Expert Declaration In Support of Petitioner's Petition for *Inter Partes* Review of U.S. Patent No. 9,898,014

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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 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 1-9 and 11-23 of the ‘014 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 LED drivers and dimmers.

10. More specifically, for this work, I have been asked to review the Challenged Patents including the specification 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. 10,488,871
Ex 1002	Declaration of Dr. Gary Wooley
Ex 1003	Curriculum Vitae of Dr. Gary Wooley
Ex 1004	File Wrapper for U.S. Patent No. 10,488,871
Ex 1005	US Patent 7,424,399 to Khan

Ex 1006	U.S. Patent No. 9,709,995 to Gutierrez
Ex 1007	Fundamentals of Computing With C++
Ex 1008	Learning Java, 3rd Edition
Ex 1009	Java Threads, 2nd Edition
Ex 1010	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. ("POSITA"). 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 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

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 POSITA 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 under the above-provided standard.

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.

28. 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

29. The '014 Patent, entitled "Remote Control of Fluid-Handling Devices," describes a hosted, web-based, remote industrial monitoring and control system for geographically distributed facilities in oil and gas fields that includes a computer-implemented datastore for storing plurality of accounts, each account corresponding to an entity operating one or more geographically distributed oil or gas facilities, the accounts associating different oil or gas facilities with different entities; and network addresses by which industrial monitoring or control equipment at the facilities is accessible via cellular network connection. The monitoring or control equipment includes sensors or actuators; computer modules configured to obtain data from the sensors at the facilities and send commands to the actuators at the facilities via the cellular network connections; and web-interface modules configured to send instructions to present control interfaces in web browsers executing on user computing devices logged in to the accounts and to receive commands to control actuators from the user computing devices. Ex. 1001, Claim 1.

C. Prosecution History Summary

1. The ‘014 Patent History (Ex. 1004)

30. Application resulting in the ‘014 Patent was filed on December 30, 2015. Ex. 1004, at 1-2. The present application is a continuation of U.S. Patent Application 14/147,190, 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 December 7, 2012, and titled Remote Control of Fluid-Handling Devices. Ex. 1004, at 325.

31. In a December 21, 2016 Office Action, the Examiner rejected claims 1, 5, 7-10, 12, 18-21, and 23 were rejected 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 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 No. 6,967,589 (Peters). Claim 4 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. 7,967,066 (McStay). 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 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). Claim 22 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. 4,052,703 (Collins). Ex. 1004, at 280-316.

32. In a March 21, 2017 response to the office action, the applicant amended claim 2 to add that the accounts: (1) designate oil or gas facilities to which a given user is authorized to send the user command to actuate the actuator; (2) include a first account corresponding to a first group of oil or gas facilities, users of the first account being authorized to send commands to remotely control fluid handling devices at the first group of oil or gas facilities; and (3) include a second account corresponding to a second group of oil or gas facilities, the first group being different from the second group, users of the second account being authorized to send commands to remotely control fluid handling devices at the second group of oil or gas facilities. Additionally, Claims 13 and 14 were amended to recite that the system is configured to instantiate distinct threads. Ex. 1004, at 170-212.

33. In a March 31, 2017 Office Action, the Examiner rejected Claims 1, 5, 7-10, 12, 18-21, and 23 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. Claim

2 was 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, Peters, and U.S. Patent No. 6,665,568 (Hott). Claim 3 was 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). Claim 4 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. 7,967,066 (McStay). Claims 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 Peters. Claims 13-14 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 Huang. Claim 16 was 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). Claim 22 was rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable Dwinnell in view of Schultz and further in view of Huhn and U.S. Patent No. 4,052,703 (Collins). *Id.*

34. On September 21, 2017, the Applicant filed an amendment and response to the March 31, 2017 office action. The applicant amended claim 1 to include that the plurality of accounts include a first account, a second account, a third account, and a fourth account; the first account corresponds to a first group of oil or gas facilities, users of the first account being authorized to send commands to

remotely control fluid handling devices at the first group of oil or gas facilities; the second account corresponds to a second group of oil or gas facilities, the first group being different from the second group, users of the second account being authorized to send commands to remotely control fluid handling devices at the second group of oil or gas facilities; the third account corresponds to the first group of oil or gas facilities, users of the third account being authorized to view reports of data from fluid handling devices at the first group of oil or gas facilities; and the fourth account corresponds to the second group of oil or gas facilities, users of the fourth account being authorized to view reports of data from fluid handling devices at the second group of oil or gas facilities. Ex. 1004, at 67-73.

35. In an October 10, 2017 Notice of Allowability, the Examiner allowed Claims 1-23. Ex. 1004, at 62-66.

D. Overview of the Prior Art

1. Khan (Ex. 1005)

U.S. Patent No. 7424,399 to Khan was filed on June 9, 2006, and issued on September 9, 2008. Khan claims priority to U.S. Provisional Patent Application Ser. No. 60/689,257, filed Jun. 10, 2005, and entitled Systems And Methods For Fluid Quality Sensing, Data Sharing And Data Visualization. Khan is prior art under pre-AIA § 102(a).

Khan teaches receiving fluid test data generated from multiple different

entities and permits authorized users affiliated with the different entities, as well as others, to visualize information associated with that data via the Internet using graphical computer interfaces at respective computers. The fluid test data can be gathered using portable sensor units equipped with GPS and wireless communication to transmit the fluid test data and geographical information to the service provider. Ex. 1005, Abstract.

2. Gutierrez (Ex. 1006)

36. 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).

37. 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. 1006, 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.*

VI. SUMMARY OF MY OPINIONS

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

- Khan Anticipates Claims 1, 3, 4-9, 11-17, and 21-23 or would be obvious to a POSITA in view of Kahn.
- Gutierrez Anticipates Claims 1-2, 4-9, 11-16, and 18-23 or would be obvious to a POSITA in view of Gutierrez or Gutierrez in view of Khan.

A. Opinions Regarding the '014 Patent

1. Ground 1: Kahn Anticipates Claims 1, 4, 5-9, 11-17, and 21-23 or Would be Obvious in View of Kahn

39. Independent claim 1 and dependent claims 2-3, 5-9, 11-17, and 21-23 are anticipated by U.S. Patent No. 7,424,399 ("Kahn") under 35 U.S.C. § 102, or would be obvious to a POSITA in view of Kahn under 35 U.S.C. § 103.

a. Claim 1

> *[1.1] A hosted, web-based, remote industrial monitoring and control system for geographically distributed facilities in oil and gas fields, the system comprising:*

40. A POSITA would recognize that Kahn discloses the recited system. *See, e.g.*, Ex. 1005, Abstract, 10:62-67; 14:35-15:2, 15:62-16:32; 2:50-54, 25:5-12.

Kahn discloses that its invention "can be used in conjunction with other fluids, such as natural gas." Ex. 1005, 17:67-18:2. Thus, Kahn discloses the recited system.

[1.2] a computer-implemented datastore storing:

41. 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. 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.

42. A POSITA would recognize that Kahn discloses storing records, with one or more processors through its disclosure of centralized data collection points. *See, e.g.*, Ex. 1005, 8:51-59, 9:53-58, 17:18-30, 18:48-52, 63-65, 19:5-23, 19:58-65, 23:27-31. Kahn discloses that the centralized data collection point is a server. Ex. 1005, 10:52-61, 23:27-31. Kahn discloses that servers are computers, i.e. include processors. Ex. 1005, 32:58-63. Therefore, Kahn discloses storing records, with one or more processors.

[1.3] a plurality of accounts, each account corresponding to an entity operating one or more geographically distributed oil or gas facilities, the accounts associating different oil or gas facilities with different entities; and

43. A POSITA would recognize that Kahn discloses a plurality of accounts, namely one or more geographically distributed fluid-handling facilities with

different entities. *See, e.g.*, Ex. 1005, 16:40-18:52, 25:5-12. A hallmark of the distribution system in Kahn is the ability to identify the location of and communicate with the system's sensor units. Ex. 1005, 4:12-25, 11:2-15; *see also id.*, 10:8-13; 23:51-62. Kahn discloses a user interface showing data from geographically distributed fluid handling facilities from multiple different entities. Ex. 1005, Abstract, 2:50-54, 25:5-12. Therefore, Kahn discloses the plurality of accounts recited in the '014 Patent.

> *[1.4] network addresses by which industrial monitoring or control equipment at the facilities is accessible via cellular network connections, the monitoring or control equipment including sensors or actuators;*

44. 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. A POSITA would recognize Kahn discloses the addresses for facilities accessible by the network, as well as the monitoring and control equipment as recited in the '014 Patent. *See, e.g.*, Ex. 1005, 16:40-18:52. For example, sensor unit 110 can be located at any desired point in a fluid distribution system. *See, e.g.*, Ex. 1005, 11:2-15.

45. Kahn discloses a system with Sensor unit 110 that includes multiple sensors (e.g., first sensor 111A and second sensor 111B) and a communication unit that connects via a network to centralized data collection points. *See, e.g.*, Ex. 1005, 5:62-6:16, 9:37-43, 10:18-67, 13:46-52, 17:18-30, 18:40-19:2, 19:5-20:39, 22:12-20, 23:22-50, FIG. 1A, FIG. 3. Kahn discloses monitoring and control equipment including one or more actuators configured to manipulate fluid flow at respective fluid-handling facilities. *See, e.g.*, Ex. 1005, 10:62-67; *see also id.*, 14:35-15:2 ("one or more actuators"), 15:62-16:32 (describing an actuator for each sensor 111). Therefore, Kahn discloses this limitation of the '014 Patent.

> *[1.5] a computer-implemented facility-interface module or modules configured to obtain data from the sensors at the facilities and send commands to the actuators at the facilities via the cellular network connections; and*

46. 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.

47. 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.techtarget.com/whatis/definition/control-system.

48. A POSITA would recognize that Kahn discloses the facility interface module as recited in the '014 Patent. . *See, e.g.*, Ex. 1005, 5:62-6:2, 9:37-43, 10:18-67, 13:46-52, 17:18-30, 18:40-19:2, 19:5-20:39, 22:12-20, 23:22-50, FIG. 1A, FIG. 3. Kahn further discloses that sensor unit 110 includes communication equipment with actuators configured to manipulate fluid flow at respective fluid-handling facilities. *See, e.g.*, Ex. 1005, 10:62-67; *see also id.*, 14:35-15:2, 15:62-16:32. Therefore, Kahn discloses this limitation of the '014 Patent.

> *[1.6] a computer-implemented web-interface module or modules configured to send instructions to present control interfaces in web browsers executing on user computing devices logged in to the accounts and to receive commands to control actuators from the user computing devices,*

49. 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.

50. 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.

51. 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.

52. A POSITA would recognize that Kahn discloses the web interface module, as recited in the '014 Patent. Ex. 1005, Abstract, 1:28-36, 2:50-3:2, 25:5-25, 25:48-26:19, 28:8-25, 29:5-37. Kahn discloses that users log into the system on respective user computing devices. *See, e.g.*, Ex. 1005, 2:50-45, 25:5-12, 28:35-37, 30:45-49. Kahn discloses a variety of users and entities having different levels of authorized access. Ex. 1005, 25:48-26:67, *see also id.*, 2:50-60, 19:58-65, 21:50-22:44, 22:62-23:50, 24:44-25:2, 25:5-12, 27:39-28:7. Therefore, Kahn discloses this limitation of the '014 Patent.

> *[1.7] wherein the system is configured to receive, with the web-interface module or modules, a user command to actuate an actuator entered via a presented control interface, identify a network address in the datastore corresponding to a facility at which the actuator is located, and send instructions with the facility-interface module or modules to the facility to actuate the actuator, and*

53. 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.

54. 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.

55. 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.

