing device via a control interface, wherein the command is received in association with a record stored on a datastore;

116. A POSITA would recognize that Gutierrez discloses receiving a command including a target value of a fluid-handling device as recited in the '680 Patent because the disclosed GUI transmits commands including a target value of a fluid-handling device, i.e, components of the chemical injection system. *See, e.g.,* Ex. 1007, 3:40-45, 5:58-67, 6:1-10, 6:13-23, 6:24-44, 9:21-25, 9:55-64, 10:27-30, 10:39-43, 11:18-26, 13:9-26. Therefore, Gutierrez discloses this limitation of the '680 Patent.

[1.3] determining, with the server, a network address of a network based on the record, wherein the network address identifies a controller of the fluid-handling device, and wherein the controller accesses a sensor to measure a fluid being handled by the fluid-handling device and an actuator of the fluid-handling device;

117. A POSITA would recognize that Gutierrez discloses determining the network address of a network, where the network address identifies the controller of fluid-handling devices in the '680 Patent because the network address would have to be known for commands to be sent to that fluid-handling device. Ex. 1007, 6:28-35; 10:22-24, 10:34-38, 10:43-59. Therefore, Gutierrez discloses this limitation of the '680 Patent.

[1.4] sending, with the server, the target value to the network address via the network;

118. A POSITA would recognize from the above disclosures that Gutierrez discloses sending the target value to the network address as recited in the '680 Patent. *See, e.g.*, Ex. 1007, 3:40-45, 5:58-67, 6:1-10, 6:13-23, 6:24-44, 9:21-25, 9:55-64, 10:27-30, 10:39-43, 11:18-26, 13:9-26. Therefore, Gutierrez discloses this limitation of the '680 Patent.

[1.5] receiving, with the controller, a measurement of the fluid by the sensor;

119. A POSITA would recognize that enterprise or secured networks require individual users to log in, and then users receive access only to designated systems, e.g. access to control a designated group of devices. *See, e.g.*, Ex. 1007, 3:40-45, 5:58-67, 6:1-10, 6:13-23, 6:24-44, 9:21-25, 9:55-64, 10:27-30, 10:39-43, 11:18-26, 13:9-26. Further, a POSITA would recognize that Gutierrez inherently discloses a plurality of accounts including accounts in a first group with access permitted for control of a first designated group of devices, as recited in the '680 Patent. Ex. 1007, 9:4-13, 9:21-25, 10:7-16, 10:40-46, 13:12-17. Therefore, Gutierrez discloses this limitation of the '680 Patent.

[1.6] determining, with the controller, whether the measurement satisfies the target value;

120. A POSITA would recognize from the above disclosures that Gutierrez discloses determining whether the measurements satisfy the target value as recited

in the '680 Patent. Therefore, Gutierrez discloses this limitation of the '680 Patent. See, e.g., Ex. 1007, 3:40-45, 5:58-67, 6:1-10, 6:13-23, 6:24-44, 9:21-25, 9:55-64, 10:27-30, 10:39-43, 11:18-26, 13:9-26.

[1.7] in response to a determination that the measurement does not satisfy the target value, obtaining, with the controller, a set point based on the command; and

121. A POSITA would recognize that Gutierrez discloses obtaining a set point based on a determination that a measurement does not satisfy a target value in the '680 Patent. Ex. 1007, 9:4-13, 9:21-25, 10:40-46, 13:12-17. Therefore, Gutierrez discloses this limitation of the '680 Patent.

[1.8] controlling, with the controller, the actuator based on the set point.

122. A POSITA would recognize from the above disclosure that Gutierrez discloses controlling the actuator based on a set point as recited in the '680 Patent. Ex. 1007, 6:45-8:38, 9:54-10:16, 11:62-12:29, 13:23-26.

123. Therefore, Gutierrez discloses this limitation of the '680 Patent and anticipates Claim 1 or would be obvious to a POSITA in view of Gutierrez.

b. Claim 7

[7] The medium of claim 1, wherein the record is a first record, the operations further comprising sending sensor data from the sensor to a plurality of records that comprises the first record, wherein the plurality of records is associated with a user.

