

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

TANKLOGIX, LLC,
Petitioner v.

SITEPRO, INC.,
Patent Owner

Case No. IPR 2025-00652

Expert Declaration in Support of Petitioner's Petition for *Inter Partes* Review of
U.S. Patent No. 11,294,403

DECLARATION OF GARY R. WOOLEY, Ph.D.

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I. INTRODUCTION

A. Background and Qualifications

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

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

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

4. Based on my experience and expertise, it is my opinion that the references discussed in detail below disclose or suggest all of the features recited in Claims 1-23 and 25-30 and that it would have been obvious to combine the features in the manner described below to arrive at the claimed invention. Nothing in any of the challenged claims is new or operates in a manner that would have been unexpected by a person of ordinary skill in the art.

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

and Alumnus of the Year, and I currently serve as chair of the LSU College of Engineering Dean's Advisory Council.

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

B. Compensation.

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

II. METHODOLOGY AND MATERIALS CONSIDERED

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

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

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

<u>EXHIBIT</u>	<u>DESCRIPTION</u>
Ex. 1001	U.S. Patent No. 11,294,403
Ex. 1002	Declaration of Dr. Gary Wooley
Ex. 1003	Curriculum Vitae of Wooley
Ex. 1004	File Wrapper for U.S. Patent No. 11,294,403

Ex. 1005	U.S. Patent No. 7,424,399 to Kahn
Ex. 1006	U.S. Patent No. 8,667,091 to Almadi
Ex. 1007	U.S. Patent No. 9,709,995 to Gutierrez
Ex. 1008	Judicial Caseload for Western District of Texas

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

III. OVERVIEW OF LEGAL CONSIDERATIONS.

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

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

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

the prior art. I understand that prior art in an *inter partes* review is limited to patents or printed publications that predate the priority date of the patent at issue.

A. Person of Ordinary Skill in the Art

15. I was asked to provide my opinion as a person of skill in the art 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 *Spanion, Inc. v. Int’l Trade Comm’n*, 629 F.3d 1331, 1356 (Fed. Cir. 2010)).

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

C. Obviousness

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

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

20. I also have been informed and understand that the combination of familiar elements according to known methods is obvious when it does no more than yield predictable results. However, I further understand that a patent claim composed of several elements is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art. I understand that, to prove a claim would have been obvious, one must demonstrate that a POSITA would have

been motivated to combine or modify the prior art to achieve the claimed invention while having a reasonable expectation of success in doing so.

21. I further understand 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 person having ordinary skill at the relevant time (prior to 2012, which I understand is the priority date claimed by the Challenged Patents). In my opinion, a POSITA at the time of the alleged invention would have had at least a bachelor's degree in engineering (electrical, chemical, or mechanical), computer science, or a related field and significant experience with remotely controlling fluid-handling devices, like SCADA systems

V. TECHNICAL BACKGROUND OF THE CHALLENGED PATENTS

A. Background of the Relevant Technology

26. The Challenged Patents relate to the remote operation of fluid-handling devices. In the oil and gas industry, fluid handling systems direct, measure, display,

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

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

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

B. The Alleged Invention

28. The ‘403 Patent, entitled “Remote Control of Fluid-Handling Devices,” describes a system, comprising: a first computer system disposed at a first fluid handling site, the first fluid handling site comprising a first pump, a first valve, and a first tank that handles a first fluid, the first tank having a first fluid-level sensor with which the first computer system is configured to communicate to obtain a level of the first fluid in the first tank, and the first computer system being configured to provide remote control of the first pump or the first valve. The system further includes a server system that receives a first fluid level sensed by the fluid-level sensor; obtains credentials from a first client computing device; and determines that a user of the first client computing device is authorized to interact with the first fluid handling site. After the determination, providing, a first command to change a state of the first pump; and changing the state of the first pump to a sequence of different target states that change over time. Ex. 1001, Claim 1

C. Prosecution History Summary (Ex. 1004)

29. The application resulting in the ‘403 Patent was filed on October 28, 2021. The present application is a continuation of U.S. Patent Application

16/656,319 filed on October 17, 2019. U.S. Patent Application 16/656,319 is a continuation of U.S. Patent Application 15/867,077 filed on January 10, 2018; which is a continuation of U.S. Patent Application 14/984,422 filed on December 30, 2015; which is a continuation of U.S. Patent Application 14/147,190, issued as U.S. Patent 9,342,078, filed January 3, 2014; which is a continuation of U.S. Patent Application 13/708,557, issued as U.S. Patent 8,649,909, filed on December 7, 2012. Ex. 1001, Cover. Each of the above patents and patent applications is titled Remote Control of Fluid-Handling Devices. On January 18, 2022, the Examiner mailed its Notice of Allowability which allowed Claims 1-30. Ex. 1004, at 891-900.