56. A POSITA would recognize that Kahn discloses receiving with the user interface module a user command to actuate an actuator of the fluid handling system, as recited in the '014 Patent. Ex. 1005, Abstract, 1:28-36, 2:50-3:2, 25:5-25, 25:48-26:19, 28:8-25, 29:5-37. Kahn further discloses that sensor unit 110 includes communication equipment with actuators configured to manipulate fluid flow at

respective fluid-handling facilities and to facilitate the measurement of data requested through the graphical user interface. *See, e.g.*, Ex. 1005, 10:62-67; *see also id.*, 14:35-15:2, 15:62-16:32. A POSITA would recognize that Kahn discloses identifying an address in the datastore corresponding to the facility at which the actuator is located, as recited in the '014 Patent, because the disclosed GUI enables the user to control a designated component of the system.

57. A POSITA would recognize that Kahn discloses sending instructions to the facility interface module to actuate the fluid handling system's actuator, as recited in the '014 Patent.

58. Therefore, Kahn discloses this limitation of the '014 Patent.

> *[1.8] wherein: the plurality of accounts include a first account, a second account, a third account, and a fourth account;*

59. A POSITA would recognize that Kahn discloses a plurality of accounts, as recited in the '014 Patent. Kahn discloses an "authorized account A" for "a first entity" "to access aspects of first fluid test data." Ex. 1005, 25:48-26:67. Kahn further discloses an "authorized account B" for "a second entity" "to access aspects of second fluid test data." *Id*. The "first and second entities can control access to date generated by their respective sensors." *Id*. Thus, "separate entities provide their fluid test data to the computer system 4 controlled by the service provider (an entity different from the first and second entities), and the first and second entities can

control access to data generated by their respective sensors." *Id*. Entities also "grant authorization to visualize [data] generated by them to others beyond themselves, such as government health organizations or security organizations such as the Department of Homeland Security." *Id*. Therefore, Kahn discloses this limitation of the '014 Patent.

> *[1.9] the first account corresponds to a first group of oil or gas facilities, users of the first account being authorized to send commands to remotely control fluid handling devices at the first group of oil or gas facilities;*

60. A POSITA would recognize that Kahn discloses a plurality of accounts with varying degrees of access to designated systems, wherein a first group has access to control a first group of fluid handling facilities, as recited in the '014 Patent. Ex. 1005, 25:48-26:67, *see also* Ex. 1005, 2:50-60, 19:58-65, 21:50-22:44, 22:62-23:50, 24:44-25:2, 25:5-12, 27:39-28:7. Kahn further discloses that sensor unit 110 includes communication equipment with actuators configured to manipulate fluid flow at respective fluid-handling facilities. *See, e.g.*, Ex. 1005, 10:62-67; *see also id.*, 14:35-15:2, 15:62-16:32. Therefore, Kahn discloses this limitation of the '014 Patent.

> *[1.10] the second account corresponds to a second group of oil or gas facilities, the first group being different from the second group, users of the second account being authorized to send commands to remotely control fluid handling devices at the second group of oil or gas facilities;*

61. As detailed above for element 1.9, a POSITA would readily recognize that Kahn discloses a plurality of accounts with varying degrees of access to designated systems, wherein a second group (authorized account B) has access to control a second group of fluid handling facilities, as recited in the ’014 Patent. Therefore, Kahn discloses this limitation of the ’014 Patent.

> *[1.11] the third account corresponds to the first group of oil or gas facilities, users of the third account being authorized to view reports of data from fluid handling devices at the first group of oil or gas facilities; and*

62. A POSITA would recognize that Kahn discloses a plurality of accounts with varying degrees of access to designated systems, wherein a third group has access to view data from a first group of fluid handling facilities, as recited in the ’014 Patent. Ex. 1005, 25:48-26:67, *see also id.*, 2:50-60, 19:58-65, 21:50-22:44, 22:62-23:50, 24:44-25:2, 25:5-12, 27:39-28:7. Therefore, Kahn discloses this limitation of the ’014 Patent.

> *[1.12] the fourth account corresponds to the second group of oil or gas facilities, users of the fourth account being authorized to view reports of data from fluid handling devices at the second group of oil or gas facilities.*

63. As detailed above for element 1.11, a POSITA would readily recognize that Kahn discloses a plurality of accounts with varying degrees of access to designated systems, wherein a fourth group (government health or security organizations such as the Department of Homeland Security) has access to view data from a second group of fluid handling facilities, as recited in the '014 Patent. Therefore, Kahn discloses this limitation of the '014 Patent.

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

b. Claim 4

> *[4.1] The system of claim 1, wherein the sensors include a leak detector at one of the facilities, and wherein the datastore includes a record associating the leak detector with the facility.*

65. Kahn discloses a user interface showing data from geographically distributed fluid handling facilities from multiple different entities. Ex. 1005, Abstract, 2:50-54, 25:5-12. A hallmark of the distribution system in Kahn is the ability to identify the location of and communicate with the system's sensor units. Ex. 1005, 4:12-25, 11:2-15.

66. A POSITA would readily recognize that Kahn discloses a leak detector at a fluid-handling facility. Ex. 1005, 10:8-13 ("Physical events, such as a breakage of a pipe might be detected . . . thereby identifying the exact location or proximate location of the breakage.").

c. Claim 5

[5.1] The system of claim 1, wherein: the web-interface module or modules comprises a web server; and

67. A POSITA would recognize that Kahn discloses the web-interface module or modules comprises a web server. *See, e.g.*, Ex. 1005, 8:51-59, 9:53-58, 17:18-30, 18:48-52, 63-65, 19:5-23, 19:58-65, 23:27-31. Kahn discloses that the centralized data collection point is a server. Ex. 1005, 10:52-61, 23:27-31. Kahn discloses that servers are computers, i.e. include processors. Ex. 1005, 32:58-63. Therefore, Kahn discloses this limitation of the '014 Patent.

[5.2] the facility-interface module or modules comprises a site server distinct from the web server.

68. A POSITA would recognize that Kahn discloses the facility-interface module or modules comprises a web server, as recited in the '014 Patent, because sensor unit 110 can communicate with each other in a distributed network with each sensor unit 110 operating as a server. *See, e.g.*, Ex. 1005, 5:62-6:2, 9:37-43, 10:18-67, 13:46-52, 17:18-30, 18:40-19:2, 19:5-20:39, 22:12-20, 23:22-50, FIG. 1A, FIG. 3. Kahn further discloses that the network of sensor units 110 can be configured

to communicate with a central communication device, e.g., a server, and/or sensor unit 110 can communicate with each other as a distributed network. Ex. 1005, 10:54-56. Therefore, Kahn discloses this limitation of the '014 Patent. As such, Claim 5 is anticipated by Kahn, or would be obvious to a POSITA in view of Kahn.

d. Claim 6

> *[6.1] The system of claim 5, wherein: the web server communicates with user devices via a first network port of a computing device executing the web server; and*

69. A POSITA would recognize that Kahn discloses web server is configured to communicate with user devices via a first network port of a computing device executing the web server, as recited in the '014 Patent, because Kahn discloses that the server communicates using communication components known in the art that would include a first network port. Ex. 1005, 10:54-56, 23:29-30. Therefore, Kahn discloses this limitation of the '014 Patent.

> *[6.2] the site server communicates with facilities via a second network port of the computing device, the second network port being different from the first network port.*

70. A POSITA would recognize that Kahn discloses site server configured to communicate via a second network port, as recited in the '014 Patent, because Kahn discloses that sensor units 110 communicate using communication components known in the art that would include a second network port. Ex. 1005,

10:54-56, 23:29-30. Therefore, Kahn discloses this limitation of the '014 Patent. As such, Claim 6 is anticipated by Kahn, or would be obvious to a POSITA in view of Kahn.

e. Claim 7

> *[7] The system of claim 1, wherein: the data store stores subscription information associated with at least some of the accounts.*

71. A POSITA would recognize that Kahn discloses the data store is configured to store subscription information associated with at least some of the accounts, as recited in the '014 Patent Ex. 1005, 22:12-44. Therefore, Kahn discloses this limitation of the '014 Patent. As such, Claim 7 is anticipated by Kahn, or would be obvious to a POSITA in view of Kahn.

f. Claim 8

> *[8] The system of claim 1, wherein the facility-interface module or modules comprise: means for interfacing with a plurality of site controllers associated with the facilities.*

72. A POSITA would recognize that Kahn discloses the facility-interface module or modules comprise: means for interfacing with a plurality of site controllers associated with the facilities as recited in the '014 Patent. *See, e.g.*, Ex. 1005, 5:62-6:2, 9:37-43, 10:18-67, 13:46-52, 17:18-30, 18:40-19:2, 19:5-20:39, 22:12-20, 23:22-50, FIG. 1A, FIG. 3. Kahn further discloses that sensor unit 110 includes communication equipment with actuators configured to manipulate fluid flow at respective fluid-handling facilities. *See, e.g.*, Ex. 1005, 10:62-67; *see also*

id., 14:35-15:2, 15:62-16:32. Therefore, Kahn discloses this limitation of the '014 Patent. As such, Claim 8 is anticipated by Kahn, or would be obvious to a POSITA in view of Kahn.

g. Claim 9

> *[9] The system of claim 1, wherein the web-interface module or modules comprise: means for sending instructions to present a control interface on the user devices.*

73. A POSITA would recognize that Kahn discloses a GUI control interfaces on a user computer device for reviewing data from the system's sensor or sending commands to control fluid handling system actuators, as recited in the '014 Patent. Ex. 1005, Abstract, 1:28-36, 2:50-3:2, 25:5-25, 25:48-26:19, 28:8-25, 29:5-37. Kahn further discloses that sensor unit 110 includes communication equipment with actuators configured to manipulate fluid flow at respective fluid-handling facilities, to facilitate the measurement of data requested through the graphical user interface. *See, e.g.*, Ex. 1005, 10:62-67; *see also* Ex. 1005, 14:35-15:2, 15:62-16:32.. Therefore, Kahn discloses this limitation of the '014 Patent. As such, Claim 9 is anticipated by Kahn, or would be obvious to a POSITA in view of Kahn.

h. Claim 11

> *[11] The system of claim 1, wherein the facility-interface module or modules are configured to send pull requests to facilities to retrieve data buffered at the facilities.*

74. A POSITA would recognize that Kahn discloses the facility-interface module or modules are configured to send pull requests to facilities to retrieve data buffered at the facilities upon the request of a user, as recited in the '014 Patent. See, e.g., Ex. 1005, 10:62-67; see also Ex. 1005, 14:35-15:2, 15:62-16:32.

75. As such, Claim 11 is anticipated by Kahn, or would be obvious to a POSITA in view of Kahn.

i. Claim 12

> *[12] The system of claim 1, comprising: a controller at one of the facilities communicatively coupled to an actuator or a sensor.*

76. A POSITA would recognize that Kahn discloses the addresses for facilities accessible by the network, as well as the monitoring and control equipment as recited in the '014 Patent. *See, e.g.*, Ex. 1005, 5:62-6:16, 9:37-43, 10:18-67, 13:46-52, 17:18-30, 18:40-19:2, 19:5-20:39, 22:12-20, 23:22-50, FIG. 1A, FIG. 3.

77. Kahn discloses monitoring and control equipment including one or more actuators configured to manipulate fluid flow at respective fluid-handling facilities. *See, e.g.*, Ex. 1005, 10:62-67; *see also* Ex. 1005, 14:35-15:2 ("one or more actuators"), 15:62-16:32 (describing an actuator for each sensor 111). Therefore,

Kahn discloses this limitation of the ’014 Patent. As such, Claim 12 is anticipated by Kahn, or would be obvious to a POSITA in view of Kahn.

j. Claim 13

> *[13.1] The system of claim 12, wherein the system is configured to instantiate at least four of the following as distinct threads from one another:*

78. A POSITA would readily recognize that Kahn discloses software applications written or described in any appropriate computer language including HTML, Java, and XML, among others. Ex. 1005, 28:8-26, *see also id.*, 33:31-43.

79. The ’014 Patent’s specification lacks disclosure of “instantiation” and fails to provide any details regarding “threads,” aside from reciting the term and use of JavaScript instructions. Ex. 1001, 3:53-54, 8:22-39.