124. A POSITA would recognize that Gutierrez discloses the plurality of records is associated with a user the translation module 145 may allow a user or operator to connect to the controller 130 and receive feedback data (e.g., operational data of the motor 110, pump 105, or any other component of the system 100) without regard to a particular protocol understood by the user's device (i.e., computer, laptop, PDA, cell phone). Ex. 1007, 9:6-11.

125. A POSITA would recognize that Gutierrez inherently discloses a first record from the operational parameters sensed by the sensor and that sending sensor data from the sensor to a plurality of records comprising the first record is the transmitting of operational data parameters to the controller 130. Ex. 1007, 9:6-11. Further, a POSITA would recognize that Gutierrez inherently discloses that the plurality of records is associated with a user through its disclosure of a user or operator connecting to the controller 130 and receiving feedback data (e.g., operational data of the motor 110, pump 105, or any other component of the system 100) with the user's device (i.e., computer, laptop, PDA, cell phone. Ex. 1007, 9:6-11. Further, a POSITA would understand that the plurality of records accessed by the user on a user device would be associated with that user. Ex. 1007, 9:54-59.

Therefore, Gutierrez anticipates Claim 7 or would be obvious to a POSITA in view of Gutierrez.

c. Claim 20

126. Gutierrez discloses each limitation of Claim 20, anticipating Claim 20. Claim 20's preamble is analogous to limitation 1.1, limitation 20.2 is analogous to limitation 1.2, limitation 20.3 is analogous to limitation 1.3, limitation 20.4 is analogous to limitation 1.4, limitation 20.5 is analogous to limitation 1.5, limitation 20.6 is analogous to limitation 1.6, limitation 20.7 is analogous to limitation 1.7, and limitation 20.8 is analogous to limitation 1.8. Each of Claim 20's limitations is disclosed by Gutierrez for reasons provided above, and incorporated here. Gutierrez anticipates Claim 20 or would be obvious to a POSITA in view of Gutierrez.

4. SCADA Anticipates 1 and 20 Or Would Be Obvious In View Of SCADA.

127. Independent claims 1 and 20 are anticipated by SCADA: Supervisory Control and Data Acquisition. 4th Edition ("SCADA") under 35 U.S.C. § 102, or would be obvious to a POSITA in view of SCADA under 35 U.S.C. § 103.

a. Claim 1

[1.1] A non-transitory, machine-readable medium comprising instructions to effectuate operations, the operations comprising:

128. To the extent that the Board finds that the preamble is limiting, SCADA discloses non-transitory, machine-readable medium comprising instructions to effectuate operations. For example, SCADA discloses that [M]odern RTUs are

essentially microcomputers with special equipment at one end to interface with the long-range communications link and with special equipment at the other end to interface with the sensors, actuators, and calculators in the process. While the RTU is in receive mode, part of the communications interface equipment (the modem...) receives a serial signal from the communications medium...Modern RTUs accomplish these functions with the protocol driver program run by the RTU's central processing unit." Ex. 1007, at 92-93. Therefore, SCADA discloses this claim limitation of the '680 Patent.

[1.2] receiving, with a server, a command comprising a target value of a fluid-handling device from a computing device via a control interface, wherein the command is received in association with a record stored on a datastore;

129. SCADA discloses claim element 1.2. For example, SCADA discloses receiving, with a server, a command comprising a target value of a fluid-handling device from a computing device via a control interface through its "Figure 2-1 shows the major elements of a SCADA system. At the center is the operator, who interfaces with the system through some form of input/output (I/O) device. The I/O device in turn communicates with the master terminal unit (MTU). The MTU communicates with one or more remote terminal units (RTUs), each of which communicates with sensors or actuators at the process..." Ex. 1007, at 12.