D. Overview of the Prior Art

1. Kahn (Ex. 1005)

30. U.S. Patent No. 424,399 to Kahn was filed on June 9, 2006, and claims priority to Provisional U.S. Patent Application No. 60/689,257 filed on June 10, 2005. Kahn was published on March 1, 2007, and is prior art under pre-AIA § 102(a). Kahn teaches a remote monitoring and control fluid delivery system permitting authorized users from different entities to view data and control designated fluid delivery devices. Ex. 1005.

2. Almadi (Ex. 1006)

31. U.S. Patent No. 8,667,091 to Almadi was filed on July 22, 2011, published on April 5, 2012, and claims priority to Provisional Patent Application

No. 61/367,207 filed on July 25, 2010. Almadi issued March 4, 2014. Almadi is prior art under pre-AIA § 102(a).

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

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

3. Gutierrez (Ex. 1007)

34. 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).

35. Gutierrez teaches a chemical injection system that includes a pump connected to a chemical reservoir and pipeline that can all be controlled using a local

motor controller connected to a central controller and remote computing device. Ex. 1007. 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. Ex. 1007, Abstract.

VI. SUMMARY OF MY OPINIONS

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

- Kahn Anticipates Claims 1-2, 4-5, 7;
- Almadi Anticipates Claims 1-3, 6, 8-23, and 25-30;
- Gutierrez Anticipates Claims 1, 4-5, 7, and 30.

A. Opinions Regarding the ‘403 Patent

1. Ground 1: Kahn Anticipates Claims 1-2, 4-5, 7

a. Claim 1

[1.1] A fluid processing system, comprising:

37. I would readily recognize the system disclosed by Kahn discloses a method. Likewise, a POSITA would recognize that the system for fluid sensing, quality sensing, data sharing, and data visualization is a system frequently deployed in the processing of various types of fluids. Ex. 1005, 1:28-36, Claims 1-29. Thus, Kahn discloses this method.

[1.2] a first computer system disposed at a first fluid handling site, the first fluid handling site comprising a first pump, a first valve, and a first tank that handle a first fluid, the first tank having a first fluid-level sensor with which the first computer system is configured to communicate to

obtain a level of the first fluid in the first tank, and the first computer system being configured to provide remote control of the first pump or the first valve; and

38. Kahn discloses a system with sensor unit 110 including multiple sensors (like first sensor 111A and second sensor 111B), capable of identifying the location of and communication with the system's individual sensor units. Ex. 1005, 4:12-25, 11:2-15.

39. A POSITA would understand Kahn discloses receiving information comprising fluid level properties from one or more sensors disposed at the first fluid-handling site, the fluid-handling site through its disclosure of a computer system that receives first fluid test data from sensors. A POSITA would also understand that Kahn comprising one or more fluid-handling devices comprising one or more of a first pump, a first filter, and a first valve through its disclosure valves, filters, and a pump. *Id.*

40. A POSITA would understand that the system disclosed in Kahn includes a tank through its disclosure of distribution systems that include reservoirs, water treatment plants, and contain water, all of which include tanks. *Id.* Thus, Kahn discloses this claim element.

41. A POSITA would understand that the system disclosed in Kahn discloses remote control of a first fluid-handling device of the one or more fluid-handling devices. Controllers are used in remote oil fields and fluid-handling

management systems to control fluid-handling devices such as pumps, valves, filters, tanks, motor drive systems, and pump systems including actuators. *See, e.g.,* Ex. 1005, 8:19-21, 10:62-67; *see also id.*, 14:35-15:2, 15:62-16:32.

42. A POSITA would understand from Kahn that it discloses remote control of a first fluid-handling device of the one or more fluid-handling devices. Thus, Kahn discloses the claim element “*the first computer system being configured to provide remote control of the first pump or the first valve*”.

[1.3] a server system remote from the fluid handling site, wherein the server system has memory storing instructions that, when executed, effectuate operations comprising:

43. Kahn discloses a data collection network with centralized data collection points. 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. Kahn discloses that processing unit is a generic term meaning one or more processing units programmed at a software, firmware, or hardware level, including, ASIC (application-specific integrated circuit). Ex. 1005, 4:49-53. Kahn discloses that the server system has memory storing instructions for its operation. Ex. 1005, 8:54-59, 33:4-14, 33:15-21.