80. A POSITA would readily recognize that Kahn inherently discloses instantiation of threads, and the various thread implementations recited in Claim 13, through computer coding in computer languages such as Java. “Instantiation” is a programming term referring to the creation of a new parameter type within the code. Ex. 1008, p.894 (“the point at which a generic type is applied by supplying actual or wildcard types as its type parameters. A generic type is instantiated by the user of the type, effectively creating a new type in the Java language specialized for the parameter types”); see also Ex. 1007, p.226. Essentially, instantiation creates a new container for a particular object class, such as arrays, stacks, queues, and lists. See,

e.g., Ex. 1007, p.226; Ex. 1008, p.894, Ex. 1009, p.17 (“in order to create a separate thread of control, an instance of the Thread class is still needed, but it will be instantiated with a reference to our . . . object.”), p.128 (“we need to allow only one instance of the class to be instantiated. We'll do this by creating a static variable in the class and testing it to make sure that an instance of the CPUScheduler class doesn't already exist.”). “Instantiation” is used to describe creation of a parameter in many different programming languages, including C++ and, in particular here, Java. *Id*.. A POSITA would recognize that Kahn inherently discloses instantiation of threads, and the various thread implementations recited in Claim 26, through computer coding in computer languages such as Java. Java makes threads easy to use because support for them is built into the language. Ex. 1008, p.14, p.60(“A thread is a separate flow of control within a program. Conceptually, threads are similar to processes. Unlike processes, multiple threads share the same program space, which means that they can share variables and methods (but also have their own local variables). Threads provide efficient multiprocessing and distribution of tasks for both client and server applications. Id. Threads are also quite lightweight in comparison to processes, so it’s conceivable for a single application to be running many (perhaps hundreds or thousands) of threads concurrently.”), see also Ex. 1008, p.247-297. “Threads aren't a new idea: many operating systems and languages support them.” Ex. 1009, p.Preface (“it's impossible to write anything but the

simplest applet without encountering threads. If you want to work with Java, you have to learn about threads"), pp.5-11.

[13.2] a thread configured to sends and receive data requests;

81. A POSITA would readily recognize that Kahn inherently discloses a thread configured to send and receive data requests, as recited in the '014 Patent, from its disclosure of software or applications written in then-current computer languages, including Java. Using threads in Java to send and receive data is well known. Ex. 1008, pp.389-433, Ex. 1009, pp.9-10, 33-34, 60-63.; *see, e.g.*, Ex. 1005, 8:51-59, 9:53-58, 17:18-30, 18:48-52, 63-65, 19:5-23, 19:58-65, 23:27-31. Therefore, Kahn discloses this limitation of the '014 Patent.

[13.3] a thread configured to synchronize other threads with updated information;

82. A POSITA would recognize that Kahn inherently discloses a thread configured to synchronize other threads with updated information, as recited in the '014 Patent, from its disclosure of software or applications written in then-current computer languages, including Java. "In most cases, threads need to be synchronized." Ex. 1008, p.p14-15, 193 ("versions of wait( ) and notify( ) that are used to synchronize threads on object instances,"), 264-266, 893-894 ("synchronized A keyword used in two related ways in Java: as a modifier and as a statement. First, it is a modifier applied to class or instance methods. It indicates that the method

modifies the internal state of the class or the internal state of an instance of the class in a way that is not thread-safe. Before running a synchronized class method, Java obtains a lock on the class, to ensure that no other threads can modify the class concurrently. Before running a synchronized instance method, Java obtains a lock on the instance that invoked the method, ensuring that no other threads can modify the object at the same time. Java also supports a synchronized statement that serves to specify a "critical section" of code. The synchronized keyword is followed by an expression in parentheses and a statement or block of statements. The expression must evaluate to an object or array. Java obtains a lock on the specified object or array before executing the statements."); Ex. 1009, pp.31-63, 137-161. Therefore, Kahn discloses this limitation of the '014 Patent.

[13.4] a thread configured to set a target state of actuators;

83. Kahn discloses that sensor unit 110 includes communication equipment with actuators configured to manipulate fluid flow by setting a target state for actuators at respective fluid-handling facilities. *See, e.g.*, Ex. 1005, 8:3-11, 8:21-24, 10:62-67; *see also id.*, 14:35-15:2, 15:62-16:32, 34:7-12.

84. A POSITA would readily recognize that Kahn inherently discloses a thread configured to set a target state of actuators, as recited in the '014 Patent, from its disclosure of software or applications written in then-current computer languages, including Java. Java enables threads for software implementations to enable device

functionality across many device platforms. See, e.g., Ex. 1008, p.4 ("Java continues to spread on both high- and low-end platforms. As we begin looking at the Java architecture, you'll see that much of what is exciting about Java comes from the self-contained, virtual machine environment in which Java applications run. Java has been carefully designed so that this supporting architecture can be implemented either in software, for existing computer platforms, or in customized hardware, for new kinds of devices. Sun and other industry giants are producing fast Java chips and microprocessors tailored to run media-rich Java applications. Hardware implementations of Java are currently used in smart cards and other embedded systems. Today you can buy "wearable" devices, such as rings and dog tags, that have Java interpreters embedded in them. Software implementations of Java are available for all modern computer platforms down to portable computing devices, such as the popular Palm PDA. Java is also becoming standard equipment on many new cell phones."), Ex. 1009, p.31 (exemplary flow chart for software controlling ATM machine withdraws including checking values—operator cash balance—and hardware activities such as dispersing cash and printing receipt). Therefore, Kahn discloses this limitation of the '014 Patent.

[13.5] a thread configured to obtain updated sensor readings;

85. Kahn discloses a data collection network with centralized data collection points. *See, e.g.*, Ex. 1005, 8:51-59, 9:53-58, 17:18-30, 18:48-52, 63-65,

19:5-23, 19:58-65, 23:27-31. Kahn discloses that the centralized data collection points receive sensor information via a network from a facility interface module, Sensor unit 110. *See, e.g.*, *id.*, 5:62-6:2, 9:37-43, 10:18-67, 13:46-52, 17:18-30, 18:40-19:2, 19:5-20:39, 22:12-20, 23:22-50, FIG. 1A, FIG. 3. A POSITA would recognize that Kahn inherently discloses a thread configured to obtain updated sensor readings, as recited in the '014 Patent, from its disclosure of software or applications written in then-current computer languages, including Java. Java enables threads for software implementations to enable device functionality across many device platforms. See, e.g., Ex. 1008, p.4 ("Java continues to spread on both high- and low-end platforms. As we begin looking at the Java architecture, you'll see that much of what is exciting about Java comes from the self-contained, virtual machine environment in which Java applications run. Java has been carefully designed so that this supporting architecture can be implemented either in software, for existing computer platforms, or in customized hardware, for new kinds of devices. Sun and other industry giants are producing fast Java chips and microprocessors tailored to run media-rich Java applications. Hardware implementations of Java are currently used in smart cards and other embedded systems. Today you can buy "wearable" devices, such as rings and dog tags, that have Java interpreters embedded in them. Software implementations of Java are available for all modern computer platforms down to portable computing devices,

such as the popular Palm PDA. Java is also becoming standard equipment on many new cell phones."), Ex. 1009, p.31 (exemplary flow chart for software controlling ATM machine withdraws including checking values—operator cash balance—and hardware activities such as dispersing cash and printing receipt). Therefore, Kahn discloses this limitation of the '014 Patent.

[13.6] a thread configured to process user interactions; and

86. A POSITA would recognize that Kahn inherently discloses a thread configured to process user interactions, as recited in the '014 Patent, from its disclosure of software or applications written in then-current computer languages, including Java. Ex. 1008, pp.2 ("Java has Swing, one of the most sophisticated toolkits for building graphical user interfaces (GUIs) in any language. This development has allowed Java to become a popular platform for developing traditional client-side application software."), 14, 38, 552-661 ("Swing is Java's graphical user interface toolkit"), Ex. 1009, pp.9-10, 31-33, 88, 114-116.. Therefore, Kahn discloses this limitation of the '014 Patent.

[13.7] a thread that eliminates other threads upon detecting a problem with the eliminated threads

87. A POSITA would recognize that Kahn inherently discloses a thread that eliminates other threads upon detecting a problem with the eliminated threads, as recited in the '014 Patent, from its disclosure of software or applications written

in then-current computer languages, including Java. Java includes commands for eliminating threads. Ex. 1008, pp.251 ("method called stop( ), which kills the thread permanently."), 255-261 (describing various ways threads are managed, put to sleep, or eliminated); Ex. 1009, pp.205-207 (discussion of stopping thread). Therefore, Kahn discloses this limitation of the '014 Patent. Therefore, a POSITA would understand that Kahn inherently discloses the elements recited in Claim 13.

88. As such, Claim 13 is anticipated by Kahn, or would be obvious to a POSITA in view of Kahn.

k. Claim 14

[14.1] The system of claim 12, wherein the system is configured to instantiate at least two of the following as distinct threads from one another:

89. A POSITA would readily recognize that Kahn discloses software applications written or described in any appropriate computer language including HTML, Java, and XML, among others. Ex. 1005, 28:8-26, see also Ex. 1005, 33:31-43. Kahn inherently discloses instantiating the recited thread in element 14.1, or this limitation would be obvious to a POSITA in view of Kahn, as discussed above for these elements in Claim 13 and incorporated herein.

[14.2] a thread configured to sends or receive data request;

90. A POSITA would readily recognize that Kahn discloses software applications written or described in any appropriate computer language including

HTML, Java, and XML, among others. Ex. 1005, 28:8-26, see also Ex. 1005, 33:31-43. Kahn inherently discloses instantiating the recited thread in element 14.2, or this limitation would be obvious to a POSITA in view of Kahn, as discussed above for these elements in Claim 13 and incorporated herein.

[14.3] a thread configured to synchronize other threads with updated information;

91. A POSITA would readily recognize that Kahn discloses software applications written or described in any appropriate computer language including HTML, Java, and XML, among others. Ex. 1005, 28:8-26, see also Ex. 1005, 33:31-43. Kahn inherently discloses instantiating the recited thread in element 14.3, or this limitation would be obvious to a POSITA in view of Kahn, as discussed above for these elements in Claim 13 and incorporated herein.

[14.4] a thread configured to set a target state of actuators;

92. A POSITA would readily recognize that Kahn discloses software applications written or described in any appropriate computer language including HTML, Java, and XML, among others. Ex. 1005, 28:8-26, see also Ex. 1005, 33:31-43. Kahn inherently discloses instantiating each and the recited thread in element 14.4, or this limitation would be obvious to a POSITA in view of Kahn, as discussed above for these elements in Claim 13 and incorporated herein.

[14.5] a thread configured to obtain updated sensor readings;

93. A POSITA would readily recognize that Kahn discloses software applications written or described in any appropriate computer language including HTML, Java, and XML, among others. Ex. 1005, 28:8-26, see also Ex. 1005, 33:31-43. Kahn inherently discloses instantiating each and every one of specifically recited threads in elements 14.5, or this limitation would be obvious to a POSITA in view of Kahn, as discussed above for these elements in Claim 13 and incorporated herein.

[14.6] a thread configured to process user interactions; and

94. A POSITA would readily recognize that Kahn discloses software applications written or described in any appropriate computer language including HTML, Java, and XML, among others. Ex. 1005, 28:8-26, see also Ex. 1005, 33:31-43. Kahn inherently discloses instantiating each and every one of specifically recited threads in elements 14.6, or this limitation would be obvious to a POSITA in view of Kahn, as discussed above for these elements in Claim 13 and incorporated herein.

[14.7] a thread that eliminates other threads upon detecting a problem with the eliminated threads.

95. A POSITA would readily recognize that Kahn discloses software applications written or described in any appropriate computer language including HTML, Java, and XML, among others. Ex. 1005, 28:8-26, see also Ex. 1005, 33:31-43. Kahn inherently discloses instantiating the recited thread in

element 14.7, or this limitation would be obvious to a POSITA in view of Kahn, as discussed above for these elements in Claim 13 and incorporated herein.

l. Claim 15

> *[15] The system of claim 12, wherein the controller is communicatively coupled to the actuator or sensor via a private local area network.*

96. A POSITA would recognize that Kahn discloses communicating with a controller at one of the facilities to control and actuator or read from a sensor via a private local area network. Ex. 1005, 10:18-48, 19:34-57. As such, Claim 15 is anticipated by Kahn, or would be obvious to a POSITA in view of Kahn.

m. Claim 16

> *[16] The system of claim 12, wherein controller is communicatively coupled to the actuator or sensor via a frame-based carrier-sense multiple access protocol with collision detection.*

97. 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, e.g.,* https://www.trendmicro.com/vinfo/hk-en/security/definition/protocol-gateway.