130. "The RTU outputs an electrical signal that is a direct current that varies between 4 and 20 mA. It is received by a transducer, sometimes also called an I to P

transducer or just an I to P, since it will change the language from electrical current (I) to air pressure (P). The I to P receives air from the instrument air compressor at about 100 psi if it receives 20 mA from the RTU. This air pressure provides power to open or close the valve by an amount proportional to the current output by the RTU. The 6 to 30 psi is one popular air pressure language, but not the only one. Ex. 1007, at 73.

131. SCADA further discloses receiving in command in association with a record stored on a datastore through its disclosure that "[M]odern RTUs are essentially microcomputers with special equipment at one end to interface with the long-range communications link and with special equipment at the other end to interface with the sensors, actuators, and calculators in the process. While the RTU is in receive mode, part of the communications interface equipment (the modem...) receives a serial signal from the communications medium...Modern RTUs accomplish these functions with the protocol driver program run by the RTU's central processing unit." Ex. 1007, at 92-93.

132. A POSITA would understand that SCADA discloses the recited receiving commands from the server comprising a target value to control specific fluid handling devices of the '680 Patent through its disclosure of receiving signal through the MTU, which connects via communications interface equipment to

individually addressable RTU for controlling operation of well site components.

Thus, SCADA discloses this claim limitation.

[1.3] determining, with the server, a network address of a network based on the record, wherein the network address identifies a controller of the fluid-handling device, and wherein the controller accesses a sensor to measure a fluid being handled by the fluid-handling device and an actuator of the fluid-handling device;

133. SCADA discloses determining, with the server, a network address of a network based on the record through its disclosure “The RTU also communicates with sensors that measure field equipment conditions and with actuators that change field equipment conditions...To do this, the RTU must know the language, or protocol, each device uses. It must know the name, or address, of each field device. If it is to gather information from field devices, it must know where to store the information so that it will be able to send the information onward when told to do so by the MTU.” SCADA, 4th edition, p. 14-15.

134. SCADA also discloses that the network address identifies a controller of the fluid-handling device through its disclosure that the RTU must know the language or protocol, each device uses. It must know the name, or address, of each field device. If it is to gather information from field devices, it must know where to store the information so that it will be able to send the information onward when told to do so by the MTU.” SCADA, 4th ed., at 14-15.

135. SCADA discloses that the controller accesses a sensor to measure a fluid being handled by the fluid-handling device and an actuator of the fluid-handling device through its disclosure that if it is to gather information from field devices, it must know where to store the information so that it will be able to send the information onward when told to do so by the MTU.” SCADA, 4th ed., at 14-15.

136. A POSITA would understand that SCADA’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 ’680 Patent. Thus, SCADA discloses this claim limitation.

[1.4] sending, with the server, the target value to the network address via the network;

137. SCADA discloses sending, with the server, the target value to the network address via the network through its disclosure that “the remote terminal unit (RTU) will sample this variable and will store it in a memory register. The RTU will also sample analog variables from other flowmeters, level transmitters, or temperature transmitters, and will sample discrete variables from fire alarms and the like. Each of these variables will be sampled and stored in its memory location...Third, the RTU must listen for a request from the master terminal unit (MTU), which will periodically tell each of the RTUs in the system to report what it knows. When it receives such an order, the RTU must then confirm that the message

is indeed for it and not for some other RTU. Then it must put together a message that includes all of the information requested by the MTU...Fourth, the MTU must receive this data; check it to determine if any communication errors have occurred; store the data in predetermined memory locations; and present any alarms, reports, or data screens to the process operator.” SCADA, 4th ed., at 34-35.

138. A POSITA would understand that transmitting process data via an Ethernet switch is the sending, with the server, the target value to the network address via the network as claimed in the '680 Patent. Thus, SCADA discloses this claim limitation.