44. A POSITA would understand from the above disclosure of a central communication device, e.g., a server that Kahn discloses a server system wherein

the server system has memory storing instructions. Thus, Kahn discloses this claim element.

[1.4] receiving, with the server system, from the first computer, via a network, a first fluid level sensed by the fluid-level sensor;

45. Kahn discloses a data collection network with centralized data collection points. 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.

46. Kahn discloses that the centralized data collection points receive sensor information via a network from a facility interface module, Sensor unit 110. 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.

47. Kahn discloses that sensor units 110 detect breakage of a pipe, for example the level of a first fluid, based on reduced water pressure in the pipe. Ex. 1005, 10:8-16. Kahn discloses that its method can be applied to monitor any fluid (gas or liquid) including those present in a distribution system, reservoir, or feed source in need of monitoring. Ex. 1005, 4:4-7, 4:12-48.

48. A POSITA would understand from the above disclosure and figures Kahn discloses receiving, with the server system, from the first computer system, via a network, a level associated with the first fluid sensed by a first sensor of one or more sensors. Thus, Kahn discloses this claim element.

[1.5] obtaining, with the server system, credentials from a first client computing device;

49. A POSITA would understand from Kahn's disclosure of authenticated accounts and suitable techniques for verification of the identity of present users as authorized users that Kahn discloses that credentials can be obtained from a first client computer. This Kahn discloses this claim element.

50. A POSITA would recognize from its disclosure that any suitable technique can be used to verify that the identity of a present user is an authorized user of the device. *See supra*, ¶¶ 27-28 (above discussion of controllers). Kahn further discloses that an authorized Account A (first user 5 a) can be authorized by a first entity. Ex. 1005, 25:55-58. Finally, Kahn discloses that an authorized Account B (second user 5 b) second user can be authorized by a second entity. Ex. 1005, 25:55-58. A POSITA would understand that Kahn discloses that credentials can be obtained from a first client computer, and would further understand the server system hosts data about other fluid handling sites the user is not authorized to interact. Thus, Kahn discloses this claim element.

[1.6] determining, with the server system, based on the credentials, that a user of the first client computing device is authorized to interact with the first fluid handling site, wherein the server system hosts data about other fluid handling sites the user is not authorized to interact;

51. A POSITA would recognize Kahn discloses a providing, a user interface indicating the first fluid level, the first client computing device being

remote from the server system and the first computer system through its disclosure of a graphical user interface for monitoring fluid quality. Thus, Kahn discloses this claim element.

[1.7] after the determination, providing, with the server system, via the network, information by which a first client computing device presents a user interface indicating the first fluid property, the first client computing device being remote from the server system and the first computer system;

52. 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 that Sensor unit 110 connects via a network to centralized data collection points. 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 discloses that the centralized data collection points are a server. Ex. 1005, 10:54-56, 23:29-30. Kahn discloses that users log into the system on respective user computing devices. 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.

53. 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. Ex. 1005, 10:62-67; *see also id.*, 14:35-15:2, 15:62-16:32.

54. Kahn discloses that sensor units 110 detect breakage of a pipe, i.e., level of a first fluid, based on reduced water pressure in the pipe. Ex. 1005, 10:8-16. Kahn discloses that its method can be applied to monitor any fluid (gas or liquid) including those present in a distribution system, reservoir or feed source in need of monitoring. Ex. 1005, 4:4-7, 4:12-48.

55. The sensor outputs are presented to the user through the GUI on the remote user's computer. Ex. 1005, 2:50-54, 2:61-65, 25:5-12, 26:3-7, Claim 36, FIG. 5, FIG. 6.