98. 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

99. 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.

100. 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.

101. 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.

102. 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

103. 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

104. 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.

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

106. A POSITA would recognize that Kahn discloses a frame-based carrier-sense multiple access protocol with collision detection because a POSITA would know that frame-based carrier-sense multiple access protocol with collision detection, as recited in the '014 Patent, is an Ethernet networking technology.

107. A POSITA would recognize that Kahn discloses communicating with a controller at one of the facilities to control and actuator or read from a sensor via a private local area network that uses a frame-based carrier-sense multiple access protocol with collision detection.

108. As such, Claim 16 is anticipated by Kahn, or would be obvious to a POSITA in view of Kahn.

n. Claim 17

> *[17] The system of claim 12, wherein controller is configured to periodically push buffered data to the facility-interface module or modules.*

109. A data buffer is a reserved segment of memory (RAM) within a program that is used to hold the data being processed. Buffers are set up in every program to hold data coming in and going out. In a video streaming application, the program uses buffers to store an advance supply of video data to compensate for momentary delays. Applications may be able to allocate and deallocate buffers from the general memory pool. In a printer and other peripherals, fixed buffers provide temporary storage for data passing through. See https://www.pcmag.com/encyclopedia/term/buffer.

110. A POSITA would recognize that Kahn discloses buffering data from sensors with the controller and pushing, with the controller, buffered data to the facility-interface module or modules.

o. Claim 18

> *[18] system of claim 12, comprising: means for ensuring at least some data is not lost if network access ceases intermittently.*

111. Gutierrez discloses that Controller 130 is communicably coupled to the motor controller 115 and provides microprocessor-based control of the motor controller 115 and thus motor 110 and pump 105 . . . a communication module 140,

a translation module 145, motor driver, data acquisition, data storage, and a processor 150. Ex. 1006, 8:16-21.

112. Kahn discloses that data collection can run in real time, and can continuously, or intermittently (e.g., periodically at pre-set time intervals) monitor fluid quality, or upon inquiry, or operate based on stored data at the sensor sites 110A-110F, depending on the data storage and communication capabilities of the sensor units 110. Ex. 1005, 19:24-33; 29:47-50 ("If a wireless communication is not currently available, the measurement can be stored in the handheld unit until a wireless link is established.").

113. A POSITA would recognize that Kahn discloses steps for ensuring at least some data is not lost if network access ceases intermittently, because sensor units 110 include data storage and allow for intermittent transmission of data.

114. As such, Claim 18 is anticipated by Kahn, or would be obvious to a POSITA in view of Kahn.

p. Claim 21

> *[21] The system of claim 12, comprising: means for transmitting data to the facility-interface module or modules.*

115. Kahn discloses a system that includes a remote computing system with a processor displaying a graphical user interface (GUI) showing data from the system's sensors. Ex. 1005, Abstract, 1:28-36, 2:50-3:2, 25:5-25, 25:48-26:19, 28:8-

25, 29:5-37. Kahn discloses a facility interface module, sensor unit 110, including a processor that connects via a network to centralized data collection points. *See, e.g.*, Ex. 1005, 5:62-6:2, 9:37-43, 10:18-67, 13:46-52, 17:18-30, 18:40-19:2, 19:5-20:39, 22:12-20, 23:22-50, FIG. 1A, FIG. 3. Kahn further discloses that sensor unit 110 includes communication equipment with actuators configured to manipulate fluid flow at respective fluid-handling facilities. *See, e.g.*, Ex. 1005, 10:62-67; *see also* Ex. 1005, 14:35-15:2, 15:62-16:32

116. A POSITA would recognize that Kahn discloses the control interfaces on a user computer device sending commands to control fluid handling system actuators, as recited in the '014 Patent.

117. Therefore, Kahn discloses anticipates claim 21 or would be obvious to a POSITA in view of Kahn.

q. Claim 22

> *[22] The system of claim 12, comprising: means for checking validity of a command.*

118. Kahn discloses verification of data collected based on a command. Ex. 1005, 29:40-50 ("The fluid test data associated with a given measurement can be initiated by a suitable push-button stroke and/or navigating a suitable menu on the display of the sensor unit. When the measurement is completed it can be "accepted" by a suitable menu navigation and/or push button stroke. When accepted, the measurement result is automatically transmitted via wireless communication to the

computer system 4 (see FIG. 5) along with the handheld sensor unit's unique identifier."); 32:10-17 ("some sources can be locked out, such that data from those sources is recorded but is not regarded as accepted data for general visualization, some sources can be flagged as needing approval before their data is accepted for general visualization, and some sources can be flagged as certified such that their data is accepted for visualization without approval.")

119. A POSITA would recognize that Kahn discloses the means for checking validity of a command because Kahn discloses checking the validity of data resulting from a command, as recited in the '014 Patent.

120. Therefore, Kahn discloses this limitation of the '014 Patent. As such, Claim 22 is anticipated by Kahn, or would be obvious to a POSITA in view of Kahn.

r. Claim 23

> *[23] The system of claim 12, comprising: an oil or gas facility communicatively coupled to the controller.*

121. Kahn discloses hosted, web-based, remote industrial monitoring and control system for geographically distributed facilities. *See, e.g.,* Ex. 1005, Abstract, 10:62-67; 14:35-15:2, 15:62-16:32; 2:50-54, 25:5-12. Kahn discloses that its invention "can be used in conjunction with other fluids, such as natural gas." Ex. 1005, 17:67-18:2. As such, Claim 23 is anticipated by Kahn, or would be obvious to a POSITA in view of Kahn.

2. Ground 2: Gutierrez Anticipates Claims 1-5, 8-9, 12-16, 18-21 and 23 or Would Be Obvious In View of Gutierrez.

122. Independent Claim 1 and dependent Claims 2-5, 8-9, 12-16, 18-21, and 23 are obvious to a POSITA over U.S. Patent No. 7,424,399 ("Kahn") in view of U.S. Patent 9,709,995 ("Gutierrez") under 35 U.S.C. § 103.

123. The disclosures of Kahn for each claim challenged under Ground 1, above, are incorporated by reference into each challenged claim herein

124. A POSITA would be motivated to combine Gutierrez and Kahn. *See Allergan, Inc. v. Sandoz, Inc.*, 726 F.3d 1286, 1292 (Fed. Cir. 2013); *Alza Corp. v. Mylan Labs., Inc.*, 464 F.3d 1286, 1294 (Fed. Cir. 2006) (motivation to combine may be implicitly stated in the prior art and supported by the testimony of an expert witness regarding knowledge of a POSITA). As I explain in my declaration, combining Gutierrez and Kahn would have been obvious to try because both references describe similar systems for remote monitoring and control of fluid handling facilities.

125. A POSITA would have referred to Gutierrez for its disclosure of a general fluid handling system for oil and oil extraction wastewater storage and transport, which allows remote users to monitor and control fluid handling facilities. Ex. 1006, 1:26-27. A POSITA would understand that the pipelines and transport systems of Gutierrez would involve multiple operators and site geographically dispersed site locations, each responsible for the efficient and safe operation of the

fluid handling systems. A POSITA would further understand that supervisors, regulators, etc. would require access to data from the systems, thus different levels of access to data or control of the fluid handling systems would be expected by a POSITA.

126. A POSITA would have referred to Kahn, and its disclosure of specific user differentiation features for fluid handling facilities, with different users having specified access only to designated data or controls. A POSITA would also recognize that Kahn's disclosure similarly relates to gas facilities. Ex. 1005, 17:67-18:2.

127. A POSITA would have been motivated to combine Gutierrez and Kahn because Kahn provides additional detailed disclosure regarding user differentiation, which a POSITA would implement as a standard security practice in any remote systems having multiple facilities and users. Differentiating the access allowed to different users, and limiting user's access to only designated facilities and functions, would motivated a POSITA to combine Gutierrez and Kahn to achieve the security, efficiency, and safety benefits limiting access provides across the system.

128. Combining Gutierrez and Kahn would lead to predictable results of users of the systems and methods of Gutierrez having predetermined levels of access to view data or control only designated systems. A POSITA would not have difficulty combining Gutierrez and Kahn, because Gutierrez and Kahn do not

describe alternative systems or methods, but rather the disclosure of Kahn merely provides additional detail rather than a different approach to solving problems in the underlying technology.

a. Claim 1

[1.1] A hosted, web-based, remote industrial monitoring and control system for geographically distributed facilities in oil and gas fields, the system comprising:

129. A POSITA would readily recognize that Gutierrez discloses a hosted, web-based, remote industrial monitoring and control system for geographically distributed facilities in oil and gas fields. *See, e.g.*, Ex. 1006, Abstract, 1:14-50. Thus, Gutierrez discloses the recited system. Thus, Gutierrez discloses the recited system.

[1.2] a computer-implemented datastore storing:

130. Gutierrez discloses that chemical injection system 100 may be utilized in a hydrocarbon production system, such as, for example, a field or area having one or more hydrocarbon (e.g., oil, natural gas) production sites. Ex. 1006, 6:55-7:2. Chemical injection system 100 includes a pump 105 mechanically coupled to a driver, such as a motor 110; a motor controller 115; and a controller 130. Ex. 1006, 6:46-49. Controller 130 provides microprocessor-based control of the motor controller 115 and thus motor 110 and pump 105. Ex. 1006, 8:15-19. Controller 130 includes a communication module 140, data acquisition, data storage, and a

processor 150. Ex. 1006, 8:19-21; *see also id.*, 8:39-9:3. A POSITA would recognize that Gutierrez discloses controller 130 that includes a processor and data storage for records related to hydrocarbon production facilities. Therefore, Gutierrez discloses this element of the '014 Patent.

> *[1.3] a plurality of accounts, each account corresponding to an entity operating one or more geographically distributed oil or gas facilities, the accounts associating different oil or gas facilities with different entities; and*

131. Gutierrez discloses chemical injection system 100 in a hydrocarbon production system, such as, for example, a field or area having one or more hydrocarbon (e.g., oil, natural gas) production sites. Ex. 1006, 6:55-7:2; *see also* Ex. 1006, 5:22-26; 6:24-27; 10:22-38. Gutierrez discloses that the production sites are unique, disclosing control systems for "each." Ex. 1006, 6:28-35; 10:22-24, 10:34-38, 10:43-59 ("data may be wirelessly transmitted directly to each chemical injection system . . . some or all of the processing of data and command generation may occur at the remote control center 220 rather than each individual chemical injection system 220."), 11:55-61 ("each computer 305 may monitor, receive data from, and/or generate commands transmitted to a single chemical injection system 310 or multiple chemical injection systems 310."), 11:62-12:3, 13:10-26 ("a user or operator may utilize the GUI 315 to control one or more components of the chemical injection system 310"); Claim 1.

132. Gutierrez discloses a hydrocarbon transmission system including one or more chemical injection systems for relative distances between production sites and pipeline monitoring locations in order to efficiently inject chemical additives into the system without waste. Ex. 1006, 5:22-31; *see also id.*, 3:49-4:4, 4:50-63, 6:24-44 ("a hydrocarbon transmission system includes a pipeline adapted to enclose a fluid transmitted from a plurality of hydrocarbon production sites to a processing site and a plurality of chemical injection systems"), 6:45-58, 10:22-24 ("System 200 includes one or more hydrocarbon production sites 215, each of which is fluidly coupled to a pipeline 205."), and 11:37-42.

133. A POSITA would recognize that Gutierrez discloses a plurality of accounts, namely geographically distributed fluid-handling facilities. A POSITA would further recognize from Gutierrez that the disclosed geographically distributed accounts associate fluid-handling facilities from different entities because Gutierrez discloses systems with multiple fluid-handling facilities, as well as geographically distributed systems with multiple types of fluid-handling facilities, including production sites and pipeline monitoring locations.