[1.5] receiving, with the controller, a measurement of the fluid by the sensor;

139. SCADA discloses claim element 1.5. For example, SCADA discloses receiving, with the controller, a measurement of the fluid by the sensor through its disclosure that “the remote terminal unit (RTU) will sample this variable and will store it in a memory register. The RTU will also sample analog variables from other flowmeters, level transmitters, or temperature transmitters, and will sample discrete variables from fire alarms and the like. Each of these variables will be sampled and stored in its memory location...Third, the RTU must listen for a request from the master terminal unit (MTU), which will periodically tell each of the RTUs in the system to report what it knows. When it receives such an order, the RTU must then confirm that the message is indeed for it and not for some other RTU. Then it must

put together a message that includes all of the information requested by the MTU...Fourth, the MTU must receive this data; check it to determine if any communication errors have occurred; store the data in predetermined memory locations; and present any alarms, reports, or data screens to the process operator.” SCADA, 4th ed., at 34-35.

140. A POSITA would understand SCADA’s disclosure that the disclosed controller receives a measurement of fluid from the system’s sensor, based on its discussion of modern field devices and its disclosed data verifier and data reconciler that determine the operating state of remote sub-systems based on sensor readings, as taught by the ‘680 Patent. Thus, SCADA discloses this claim limitation.

[1.6] determining, with the controller, whether the measurement satisfies the target value;

141. SCADA discloses the determining, with the controller, whether the measurement satisfies the target value through its disclosure that “the RTU also communicates with sensors that measure field equipment conditions and with actuators that change field equipment conditions...To do this, the RTU must know the language, or protocol, each device uses. It must know the name, or address, of each field device. If it is to gather information from field devices, it must know where to store the information so that it will be able to send the information onward when told to do so by the MTU.” SCADA, 4th ed., at 14-15.

142. A POSITA would understand from SCADA's disclosure that the disclosed controller determines whether the measurement satisfies the target value. Thus, SCADA discloses this claim limitation.

[1.7] in response to a determination that the measurement does not satisfy the target value, obtaining, with the controller, a set point based on the command; and

143. SCADA discloses obtaining a set point based on the command in response to a determination that the measurement does not satisfy a target value through its disclosure that "the RTU also communicates with sensors that measure field equipment conditions and with actuators that change field equipment conditions...To do this, the RTU must know the language, or protocol, each device uses. It must know the name, or address, of each field device. If it is to gather information from field devices, it must know where to store the information so that it will be able to send the information onward when told to do so by the MTU." SCADA, 4th ed., at 14-15.

144. A POSITA would recognize that limits or bounds apply a set point, which would be set by a user in a command. A POSITA would recognize that to verify measurements and determine whether a measurement was out-of-bounds, a set point would have to be obtained by the data verifier located on the controller and compared by the data reconciler also located on the controller. Thus, SCADA discloses this claim limitation.

[1.8] controlling, with the controller, the actuator based on the set point.

145. SCADA discloses controlling, with the controller, the actuator based on the set point through its disclosure that Figure 2-1 shows the major elements of a SCADA system. At the center is the operator, who interfaces with the system through some form of input/output (I/O) device. The I/O device in turn communicates with the master terminal unit (MTU). The MTU communicates with one or more remote terminal units (RTUs), each of which communicates with sensors or actuators at the process..." Ex. 1007, at 12.

146. A POSITA would understand that SCADA discloses the controlling of the actuator based on the set point of the '680 Patent through its disclosure of the intelligent field systems and the data verifier and reconciler. A POSITA would understand that the data is verified and reconciled and that a command can be sent by the controller to control any number of actuators in intelligent field systems within limits or bounds, i.e. set points. [cite] Thus, SCADA discloses this claim element and anticipates claim 1 of the '680 Patent

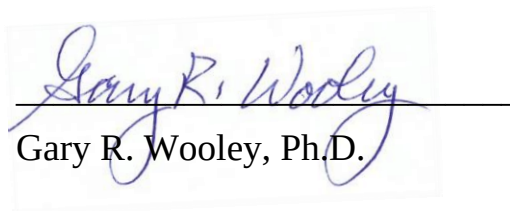
VII. CONCLUSION

147. For the reasons set forth above, in my opinion, all of the limitations of claims 1-3, 6-7, and 9-20 of the '680 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: April 15, 2024



Gary R. Wooley, Ph.D.