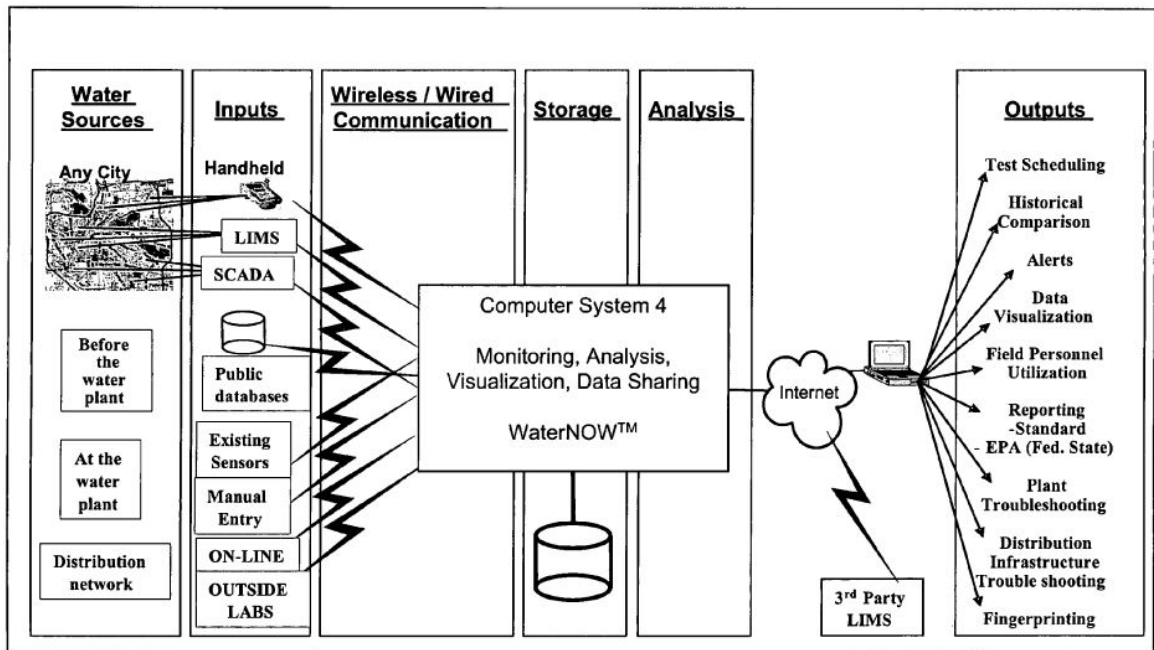


FIG. 6

56. As explained above, a POSITA would recognize Kahn discloses a providing, a user interface indicating the first fluid level, the first client computing device being remote from the server system and the first computer system through its disclosure of a graphical user interface for monitoring fluid quality.

57. In addition, a POSITA would recognize from Claim 36 Kahn discloses a providing, with the server system, via the network, information by which a first client computing device presents a user interface indicating the first fluid property, the first client computing device being remote from the server system and the first computer system. *See supra*, ¶¶ 27-28 (above discussion of controllers). Ex. 1005, 2:50-54, 2:61-65, 25:5-12, 26:3-7, Claim 36, FIG. 5, FIG. 6. Thus, Kahn discloses this claim element.

[1.8] receiving, with the server system, from the first client computing device, a first command to change a state of the first pump; and

58. Kahn discloses a facility interface module, Sensor unit 110, including a processor that connects via a network to centralized data collection points. 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.

59. Kahn further discloses that sensor unit 110 includes communication equipment with actuators configured to manipulate fluid flow at respective fluid-handling facilities. Ex. 1005, 8:3-11, 8:21-24, 10:62-67; *see also* Ex. 1005, 14:35-15:2, 15:62-16:32, 34:7-12.

60. A POSITA would recognize from the above disclosure that Kahn discloses receiving, with the server system, from the first client computing device, a first command to change a state of the first pump. *See supra*, ¶¶ 27-28 (above discussion of controllers). *See, e.g.*, Ex. 1005, 8:3-11, 8:21-24, 10:62-67; *see also* Ex. 1006, 14:35-15:2, 15:62-16:32, 34:7-12. Thus, Kahn discloses this claim element.

[1.9] causing, with the server system, the first computer system disposed at the first fluid handling site to effectuate the command by changing the state of the first pump to a sequence of different target states that change over time.

61. Kahn discloses a facility interface module, Sensor unit 110, including a processor that connects via a network to centralized data collection

points. 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.

62. Kahn further discloses that sensor unit 110 includes communication equipment with actuators configured to manipulate fluid flow at respective fluid-handling facilities. Ex. 1005, 8:3-11, 8:19-21, 10:62-67; *see also id.*, 14:35-15:2, 15:62-16:32. Kahn discloses first sensor having actuators controlling valves and pumps to manipulate fluid flow. *Id.*

63. A POSITA would recognize from Kahn's disclosures that Kahn discloses the limitation regarding changing the state of the first pump. Ex. 1002, ¶ 49. Thus, Kahn discloses this claim element. Claim 1 is anticipated by Kahn, or would be obvious to a POSITA in view of Kahn.

b. Claim 2

[2] The system of claim 1, wherein: the first fluid handling site comprises a second pump and a second tank that handle a second fluid, the second tank having a second fluid-level sensor with which the first computer system is configured to communicate to obtain a level of the second fluid in the second tank, and the first computer system being configured to provide remote control of the second pump.