> *[1.4] network addresses by which industrial monitoring or control equipment at the facilities is accessible via cellular network connections, the monitoring or control equipment including sensors or actuators;*

134. Gutierrez discloses that the production sites are uniquely addressable by the network connection through individualized control systems for "each." Ex.

1006, 6:28-35; 10:22-24, 10:34-38, 10:43-59 (“data may be wirelessly transmitted directly to each chemical injection system . . . some or all of the processing of data and command generation may occur at the remote control center 220 rather than each individual chemical injection system 220.”), 11:55-61 (“each computer 305 may monitor, receive data from, and/or generate commands transmitted to a single chemical injection system 310 or multiple chemical injection systems 310.”), 11:62-12:3, 13:10-26 (“a user or operator may utilize the GUI 315 to control one or more components of the chemical injection system 310”); and Claim 1.

135. Gutierrez discloses monitoring and control equipment including sensors configured to measure fluid handled at respective fluid-handling facilities. Ex. 1006, 9:4-13 (“one or more electronic sensors monitoring the pipeline”); 9:21-25 (“wireless sensors may detect various operations parameters of the pipeline 120, such as line pressure and/or chemical concentrate”), 10:7-16 (“a wireless pressure sensor”), 10:40-46, and 13:12-17.

136. Gutierrez discloses monitoring and control equipment including actuators configured to manipulate fluid flow at respective fluid-handling facilities. *See, e.g.*, Ex. 1006, 6:45-8:38 (describing chemical injection system with controllers for activating pumps to manipulate fluid flow), 9:54-10:16, 11:62-12:29, 13:23-26.

137. Gutierrez discloses fluid-handling facilities having sets of both sensors and actuators. Ex. 1006, 6:45-7:2, 9:65-10:16, 10:17-11:4, 11:16-33, 11:55-61

("each computer 305 may monitor, receive data from, and/or generate commands transmitted to a single chemical injection system 310 or multiple chemical injection systems 310"), 13:9-26.

138. A POSITA would recognize that Gutierrez discloses the addresses for facilities and the monitoring and control equipment as recited in the '014 Patent. Therefore, Gutierrez discloses this limitation of the '014 Patent.

> *[1.5] a computer-implemented facility-interface module or modules configured to obtain data from the sensors at the facilities and send commands to the actuators at the facilities via the cellular network connections; and*

139. Gutierrez discloses fluid-handling facilities with computers or controllers that take data from sensors and send commands to actuators. Ex. 1006, 6:45-7:2, 8:16-38 ("controller 130 includes a communication module 140 . . . and a processor 150 . . . controller 130 receives inputs and/or instructions and commands from a remote source and, according to the commands, controls the operation and/or speed of the motor 110 and pump 105 to inject chemicals into the pipeline 120 . . . [and] receive[s] data representative of pipeline conditions, such as line pressure, amount of chemicals present in the pipeline 120, and motor operating conditions"), 9:65-10:16, 10:17-11:4, 11:16-33, 11:55-61 ("each computer 305 may monitor, receive data from, and/or generate commands transmitted to a single chemical injection system 310 or multiple chemical injection systems 310"), 13:9-26.

Gutierrez discloses that the controller connects wirelessly by cellular network connections. Ex. 1006, 12:30, 30:38-39.

140. A POSITA would recognize that Gutierrez discloses obtaining data with a facility interface module, with a processor, data from the sensors at the facilities and sending commands to the actuators at the facilities by the network connections as recited in the '014 Patent. Therefore, Gutierrez discloses this limitation of the '014 Patent.

> *[1.6] a computer-implemented web-interface module or modules configured to send instructions to present control interfaces in web browsers executing on user computing devices logged in to the accounts and to receive commands to control actuators from the user computing devices,*

141. Gutierrez discloses a remote computing system with a graphical user interface (GUI); a sensor coupled with a hydrocarbon transmission system; and a chemical injection system. Ex. 1006, 2:26-29. Gutierrez discloses that the computer used to manage the remote facilities includes a processor. Ex. 1006, 11:38-42 ("reference to the computer 305 includes any processor-based computing device that is operable to manipulate, display, receive, and/or transmit data, such as data associated with a wellsite, hydrocarbon piping system, or other hydrocarbon production facility.") Gutierrez discloses that the network used to communicate between devices in the system is an enterprise or secured network. Ex. 1006, 12:48-59.

142. Gutierrez discloses a user computing device that interfaces with the fluid handling system to send instructions to control actuators of the fluid handling system. Ex. 1006, 11:16-33 ("the system 300 includes a computer 305 displaying a graphical user interface (GUI) 315, one or more remote chemical injection systems 310"), 13:9-26 ("a user or operator may utilize the GUI 315 to control one or more components of the chemical injection system 310 based on data received from the system 310 and displayed on the GUI 315. For example, each chemical injection system 310 may include a number of wireless sensor devices operable to detect one or more operational parameters of the hydrocarbon stream within the pipeline. For instance, the system 310 may detect the relative amount of chemical additives injected into the pipeline . . . the data is communicated to the computer 305 via the communication stations 320, base transceiver 325, and communications network 330, where it is then processed. The computer 305 and/or a user operating the computer 305 may then issue commands to one or more of the chemical injection systems 310 . . . includ[ing] a command to stop injecting chemical additive into the pipeline and/or a command to inject a specified amount of chemical additive into the pipeline.").

143. A POSITA would recognize that Gutierrez discloses the control interfaces on a user computer device logged into by an authorized user sending

commands to control fluid handling system actuators, as recited in the ’014 Patent. Therefore, Gutierrez discloses this limitation of the ’014 Patent.

> *[1.7] wherein the system is configured to receive, with the web-interface module or modules, a user command to actuate an actuator entered via a presented control interface, identify a network address in the datastore corresponding to a facility at which the actuator is located, and send instructions with the facility-interface module or modules to the facility to actuate the actuator, and*

144. Gutierrez discloses a graphical user interface that receives the commands, and sends them to the fluid handling system. Ex. 1006, 11:16-33 (“the system 300 includes a computer 305 displaying a graphical user interface (GUI) 315, one or more remote chemical injection systems 310”), 13:9-26 (“a user or operator may utilize the GUI 315 to control one or more components of the chemical injection system 310 . . . . The computer 305 and/or a user operating the computer 305 may then issue commands to one or more of the chemical injection systems 310. Such commands may include a command to stop injecting chemical additive into the pipeline and/or a command to inject a specified amount of chemical additive into the pipeline.”).

145. Gutierrez discloses a graphical user interface that receives the commands, and sends them to the fluid handling system. Ex. 1006, 11:16-33 (“the system 300 includes a computer 305 displaying a graphical user interface (GUI) 315, one or more remote chemical injection systems 310”), 13:9-26.

146. Gutierrez discloses that the production sites are unique, disclosing separate control systems for "each." Ex. 1006, 6:28-35; 10:22-24, 10:34-38, 10:43-59 ("data may be wirelessly transmitted directly to each chemical injection system . . . some or all of the processing of data and command generation may occur at the remote control center 220 rather than each individual chemical injection system 220."), 11:55-61 ("each computer 305 may monitor, receive data from, and/or generate commands transmitted to a single chemical injection system 310 or multiple chemical injection systems 310."), 11:62-12:3, 13:10-26; Claim 1.

147. Gutierrez discloses user computing device interfaces with the fluid handling system to send instructions to control the actuators of the fluid handling system. Ex. 1006, 11:16-33 ("the system 300 includes a computer 305 displaying a graphical user interface (GUI) 315, one or more remote chemical injection systems 310"), 13:9-26 ("a user or operator may utilize the GUI 315 to control one or more components of the chemical injection system 310 . . . a user operating the computer 305 may then issue commands to one or more of the chemical injection systems 310. Such commands may include a command to stop injecting chemical additive into the pipeline and/or a command to inject a specified amount of chemical additive into the pipeline.").

148. A POSITA would readily recognize that Gutierrez discloses receiving with the user interface module a user command to actuate an actuator of the fluid handling system, as recited in the ’014 Patent.

149. A POSITA would readily recognize that Gutierrez discloses identifying an address in the datastore corresponding to the facility at which the actuator is located, as recited in the ’014 Patent, because the user controls “each” component of the chemical injection system with the disclosed GUI.

150. A POSITA would readily recognize that Gutierrez discloses sending instructions to the facility interface module to actuate the fluid handling system’s actuator, as recited in the ’014 Patent. A POSITA would recognize that Gutierrez discloses receiving with the user interface module a user command to actuate an actuator of the fluid handling system, as recited in the ’014 Patent.

151. A POSITA would recognize that Gutierrez discloses identifying an address in the datastore corresponding to the facility at which the actuator is located, as recited in the ’014 Patent, because the user controls “each” component of the chemical injection system with the disclosed GUI.

152. A POSITA would recognize that Gutierrez discloses sending instructions to the facility interface module to actuate the fluid handling system’s actuator, as recited in the ’014 Patent.

[1.8] wherein: the plurality of accounts include a first account, a second account, a third account, and a fourth account;

153. Kahn in view of Gutierrez renders obvious the disclosed plurality of accounts. Gutierrez discloses that its subject conduit systems carry and/or transport one or more fluids to insert other fluids (e.g., additives, inhibitors, or otherwise) into the conduit system, the carried fluids include hydrocarbon systems that transport hydrocarbon fluids, such as oil and/or gas or other fluids. Ex. 1006, 1:18-26.

154. A POSITA would readily recognize that the recited plurality of accounts from the disclosure of Gutierrez, because the system described by Gutierrez requires multiple systems and operational components to transport fluids through the described conduit system, geographically distributed across the distance for monitoring and controlling fluids transported through the pipeline.

155. A POSITA would readily recognize that Gutierrez's disclosure of geographically distributed and multiple types of operational components discloses multiple fluid handling facilities.

156. As described above and incorporated by reference herein, a POSITA would be motivated to combine the disclosures of Kahn and Gutierrez for elements 1.9-1.12. The disclosures for Kahn in Section 1, above, are fully incorporated by reference into the discussion of elements 1.9-1.12 herein. Kahn provides specific

details of multiple facility and user management to the general fluid handling system disclosures of Gutierrez.

157. A POSITA would recognize that the recited plurality of accounts from the disclosure of Gutierrez because the system described by Gutierrez requires multiple systems and operational components to transport fluids through the described conduit system, geographically distributed across the distance for monitoring and controlling fluids transported through the pipeline.

158. A POSITA would recognize that Gutierrez's disclosure of geographically distributed and multiple types of operational components discloses multiple fluid handling facilities.

159. As described above and incorporated by reference herein, a POSITA would be motivated to combine the disclosures of Kahn and Gutierrez for elements 1.9-1.12. The disclosures for Kahn in Section 1, above, are fully incorporated by reference into the discussion of elements 1.9-1.12 herein. Kahn provides specific details of multiple facility and user management to the general fluid handling system disclosures of Gutierrez.

> *[1.9] the first account corresponds to a first group of oil or gas facilities, users of the first account being authorized to send commands to remotely control fluid handling devices at the first group of oil or gas facilities;*

160. Gutierrez discloses users remotely controlling fluid handling devices, as discussed above for element 1.7 and incorporated herein. Gutierrez discloses that

the network used to communicate in the disclosed methods is an enterprise or secured network. Ex. 1006, 12:48-59.

161. 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. A POSITA would recognize that the disclosure in Gutierrez matches the relevant disclosure in the ’014 Patent. A POSITA would recognize that Kahn and Gutierrez both disclose secure systems where users only have designated access to authorized data or system controls.

162. As discussed above for limitation 1.8 and incorporated herein, a POSITA would recognize that Kahn in view of Gutierrez renders obvious the disclosed 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 ’014 Patent. Therefore, Gutierrez in combination with Kahn renders obvious this limitation of the ’014 Patent.

> *[1.10] the second account corresponds to a second group of oil or gas facilities, the first group being different from the second group, users of the second account being authorized to send commands to remotely control fluid handling devices at the second group of oil or gas facilities;*

163. Kahn in view of Gutierrez renders obvious the disclosed plurality of accounts with a second group of that plurality of accounts authorized to remotely control designated second fluid handling devices. A POSITA would recognize that

Kahn and Gutierrez both disclose secure systems where users only have designated access to authorized data or system controls.

164. As discussed above for limitation 1.9 and incorporated herein, a POSITA would readily recognize that Kahn in view of Gutierrez renders obvious a plurality of accounts including accounts in a second group with access permitted for control of a second designated group of devices, as recited in the '014 Patent. Therefore, Gutierrez in combination with Kahn renders obvious this limitation of the '014 Patent.

> *[1.11] the third account corresponds to the first group of oil or gas facilities, users of the third account being authorized to view reports of data from fluid handling devices at the first group of oil or gas facilities; and*

165. Kahn in view of Gutierrez renders obvious the disclosed plurality of accounts with a third group of that plurality of accounts authorized to remotely view data reports from designated first fluid handling devices.

166. Gutierrez discloses users remotely viewing data from designated fluid handling devices. For example, Gutierrez discloses monitoring and control equipment including sensors configured to measure fluid handled at respective fluid-handling facilities. Ex. 1006, 9:4-13 ("one or more electronic sensors monitoring the pipeline"); 9:21-25 ("wireless sensors may detect various operations parameters of the pipeline 120, such as line pressure and/or chemical concentrate"), 10:7-16 ("a wireless pressure sensor"), 10:40-46, 13:12-17.

167. Gutierrez discloses that the network used to communicate in the disclosed methods is an enterprise or secured network. Ex. 1006, 12:48-59.

168. A POSITA would readily recognize that enterprise or secured networks require individual users to login, and then users receive access only to designated systems, e.g. access to view data reports for a designated group of devices. A POSITA would readily recognize that the disclosure in Gutierrez matches the relevant disclosure in the ’014 Patent.

169. A POSITA would recognize that Kahn and Gutierrez both disclose secure systems where users only have designated access to authorized data or system controls.

170. As discussed above for limitations 1.8-1.10 and incorporated herein, a POSITA would readily recognize that Kahn in view of Gutierrez renders obvious the disclosed plurality of accounts including accounts in a third group permitted access to view data reports for a first designated group of devices, as recited in the ’014 Patent. Therefore, Gutierrez in combination with Kahn renders obvious this limitation of the ’014 Patent.

[1.12] the fourth account corresponds to the second group of oil or gas facilities, users of the fourth account being authorized to view reports of data from fluid handling devices at the second group of oil or gas facilities.

171. Kahn in view of Gutierrez renders obvious the disclosed plurality of accounts with a fourth group of that plurality of accounts authorized to remotely view data reports from a designated second fluid handling devices.

172. As discussed above for limitation 1.11 and incorporated herein, a POSITA would recognize that Kahn in view of Gutierrez renders obvious the disclosed plurality of accounts including accounts in a fourth group, as recited in the '014 Patent. Therefore, Gutierrez discloses this limitation of the '014 Patent.

173. A POSITA would recognize that Kahn and Gutierrez both disclose secure systems where users only have designated access to authorized data or system controls.

174. A POSITA would recognize that Kahn in view of Gutierrez renders obvious the disclosed plurality of accounts including accounts in a fourth group permitted access to view data reports for a second designated group of devices, as recited in the '014 Patent. Therefore, Gutierrez in combination with Kahn renders obvious this limitation of the '014 Patent.

175. As such, Claim 1 would be obvious to a POSITA over Kahn in view of Gutierrez.

b. Claim 2

> *[2.1] The system of claim 1, wherein the sensors include a tank level sensor of a tank at one of the facilities, and wherein the datastore includes a record associating the tank with the facility, data from the tank being unavailable to users without an account associated with the tank, and wherein the accounts:*

176. Gutierrez discloses level sensors for chemical reservoirs. Ex. 1006, 12:65-13:8 ("the GUI 315 may display a level of a chemical reservoir at the chemical injection system 310"). Gutierrez discloses sensor readings of fluidic pressure and fluidic storage level. Ex. 1006, 13:27-49 ("One or more of GUIs 400, 410, 420, and 430 may be displayed on the computer 305 in place of or in addition to GUI 315. . . . GUI 400 provides information related to . . . fluidic pressure of fluid flowing through the pipeline and/or from chemical reservoir; fluidic storage level of the chemical reservoir").

177. Gutierrez discloses separate control systems for "each" system. Ex. 1006, 6:28-35; 10:22-24, 10:34-38, 10:43-59 ("data may be wirelessly transmitted directly to each chemical injection system . . . some or all of the processing of data and command generation may occur at the remote control center 220 rather than each individual chemical injection system 220."), 11:55-61 ("each computer 305 may monitor, receive data from, and/or generate commands transmitted to a single chemical injection system 310 or multiple chemical injection systems 310."), 11:62-

12:3, 13:10-26 (“a user or operator may utilize the GUI 315 to control one or more components of the chemical injection system 310”); Claim 1.

178. Gutierrez discloses that the network used to communicate in the disclosed methods is an enterprise or secured network. Ex. 1006, 12:48-59.

179. A POSITA would readily recognize that Gutierrez disclosure of a level sensor of fluid in a reservoir, would sense the level of fluid within a particular tank, as recited in the ’014 Patent.

180. A POSITA would readily recognize that Gutierrez discloses sensor readings associated with a specific facility sensor, such as on a tank within a given facility, as recited in the ’871 Patent.

181. A POSITA would readily recognize that enterprise or secured networks require individual users to login, and that users receive access only to designated systems, e.g. data from a specific facility will be unavailable to users without an account associated with that facility.

> *[2.2] designate oil or gas facilities to which a given user is authorized to send the user command to actuate the actuator.*

182. Gutierrez discloses users remotely controlling fluid handling devices, as discussed above for element 1.7 and incorporated herein.

183. Gutierrez discloses separate control systems for “each” system. Ex. 1006, 6:28-35; 10:22-24, 10:34-38, 10:43-59 (“data may be wirelessly transmitted

directly to each chemical injection system . . . some or all of the processing of data and command generation may occur at the remote control center 220 rather than each individual chemical injection system 220."), 11:55-61 ("each computer 305 may monitor, receive data from, and/or generate commands transmitted to a single chemical injection system 310 or multiple chemical injection systems 310."), 11:62-12:3, 13:10-26 ("a user or operator may utilize the GUI 315 to control one or more components of the chemical injection system 310"); Claim 1.

184. Gutierrez discloses that the network used to communicate in the disclosed methods is an enterprise or secured network. Ex. 1006, 12:48-59.

185. A POSITA would readily recognize that enterprise or secured networks require individual users to login, and then users receive access only to designated systems, e.g. access to control a designated group of devices.

186. A POSITA would recognize that Kahn and Gutierrez both disclose secure systems where users only have designated access to authorized data or system controls.

187. A POSITA would readily recognize Kahn in view of Gutierrez renders obvious the designated oil or gas facilities to which a given user is authorized to send the user command to actuate the actuator, as recited in the '014 Patent. Therefore, Gutierrez in combination with Kahn renders obvious this limitation of the '014

Patent. As such, Claim 2 would be obvious to a POSITA over Kahn in view of Gutierrez.

c. Claim 3

> *[3] The system of claim 1, wherein the sensors include a level sensor of an oil/water separation tank at one of the facilities configured to indicate a level at which oil meets water, and wherein the datastore includes a record associating the tank with the facility.*

188. Gutierrez discloses level sensors for chemical reservoirs. Ex. 1006, 12:65-13:8 ("the GUI 315 may display a level of a chemical reservoir at the chemical injection system 310; power capacity and/or availability of a pump motor at the chemical injection system 310; one or more pump or pump motor characteristics (e.g., amps, current status, pressure, as well as other parameters)").

189. Gutierrez discloses sensor readings of fluidic pressure, fluidic storage level, and percentage of water content in the fluidic system. Ex. 1006, 13:27-49 ("One or more of GUIs 400, 410, 420, and 430 may be displayed on the computer 305 in place of or in addition to GUI 315. . . . GUI 400 provides information related to . . . fluidic pressure of fluid flowing through the pipeline and/or from chemical reservoir; fluidic storage level of the chemical reservoir; . . . and a percentage water content of fluid flowing through the pipeline.").

190. A POSITA would readily recognize that Gutierrez disclosure of a level sensor of fluid in a reservoir, as well as information regarding the percentage of

water in the fluidic system, constitutes a fluid level indicator for the oil/water partition level within a particular storage tank within a facility, as recited in the ’871 Patent.

191. Gutierrez discloses separate control systems for “each” system. Ex. 1006, 6:28-35; 10:22-24, 10:34-38, 10:43-59 (“data may be wirelessly transmitted directly to each chemical injection system . . . some or all of the processing of data and command generation may occur at the remote control center 220 rather than each individual chemical injection system 220.”), 11:55-61 (“each computer 305 may monitor, receive data from, and/or generate commands transmitted to a single chemical injection system 310 or multiple chemical injection systems 310.”), 11:62-12:3, 13:10-26 (“a user or operator may utilize the GUI 315 to control one or more components of the chemical injection system 310”); Claim 1.

192. A POSITA would readily recognize that Gutierrez discloses sensor readings associated with a specific facility sensor, such as on a tank within a given facility, as recited in the ’871 Patent.

193. As such, Claim 3 would be obvious to a POSITA over Kahn in view of Gutierrez.

d. Claim 4

> *[4] The system of claim 1, wherein the sensors include a leak detector at one of the facilities, and wherein the datastore includes a record associating the leak detector with the facility.*

194. Gutierrez discloses sensors for chemical reservoirs. Ex. 1006, 12:65-13:8 ("the GUI 315 may display a level of a chemical reservoir at the chemical injection system 310"), 13:27-49 ("GUI 400 provides information related to . . . fluidic pressure of fluid flowing through the pipeline and/or from chemical reservoir; fluidic storage level of the chemical reservoir").

195. Gutierrez discloses that when such sensed pressure falls below a minimum threshold, such as when a pipeline break occurs, the processor 150 may command the motor controller 115 to stop or reduce the speed of the motor 110 and pump 105 so that additional chemicals are not injected into the pipeline 120 and wasted. Ex. 1006, 10:11-16.

196. A POSITA would readily recognize that Gutierrez disclosure of pressure sensors used to detect leaks or breaks discloses a leak detector at a given facility with a record associated with the leak detector as Gutierrez discloses follow up actions taken by its described system when a leak is detected, as recited in the '014 Patent.

197. Therefore, a POSITA would understand that Gutierrez discloses every element recited in Claim 4. As such, Claim 4 would be obvious to a POSITA over Kahn in view of Gutierrez.

e. Claim 5

[5.1] The system of claim 1, wherein: the web-interface module or modules comprises a web server; and

198. Gutierrez discloses a remote computing system with a graphical user interface (GUI); a sensor coupled with a hydrocarbon transmission system; and a chemical injection system. Ex. 1006, 2:26-29, 11:38-42 ("reference to the computer 305 includes any processor-based computing device that is operable to manipulate, display, receive, and/or transmit data, such as data associated with a wellsite, hydrocarbon piping system, or other hydrocarbon production facility."). Gutierrez discloses that computer 305 is a server. Ex. 1006, 11:34-37.

199. A POSITA would recognize that Gutierrez discloses the web-interface module or modules comprises a web server, as recited in the '014 Patent. Therefore, Gutierrez discloses this limitation of the '014 Patent.

[5.2] the facility-interface module or modules comprises a site server distinct from the web server.

200. Kahn discloses a system with Sensor unit 110 that connects via a network to centralized data collection points. *See, e.g.*, Ex. 1006, 5:62-6:2, 9:37-43, 10:18-67, 13:46-52, 17:18-30, 18:40-19:2, 19:5-20:39, 22:12-20, 23:22-50, FIG. 1A,

FIG. 3. Kahn further discloses that the network of sensor units 110 can be configured to communicate with a central communication device, e.g., a server, and/or sensor unit 110 can communicate with each other as a distributed network. Ex. 1006, 10:54-56.