64. Kahn discloses the first fluid-handling site, in a contiguous distribution system of pipes and/or systems of reservoirs, channels, pipes and treatment plants. Ex. 1005, 1:46-50, 2:1, 4:12-32. A hallmark of the system in Kahn is the ability

to identify the location of and communicate with the system's sensor units. Ex. 1005, 4:12-25.

65. Kahn expressly discloses a second, and indeed larger numbers of fluid handling devices for detecting and locating physical events in the distribution system. Ex. 1005, 10:8-13, 23:51-62. Kahn discloses that sensors units can be placed at the shut off valve located at the introduction of water supply into a house, business, industrial site or government site and that they can be placed at each individual faucet or selected faucets where it is likely that the end user 23 might drink water or otherwise consume or cause fluids to be consumed. Ex.1005, 11:2-15; *see also* Ex. 1005, FIG. 2, 16:67-17:7.

66. Kahn discloses a system with Sensor unit 110 that includes multiple sensors (e.g., first sensor 111A and second sensor 111B) a communication unit that connects via a network to centralized data collection points. 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 that the centralized data collection points are a server. Ex. 1005, 10:54-56, 23:29-30. Kahn discloses that users log into the system on respective user computing devices. Ex. 1005, 2:50-45, 25:5-12, 28:35-37, 30:45-49. Kahn discloses each sensor having a pump. Ex. 1005, 8:3-15; *see also id.*, 6:41-43, 7:38-40, 7:67-8:2. Each sensor also includes two valves. Ex. 1005, 8:19- 30, FIG. 1C, FIG. 1D. Sensor units 110

include a plurality of additional fluids, including recalibration solution, and reagents. Ex. 1005, 8:3-18, 8:31-34, 8:41-42. Kahn discloses recalibration fluid or reagent in the form of a replenishing supply, i.e., tracking the level of each for replenishment. Ex. 1005, 8:16-18.

67. Kahn further discloses that sensor unit 110 includes communication equipment with actuators configured to manipulate fluid flow at respective fluid- handling facilities. Ex. 1005, 8:3-11, 8:19-21, 10:62-67; *see also id.*, 14:35-15:2, 15:62-16:32. Kahn discloses first sensor having actuators controlling valves and pumps. *Id.*

68. Kahn also discloses that the sensor unit 110 is a fluid handling tank. Ex. 1005, 8:19-30, FIG. 1C, FIG. 1D, 15:50-16:5, FIG. 1L; 4:26-27. Sensor unit 110 measures the fluid level of the fluid in the sensor cavity to minimize the potential for fluid leakage. Ex. 1005, 16:2-5.

69. A POSITA would readily understand that Kahn discloses the first fluid handling site with a second pump and a second tank that handles a second fluid, the second tank having a second fluid-level sensor with which the first computer system is configured to communicate to obtain a level of the second fluid in the second tank, and the first computer system being configured to provide remote control of the second pump. Thus, Kahn discloses this claim element.

c. Claim 4

[4] The system of claim 1, wherein: the sequence of different target states that change over time are configured to ramp up or down a speed of the first pump.

70. Kahn discloses sensor unit 110, a facility interface module including a processor that connects via a network to centralized data collection points. Ex. 105, 5:62-6:2. A POSITA would recognize from Kahn's disclosure of changing the fluid by pump that a pump would ramp up and down in speed changing the fluid in the sensor cavity, e.g., the recalibration fluid during calibration.

71. A POSITA would recognize from Kahn's disclosure of changing the fluid and injecting by pumps that Kahn discloses receiving, with the server system, from the first client computing device, a first command to change a state of the first fluid-handling device over time. Thus, Kahn discloses this claim element.

72. Thus, Claim 4 is anticipated by Kahn or would be obvious to a POSITA in view of Kahn.

d. Claim 5

[5] The system of Claim 1, wherein: the sequence of different target states that change over time are determined with steps for mitigating shocks to upstream or down-stream fluid-handling devices relative to the first pump

73. Kahn discloses sensor units placed at the shut-off valve sites where each fluid line terminates. As such, a POSITA would recognize that Kahn discloses fluid handling devices for detecting, locating, and mitigating physical events in the

distribution system. *See, e.g.*, Ex. 1005, 10:8-13. Thus, Claim 5 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 server system is configured to interface with both a web browser on the client computing device and a special-purpose application executing on the client computing device to present the user interface indicating the first fluid level.