201. A POSITA would readily recognize that Kahn discloses the facility-interface module or modules is a site server, as recited in the '014 Patent, because sensor unit 110 can communicate with each other in a distributed network with each sensor unit 110 operating as a server. Therefore, Kahn discloses this limitation of the '014 Patent.

202. As such, Claim 5 would be obvious to a POSITA over Kahn in view of Gutierrez.

f. Claim 8

> *[8] The system of claim 1, wherein the facility-interface module or modules comprise: means for interfacing with a plurality of site controllers associated with the facilities.*

203. Gutierrez discloses monitoring and control equipment including sensors configured to measure fluid handled at respective fluid-handling facilities. Ex. 1006, 9:4-13; 9:21-25, 10:7-16, 10:40-46, 13:12-17. Gutierrez discloses monitoring and control equipment including actuators configured to manipulate fluid flow at respective fluid-handling facilities. *See, e.g.*, Ex. 1006, 6:45-8:38

(describing chemical injection system with controllers for activating pumps to manipulate fluid flow), 9:54-10:16, 11:62-12:29, 13:23-26.

204. Gutierrez discloses that the production sites are uniquely addressable by the network connection through individualized control systems for "each" facility. Ex. 1006, 6:28-35; 10:22-24, 10:34-38, 10:43-59, 11:55-61, 11:62-12:3, 13:10-26; Claim 1.

205. A POSITA would readily recognize that Gutierrez discloses means for interfacing with a plurality of site controllers associated with the facilities, as recited in the '014 Patent.

206. As such, Claim 8 would be obvious to a POSITA over Kahn in view of Gutierrez.

g. Claim 9

> *[9] The system of claim 1, wherein the web-interface module or modules comprise: means for sending instructions to present a control interface on the user devices.*

207. Gutierrez discloses a remote computing system where a user engages a graphical user interface (GUI) to access the capabilities of the system. Ex. 1006, 2:26-29. Gutierrez discloses that the user interacts with the GUI on a user computing device that interfaces with the fluid handling system to sends instructions to control actuators of the fluid handling system. Ex. 1006, 11:16-33, 13:9-26 ("a user or

operator may utilize the GUI 315 to control one or more components of the chemical injection system 310").

208. A POSITA would readily recognize that Gutierrez discloses means for sending instructions to present a control interface on the user devices, as recited in the '014 Patent. Therefore, Gutierrez discloses this limitation of the '014 Patent.

209. As such, Claim 9 would be obvious to a POSITA over Kahn in view of Gutierrez.

h. Claim 12

> *[12] The system of claim 1, comprising: a controller at one of the facilities communicatively coupled to an actuator or a sensor.*

210. Gutierrez discloses fluid-handling facilities having sets of both sensors and actuators. Ex. 1006, 6:45-7:2, 9:65-10:16, 10:17-11:4, 11:16-33, 11:55-61, 13:9-26. Gutierrez discloses monitoring and control equipment including actuators configured to manipulate fluid flow at respective fluid-handling facilities. *See, e.g.*, Ex. 1006, 6:45-8:38 (describing chemical injection system with controllers for activating pumps to manipulate fluid flow), 9:54-10:16, 11:62-12:29, 13:23-26.

211. Gutierrez discloses that the production sites are uniquely addressable by the network connection through individualized control systems for "each" facility. Ex. 1006, 6:28-35; 10:22-24, 10:34-38, 10:43-59, 11:55-61, 11:62-12:3, 13:10-26; Claim 1.

212. A POSITA would readily recognize that Gutierrez discloses a controller at one of the facilities communicatively coupled to an actuator or a sensor as recited in the ’014 Patent. Therefore, Gutierrez discloses this limitation of the ’014 Patent.

213. As such, Claim 12 would be obvious to a POSITA over Kahn in view of Gutierrez.

i. Claim 13

> *[13.1] The system of claim 12, wherein the system is configured to instantiate at least four of the following as distinct threads from one another:*

214. Kahn in view of Gutierrez renders obvious Claims 1 and 12 for the reasons discussed above and incorporated herein.

215. The disclosure of Kahn inherently anticipates, or renders obvious, the elements of Claim 13, as discussed above for Kahn in Claim 13 of Ground 1 and incorporated herein. A POSITA would also readily recognize that Gutierrez discloses software applications written or described in any appropriate computer language including C, C-++, Java, Visual Basic, assembler, Perl, any suitable version of 4GL, as well as others. Ex. 1006, 8:54-62, 11:50-54. *See also* “Instantiation” is a programming term referring to the creation of a new parameter type within the code. Ex. 1008, p.894 (“the point at which a generic type is applied by supplying actual or wildcard types as its type parameters. A generic type is

instantiated by the user of the type, effectively creating a new type in the Java language specialized for the parameter types"); see also Ex. 1007, p.226. Essentially, instantiation creates a new container for a particular object class, such as arrays, stacks, queues, and lists. See, e.g., Ex. 1007, p.226; Ex. 1008, p.894, Ex. 1009, p.17 ("in order to create a separate thread of control, an instance of the Thread class is still needed, but it will be instantiated with a reference to our . . . object."), p.128 ("we need to allow only one instance of the class to be instantiated. We'll do this by creating a static variable in the class and testing it to make sure that an instance of the CPUScheduler class doesn't already exist."). "Instantiation" is used to describe creation of a parameter in many different programming languages, including C++ and, in particular here, Java. *Id*.. Java makes threads easy to use because support for them is built into the language. Ex. 1008, p.14, p.60("A thread is a separate flow of control within a program. Conceptually, threads are similar to processes. Unlike processes, multiple threads share the same program space, which means that they can share variables and methods (but also have their own local variables). Threads provide efficient multiprocessing and distribution of tasks for both client and server applications. Id. Threads are also quite lightweight in comparison to processes, so it's conceivable for a single application to be running many (perhaps hundreds or thousands) of threads concurrently."), see also Ex. 1008, p.247-297. "Threads aren't a new idea: many operating systems and languages support them." Ex. 1009,

p.Preface ("it's impossible to write anything but the simplest applet without encountering threads. If you want to work with Java, you have to learn about threads"), pp.5-11.

216. A POSITA would readily recognize that Kahn and Gutierrez inherently disclose, or render obvious, instantiation of threads, and the various thread implementations recited in Claim 13, through computer coding in computer languages such as Java and C++. Ex. 1006, 8:54-62, 11:50-54.

217. As such, Claim 13 would be obvious to a POSITA over Kahn in view of Gutierrez.

[13.2] a thread configured to sends and receive data requests;

218. Kahn in view of Gutierrez renders obvious Claims 1 and 12 for the reasons discussed above and incorporated herein.

219. The disclosure of Kahn inherently anticipates, or renders obvious, the elements of Claim 13, as discussed above for Kahn in Claim 13 of Ground 1 and incorporated herein. A POSITA would also readily recognize that Gutierrez discloses software applications written or described in any appropriate computer language including C, C-++, Java, Visual Basic, assembler, Perl, any suitable version of 4GL, as well as others. Ex. 1006, 8:54-62, 11:50-54. Using threads in Java to send and receive data is well known. Ex. 1008, pp.389-433, Ex. 1009, pp.9-10, 33-34, 60-63.

220. A POSITA would readily recognize that Kahn and Gutierrez inherently disclose, or render obvious, instantiation of threads, and the various thread implementations recited in Claim 13, through computer coding in computer languages such as Java and C++. As such, Claim 13 would be obvious to a POSITA over Kahn in view of Gutierrez.

[13.3] a thread configured to synchronize other threads with updated information;

221. Kahn in view of Gutierrez renders obvious Claims 1 and 12 for the reasons discussed above and incorporated herein.

222. The disclosure of Kahn inherently anticipates, or renders obvious, the elements of Claim 13, as discussed above for Kahn in Claim 13 of Ground 1 and incorporated herein. A POSITA would also readily recognize that Gutierrez discloses software applications written or described in any appropriate computer language including C, C-++, Java, Visual Basic, assembler, Perl, any suitable version of 4GL, as well as others. Ex. 1006, 8:54-62, 11:50-54. "In most cases, threads need to be synchronized." Ex. 1008, p.p14-15, 193 ("versions of wait( ) and notify( ) that are used to synchronize threads on object instances,"), 264-266, 893-894 ("synchronized A keyword used in two related ways in Java: as a modifier and as a statement. First, it is a modifier applied to class or instance methods. It indicates that the method modifies the internal state of the class or the internal state of an instance of the class in a way that is not thread-safe. Before running a synchronized

class method, Java obtains a lock on the class, to ensure that no other threads can modify the class concurrently. Before running a synchronized instance method, Java obtains a lock on the instance that invoked the method, ensuring that no other threads can modify the object at the same time. Java also supports a synchronized statement that serves to specify a "critical section" of code. The synchronized keyword is followed by an expression in parentheses and a statement or block of statements. The expression must evaluate to an object or array. Java obtains a lock on the specified object or array before executing the statements."); Ex. 1009, pp.31-63, 137-161.

223. A POSITA would readily recognize that Kahn and Gutierrez inherently disclose, or render obvious, instantiation of threads, and the various thread implementations recited in Claim 13, through computer coding in computer languages such as Java and C++. As such, Claim 13 would be obvious to a POSITA over Kahn in view of Gutierrez.

[13.4] a thread configured to set a target state of actuators;

224. Kahn in view of Gutierrez renders obvious Claims 1 and 12 for the reasons discussed above and incorporated herein.

225. The disclosure of Kahn inherently anticipates, or renders obvious, the elements of Claim 13, as discussed above for Kahn in Claim 13 of Ground 1 and incorporated herein. A POSITA would also readily recognize that Gutierrez

discloses software applications written or described in any appropriate computer language including C, C-++, Java, Visual Basic, assembler, Perl, any suitable version of 4GL, as well as others. Ex. 1006, 8:54-62, 11:50-54. Java enables threads for software implementations to enable device functionality across many device platforms. See, e.g., Ex. 1008, p.4 ("Java continues to spread on both high- and low-end platforms. As we begin looking at the Java architecture, you'll see that much of what is exciting about Java comes from the self-contained, virtual machine environment in which Java applications run. Java has been carefully designed so that this supporting architecture can be implemented either in software, for existing computer platforms, or in customized hardware, for new kinds of devices. Sun and other industry giants are producing fast Java chips and microprocessors tailored to run media-rich Java applications. Hardware implementations of Java are currently used in smart cards and other embedded systems. Today you can buy "wearable" devices, such as rings and dog tags, that have Java interpreters embedded in them. Software implementations of Java are available for all modern computer platforms down to portable computing devices, such as the popular Palm PDA. Java is also becoming standard equipment on many new cell phones."), Ex. 1009, p.31 (exemplary flow chart for software controlling ATM machine withdraws including checking values—operator cash balance—and hardware activities such as dispersing cash and printing receipt).

226. A POSITA would readily recognize that Kahn and Gutierrez inherently disclose, or render obvious, instantiation of threads, and the various thread implementations recited in Claim 13, through computer coding in computer languages such as Java and C++. As such, Claim 13 would be obvious to a POSITA over Kahn in view of Gutierrez.

[13.5] a thread configured to obtain updated sensor readings;

227. Kahn in view of Gutierrez renders obvious Claims 1 and 12 for the reasons discussed above and incorporated herein.

228. The disclosure of Kahn inherently anticipates, or renders obvious, the elements of Claim 13, as discussed above for Kahn in Claim 13 of Ground 1 and incorporated herein. A POSITA would also readily recognize that Gutierrez discloses software applications written or described in any appropriate computer language including C, C-++, Java, Visual Basic, assembler, Perl, any suitable version of 4GL, as well as others. Ex. 1006, 8:54-62, 11:50-54. Java enables threads for software implementations to enable device functionality across many device platforms. See, e.g., Ex. 1008, p.4 ("Java continues to spread on both high- and low-end platforms. As we begin looking at the Java architecture, you'll see that much of what is exciting about Java comes from the self-contained, virtual machine environment in which Java applications run. Java has been carefully designed so that this supporting architecture can be implemented either in software, for existing

computer platforms, or in customized hardware, for new kinds of devices. Sun and other industry giants are producing fast Java chips and microprocessors tailored to run media-rich Java applications. Hardware implementations of Java are currently used in smart cards and other embedded systems. Today you can buy "wearable" devices, such as rings and dog tags, that have Java interpreters embedded in them. Software implementations of Java are available for all modern computer platforms down to portable computing devices, such as the popular Palm PDA. Java is also becoming standard equipment on many new cell phones."), Ex. 1009, p.31 (exemplary flow chart for software controlling ATM machine withdraws including checking values—operator cash balance—and hardware activities such as dispersing cash and printing receipt).