74. Kahn discloses computer system 4 permits Account A to visualize first information associated with the first fluid test data overlaid on a geographical map displayed on the graphical computer interface—meaning the web browser—of Account A’s computer. Ex. 1005, 26:3-13. As such, as POSITA would recognize Kahn discloses a system configured to interface with a web browser on an account’s computing device indicating the first fluid level.

2. Ground 2: Kahn in view of Almadi and Gutierrez Renders Obvious Claims 1-3, 6, 8-23, and 25-30.

75. The combination of Kahn with Almadi or Gutierrez was obvious because each reference describes a similar system for remote monitoring and control of fluid-handling facilities. A POSITA would have referred to Kahn, and its disclosures of specific user differentiation features for fluid-handling facilities, with different components and controls over a plurality of remotely monitored and controlled fluid-handling devices, including as related to gas facilities. Ex. 1005, 17:67-18:2.

76. 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. 1007, 1:26-27. A POSITA would understand Gutierrez's pipelines and transportation systems involve multiple operators and geographically dispersed site locations, each responsible for the efficient and safe operation of the fluid-handling system. *Id.*

77. A POSITA would have referred to Almadi for its disclosure of modern industrial operations, found in modern oil and gas field applications, which allows remote users to monitor and control fluid handling facilities. Ex. 1006, 1:26-27. The automation architecture of Almadi involves a large plurality of devices remotely monitored and controlled by an integrated node. *Id.*

78. A POSITA would have recognized the value of combining Kahn with Gutierrez or Almadi. A POSITA would consider implementing remote systems disclosed by Kahn with the oil and gas facilities operations (Gutierrez) or modern oil and gas field automation technologies (Almadi). Combining these would lead to predictable results of the disclosures of a plurality of devices in Kahn with the specific modern oil and gas field automatic technologies disclosure in either Almadi or Gutierrez. These could be combined with no difficulty, because the references do not describe alternative systems or methods, but rather disclose additional detail

rather than a different approach to solving problems in the underlying technology addressed by Kahn.

a. Claim 1

[1.1] A system, comprising:

79. A POSITA would readily recognize that the system disclosed by Almadi remotely monitors and controls a fluid handling device pump at oil wells, water disposal sites, re-injection facilities, or petroleum pumping stations. Therefore, Almadi discloses a system for remotely controlling a fluid-handling device of an oil well, a petro water disposal or re-injection facility, or a petroleum pumping station. Therefore, Almadi discloses a system for remotely controlling a fluid-handling device of an oil well, a petro water disposal or re-injection facility, or a petroleum pumping station.

[1.2] a first computer system disposed at a first fluid handling site, the first fluid handling site comprising a first pump, a first valve, and a first tank that handle a first fluid, the first tank having a first fluid-level sensor with which the first computer system is configured to communicate to obtain a level of the first fluid in the first tank, and the first computer system being configured to provide remote control of the first pump or the first valve; and

80. Process sensors come in many forms. In addition to temperature sensors, pressure sensors, level sensors, and flow sensors (more often called flowmeters), process sensors are used in many applications and are designed to take accurate measurements of the process. 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.controleng.com/articles/process-control-sensor-types-and-applications/>

81. 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>.

82. 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. <https://www.techtarget.com/whatis/definition/control-system>.

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

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

85. A POSITA would readily understand that Almadi discloses a first computer system that is configured to communicate to obtain a tank fluid and provide remote control of a pump or valve of the '403 Patent through its disclosure of remote subsystems 120, intelligent field devices which include tank level sensors and plant-wide model which includes tanks. Thus, Almadi discloses a first computer system disposed at a first fluid handling site, the first fluid handling site comprising

a first pump, a first valve, and a first tank that handle a first fluid, the first tank having a first fluid-level sensor with which the first computer system is configured to communicate to obtain a level of the first fluid in the first tank, and the first computer system being configured to provide remote control of the first pump or the first valve.

[1.3] a server system remote from the fluid handling site, wherein the server system has memory storing instructions that, when executed, effectuate operations comprising:

86. A server is a computer or system that provides resources, data, services, or programs to other computers, known as clients, over a network. A command center server is simply a server disposed at a command center or a central place for executing orders and supervising tasks. Common to every command center are three general activities: inputs, processes, and outputs. 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.

87. A POSITA would readily understand that Almadi discloses the server system remote from the fluid handling site, wherein the server system has memory storing instructions that, when executed, effectuate operations comprising of the ‘403 Patent through its disclosure of the integrated node 100 and Figures 1A and 1B. Thus, Almadi discloses a server system remote from the fluid handling site, wherein the server system has memory-storing instructions that, when executed, effectuate operations.

[1.4] receiving, with the server system, from the first computer, via a network, a first fluid level sensed by the fluid-level sensor;

88. A Process Control Network (PCN) is a communications network layer that is a part of the Industrial Automation networks in Process Industries. This network is used to transmit instructions and data between control and measurement units and Supervisory Control and Data Acquisition (SCADA) equipment. 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.>

89. A POSITA would readily understand that Almadi discloses receiving a first fluid level sensed by the fluid level sensor of the '403 Patent through its disclosure of the plant-wide model and open and close transactions (change in the level status of tanks). A POSITA would further understand that a sensor must be present to determine the level of a tank. Thus, Almadi discloses a server system remote from the fluid handling site, wherein the server system has memory-storing instructions that, when executed, effectuate operations.

[1.5] obtaining, with the server system, credentials from a first client computing device;

90. A POSITA would readily understand that Almadi discloses the obtaining credentials from a first client computing device of the '403 Patent through its disclosure of the integration node's ability to interface with a plurality of remote sub-systems by interfering with a remote sub-system, a user can obtain credentials from that remote sub-system which is first client computing computer. Thus, Almadi discloses obtaining, with the server system, credentials from a first client computing device.

[1.6] determining, with the server system, based on the credentials, that a user of the first client computing device is authorized to interact with the first fluid handling site, wherein the server system hosts data about other fluid handling sites the user is not authorized to interact;

91. A POSITA would readily understand that Almadi discloses determining whether a user is authorized to interact with the fluid-handling device of the '403 Patent through its disclosure of the integrated node 100 and the various techniques to ensure no file access violations during the process of accessing the file by the remote host. Thus, Almadi discloses the determining, with the server system, based on the credentials, that a user of the first client computing device is authorized to interact with the first fluid handling site, wherein the server system hosts data about other fluid handling sites the user is not authorized to interact.

[1.7] after the determination, providing, with the server

system, via the network, information by which a first client computing device presents a user interface indicating the first fluid level, the first client computing device being remote from the server system and the first computer system;

92. 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>.

93. A POSITA would readily understand that the user interface indicating the first fluid level is provided by Almadi in its disclosure of the user interface which can view and change the tank fluid levels. Thus, Almadi discloses after the determination, providing, with the server system, via the network, information by which a first client computing device presents a user interface indicating the first fluid level, the first client computing device being remote from the server system and the first computer system

[1.8] receiving, with the server system, from the first client computing device, a first command to change a state of the first pump; and

94. A command, in the context of technology and computing, is an instruction given by a user to a computer or software to perform a specific task. It can be a single word, a line of code, or a series of instructions that tell the computer what to do.

<https://www.lenovo.com/us/en/glossary/command/?orgRef=https%253A%252F%252Fwww.google.com%252F>. A command is a specific action assigned to a

program to perform a specific task. It commonly refers to a specific word or phrase that tells the computer what to do through a command line interface or shell, depending on what kind of system is being used. Programming languages also refer to lines of code that initiate specific processes or statements as commands.

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

95. Almadi discloses commands used by the local controller to drive the fluid handling device to a particular target state, e.g. “field devices can perform actuator functions to receive information, such as commands, from the system level to thereby affect or control the operation of an automated process, for example, through motors and pumps.” Ex, 1006, 1:45-49, 12:27-59; *see also* Ex. 1006, 25:26-37 (“switching a pump off if the flow is below a certain limit or activating some bounds or streams based on some readings/conditions”).

96. A POSITA would readily understand that Almadi’s disclosure of switching a pump off if the flow is below certain limits or activating some bounds or streams is the receiving a command to change the state of the first pump. Thus, Almadi discloses receiving, with the server system, from the first client computing device, a first command to change a state of the first pump.

[1.9] causing, with the server system, the first computer system disposed at the first fluid handling site to effectuate the command by changing the state of the first pump to a sequence of different target states that change over time

97. A target state is a particular operating condition that a device is in at a particular time. *See supra*, ¶¶ 27-28 (above discussion of controllers). Determining the target state of the fluid-handling devices is necessary to understand whether a fluid-handling device is operating within the proper device parameters or whether the operating condition of the fluid-handling device should be changed. It is well known in certain device configurations at fluid handling sites that fluid handling

devices will continue to operate based on the last received commands in the event a connection to the server is lost.