229. A POSITA would readily recognize that Kahn and Gutierrez inherently disclose, or render obvious, instantiation of threads, and the various thread implementations recited in Claim 13, through computer coding in computer languages such as Java and C++. As such, Claim 13 would be obvious to a POSITA over Kahn in view of Gutierrez.

[13.6] a thread configured to process user interactions; and

230. Kahn in view of Gutierrez renders obvious Claims 1 and 12 for the reasons discussed above and incorporated herein.

231. The disclosure of Kahn inherently anticipates, or renders obvious, the elements of Claim 13, as discussed above for Kahn in Claim 13 of Ground 1 and incorporated herein. A POSITA would also readily recognize that Gutierrez discloses software applications written or described in any appropriate computer language including C, C-++, Java, Visual Basic, assembler, Perl, any suitable version of 4GL, as well as others. Ex. 1006, 8:54-62, 11:50-54. *See* Ex. 1008, pp.2 ("Java has Swing, one of the most sophisticated toolkits for building graphical user interfaces (GUIs) in any language. This development has allowed Java to become a popular platform for developing traditional client-side application software."), 14, 38, 552-661 ("Swing is Java's graphical user interface toolkit"), Ex. 1009, pp.9-10, 31-33, 88, 114-116..

232. A POSITA would readily recognize that Kahn and Gutierrez inherently disclose, or render obvious, instantiation of threads, and the various thread implementations recited in Claim 13, through computer coding in computer languages such as Java and C++. As such, Claim 13 would be obvious to a POSITA over Kahn in view of Gutierrez.

[13.7] a thread that eliminates other threads upon detecting a problem with the eliminated threads

233. Kahn in view of Gutierrez renders obvious Claims 1 and 12 for the reasons discussed above and incorporated herein.

234. The disclosure of Kahn inherently anticipates, or renders obvious, the elements of Claim 13, as discussed above for Kahn in Claim 13 of Ground 1 and incorporated herein. A POSITA would also readily recognize that Gutierrez discloses software applications written or described in any appropriate computer language including C, C-++, Java, Visual Basic, assembler, Perl, any suitable version of 4GL, as well as others. Ex. 1006, 8:54-62, 11:50-54. *See* Java includes commands for eliminating threads. Ex. 1008, pp.251 ("method called stop( ), which kills the thread permanently."), 255-261 (describing various ways threads are managed, put to sleep, or eliminated); Ex. 1009, pp.205-207 (discussion of stopping thread)..

235. A POSITA would readily recognize that Kahn and Gutierrez inherently disclose, or render obvious, instantiation of threads, and the various thread implementations recited in Claim 13, through computer coding in computer languages such as Java and C++. As such, Claim 13 would be obvious to a POSITA over Kahn in view of Gutierrez.

j. Claim 14

> *[14.1] The system of claim 12, wherein the system is configured to instantiate at least two of the following as distinct threads from one another:*

236. Kahn in view of Gutierrez renders obvious Claims 1, 12, and 13 for the reasons discussed above and incorporated herein.

237. A POSITA would readily recognize that Kahn and Gutierrez inherently disclose, or render obvious, instantiation of threads, and the thread implementation recited in Claim 14, through computer coding in computer languages such as Java and C++. Ex. *See* Exs. 1007-1009. As such, Claim 14 would be obvious to a POSITA over Kahn in view of Gutierrez.

[14.2] a thread configured to sends or receive data request;

238. Kahn in view of Gutierrez renders obvious Claims 1, 12, and 13 for the reasons discussed above and incorporated herein.

239. A POSITA would readily recognize that Kahn and Gutierrez inherently disclose, or render obvious, instantiation of threads, and the thread implementation recited in Claim 14, through computer coding in computer languages such as Java and C++. *See* Exs. 1007-1009. As such, Claim 14 would be obvious to a POSITA over Kahn in view of Gutierrez.

[14.3] a thread configured to synchronize other threads with updated information;

240. Kahn in view of Gutierrez renders obvious Claims 1, 12, and 13 for the reasons discussed above and incorporated herein.

241. A POSITA would readily recognize that Kahn and Gutierrez inherently disclose, or render obvious, instantiation of threads, and the thread implementation recited in Claim 14, through computer coding in computer languages such as Java

and C++. *See* Exs. 1007-1009. As such, Claim 14 would be obvious to a POSITA over Kahn in view of Gutierrez.

[14.4] a thread configured to set a target state of actuators;

242. Kahn in view of Gutierrez renders obvious Claims 1, 12, and 13 for the reasons discussed above and incorporated herein.

243. A POSITA would readily recognize that Kahn and Gutierrez inherently disclose, or render obvious, instantiation of threads, and the thread implementation recited in Claim 14, through computer coding in computer languages such as Java and C++. *See* Exs. 1007-1009. As such, Claim 14 would be obvious to a POSITA over Kahn in view of Gutierrez.

[14.5] a thread configured to obtain updated sensor readings;

244. Kahn in view of Gutierrez renders obvious Claims 1, 12, and 13 for the reasons discussed above and incorporated herein.

245. A POSITA would readily recognize that Kahn and Gutierrez inherently disclose, or render obvious, instantiation of threads, and the thread implementation recited in Claim 14, through computer coding in computer languages such as Java and C++. *See* Exs. 1007-1009. As such, Claim 14 would be obvious to a POSITA over Kahn in view of Gutierrez.

[14.6] a thread configured to process user interactions; and

246. Kahn in view of Gutierrez renders obvious Claims 1, 12, and 13 for the reasons discussed above and incorporated herein.

247. A POSITA would readily recognize that Kahn and Gutierrez inherently disclose, or render obvious, instantiation of threads, and the thread implementation recited in Claim 14, through computer coding in computer languages such as Java and C++. *See* Exs. 1007-1009. As such, Claim 14 would be obvious to a POSITA over Kahn in view of Gutierrez.

[14.7] a thread that eliminates other threads upon detecting a problem with the eliminated threads.

248. Kahn in view of Gutierrez renders obvious Claims 1, 12, and 13 for the reasons discussed above and incorporated herein.

249. A POSITA would readily recognize that Kahn and Gutierrez inherently disclose, or render obvious, instantiation of threads, and the thread implementation recited in Claim 14, through computer coding in computer languages such as Java and C++. *See* Exs. 1007-1009. As such, Claim 14 would be obvious to a POSITA over Kahn in view of Gutierrez.

k. Claim 15

> *[15] The system of claim 12, wherein the controller is communicatively coupled to the actuator or sensor via a private local area network.*

250. A POSITA would readily recognize that Gutierrez discloses communicating with a controller at one of the facilities to control and actuator or read from a sensor via a private local area network. Ex. 1006, 12:26-64. Ex. 1002. As such, Claim 15 would be obvious to a POSITA over Kahn in view of Gutierrez.

l. Claim 16

> *[16] The system of claim 12, wherein controller is communicatively coupled to the actuator or sensor via a frame-based carrier-sense multiple access protocol with collision detection.*

251. Gutierrez discloses coupling the controller with the actuator and sensor via a various ethernet protocols, including VPN, LAN, RAN, MAN, WAN or the internet. Ex. 1006, 12:26-64.

252. A POSITA would readily recognize that Gutierrez discloses a frame-based carrier-sense multiple access protocol with collision detection because a POSITA would know that frame-based carrier-sense multiple access protocol with collision detection, as recited in the '014 Patent, is an Ethernet networking technology. As such, Claim 16 would be obvious to a POSITA over Kahn in view of Gutierrez.

m. Claim 18

[18] system of claim 12, comprising: means for ensuring at least some data is not lost if network access ceases intermittently.

253. Gutierrez discloses that Controller 130 is communicably coupled to the motor controller 115 and provides microprocessor-based control of the motor controller 115 and thus motor 110 and pump 105 . . . a communication module 140, a translation module 145, motor driver, data acquisition, data storage, and a processor 150. Ex. 1006, 8:16-21.

254. A POSITA would readily recognize that Gutierrez discloses steps for ensuring at least some data is not lost if network access ceases intermittently, because controller 130 includes data storage.

255. As such, Claim 18 would be obvious to a POSITA over Kahn in view of Gutierrez.

n. Claim 19

[19] The system of claim 12, comprising: means for translating a command for an actuator from an input format to a format configured to effectuate changes in the actuator.

256. Gutierrez discloses a translation module that converts communication protocol messages into the communication protocol for fluid control actuation devices. Ex. 1006, 2:18-25, 41-47, 4:7-14, 8:19-21, 23-31, 9:34-64 ("translation module 145 receives data communicated in a particular communication protocol to the system 100 via the communication bus 155 and/or wireless antenna 160 and,

when necessary, translates such data to a secondary communication protocol understood by the motor controller 115 or other components of the system 100.").

257. A POSITA would readily recognize that Gutierrez discloses steps for translating a command for an actuator from an input format to a format configured to effectuate changes in the actuator.

258. As such, Claim 19 would be obvious to a POSITA over Kahn in view of Gutierrez.

o. Claim 20

i. *[20] The system of claim 19, comprising: means for executing control routines implicated by translated commands on an individual actuator or sensor*

259. A POSITA would readily recognize that Gutierrez discloses steps for translating a command for an actuator from an input format to a format configured to effectuate changes in the actuator. Ex. 1006, 2:18-25, 41-47, 4:7-14, 8:19-21, 23-31, 9:34-64. As such, Claim 20 would be obvious to a POSITA over Kahn in view of Gutierrez.

p. Claim 21

[21] The system of claim 12, comprising: means for transmitting data to the facility-interface module or modules.

260. Gutierrez discloses steps for interfacing with site controllers associated with facilities, as discussed above for Claims 1.5, and 1.6, and incorporated herein.

261. A POSITA would readily recognize that Gutierrez discloses communicating with a controller at one of the facilities to control and actuator or read from a sensor, as recited in the ’014 Patent.

262. As such, Claim 21 would be obvious to a POSITA over Kahn in view of Gutierrez

q. Claim 23

> *[23] The system of claim 12, comprising: an oil or gas facility communicatively coupled to the controller.*

263. Gutierrez discloses chemical injection system 100 in a hydrocarbon production system, such as, for example, a field or area having one or more hydrocarbon (e.g., oil, natural gas) production sites. Ex. 1006, 6:55-7:2; *see also id.*, 5:22-26; 6:24-27; 10:22-38. Gutierrez discloses chemical injection system 100 that includes a pump 105 mechanically coupled to a driver, such as a motor 110; a motor controller 115; and a controller 130. Ex. 1006, 6:46-49, 8:15-21; *see also id.*, 8:39-9:3.

264. A POSITA would readily recognize that Gutierrez discloses an oil or gas facility communicatively coupled to the controller, as recited in the ’014 Patent. Therefore, Gutierrez discloses this element of the ’014 Patent.

265. As such, Claim 23 would be obvious to a POSITA over Kahn in view of Gutierrez.

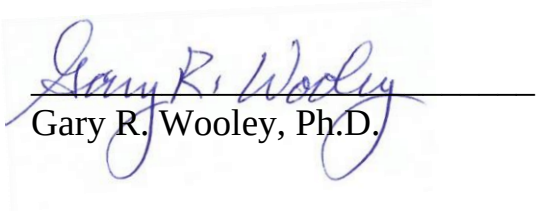
VII. CONCLUSION

266. For the reasons set forth above, in my opinion, all of the limitations of claims 1-9 and 11-23 of the ‘014 Patent are rendered unpatentable as anticipated or obvious by the above-cited prior act.

VIII. OATH

267. 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.