98. A POSITA would readily understand that changing the state of the first pump of the '403 Patent is disclosed by Almadi's disclosure of changing the state of the pump based on readings/conditions. Thus, Almadi discloses causing, with the server system, the first computer system disposed at the first fluid handling site to effectuate the command by changing the state of the first pump to a sequence of different target states that change over time.

b. Claim 2

[2] The system of claim 1, wherein: the first fluid handling site comprises a second pump and a second tank that handle a second fluid, the second tank having a second fluid-level sensor with which the first computer system is configured to communicate to obtain a level of the second fluid in the second tank, and the first computer system being configured to provide remote control of the second pump.

99. The process of oil and gas production creates "saltwater," which is considered hazardous waste because of its high salt content, hydrocarbons, and industrial compounds. Hydraulic fracturing of shale gas well sites produces millions of gallons of this saltwater, also known as "produced water" or "oilfield brine." See <https://www.wef.org/globalassets/assets-wef/direct-download-library/public/03---resources/wsec-2017-fs-013-iwwc-og-glossary---final---5.21.18.pdf> The water brings oil and gas to the earth's surface where impurities are chemically removed,

resulting in a leftover liquid that must then be safely discarded. Companies can recycle the water, injecting it back into working reservoirs for reuse in gathering any remaining oil or gas, or they can discard it at a saltwater well disposal site. *See e.g.* <https://kimray.com/training/brief-guide-water-management-oil-and-gas-industry>

An API oil/water separator is a device designed to separate oil and suspended solids from industrial wastewater sources, such as those found in oil refineries, petroleum handling facilities, petrochemical and chemical plants, natural gas processing plants, etc. <https://www.oilskim.com/blog/how-does-an-oil-water-separator-work>.

100. Almadi discloses that modern industrial operations require control of multiple remote subsystems or field devices. EX1006, 1:28-35. The complexity of connecting and controlling numerous field devices creates logistics problems related to the large number of controlled components. EX1006, 2:4-40. Thus, Almadi discloses an integrated node to interface the numerous system components to provide a single point of control for data collection, monitoring, and restoration. EX1006, 2:64-3:1. Thus, a POSITA would recognize that Almadi discloses multiples of each distributed system, both on the field device side, as well as on the user computing device side, all connected by Almadi's integrated node.

101. A POSITA would readily understand that Almadi discloses a second pump and second tank having a second fluid-level sensor through its disclosure of a plant-wide model that further discloses multiple pumps and motors, and sensor and

actuator functions that are supported by a number of controllers. Thus, Almadi anticipates Claim 2.

c. Claim 3

[3] The system of claim 2, comprising: the first tank, the first pump, the first valve, the second tank, and the second pump, wherein the first fluid is water and the second fluid is oil, wherein the first tank or the second tank is an oil/water separation tank.

102. A POSITA would readily understand that Almadi discloses the first or second tank being an oil/water separation tank of the '403 Patent through its disclosure of the plant-wide model, change in level status of tanks, and the user-initiated allocation of tanks when a service change occurs; where the tank service change is a change to an oil separation tank. Thus, Almadi anticipates claim 3.

d. Claim 6

[6] The system of claim 1, wherein: at least some of the sequence of different target states that change over time are determined by the first computer system in response to a rate of change in the level of the first fluid in the first tank.

103. A POSITA would understand from Almadi's disclosure of level bounds for each measurement (tank states) is the sequence of different target states that change over time. Thus, Almadi discloses at least some of the sequence of different target states that change over time are determined by the first computer system in response to a rate of change in the level of the first fluid in the first tank.

e. Claim 8

[8] The system of claim 1, wherein: the first computer system is configured to communicate with the server system via a cellular wireless connection.

104. A cellular network (aka mobile network) is a communication system consisting of interconnected base stations. These base stations, often called cell towers, transmit and receive radio signals to provide wireless communication for mobile devices. Unlike traditional landlines, cellular networks offer the advantage of mobility, allowing users to communicate virtually anywhere within the network's coverage area.

<https://www.sciencedirect.com/science/article/abs/pii/B978075066271050010X>.

105. A POSITA would recognize that Almadi discloses the first computer system is configured to communicate with the server system via a cellular wireless connection of claim through its disclosure of allowing a remote host to interface with a plurality of remote and in-plant subsystems and services using a wired or wireless network interface. Thus, Almadi discloses the first computer system is configured to communicate with the server system via a cellular wireless connection.

f. Claim 9

[9] The system of claim 1, wherein the first computer system is configured to translate a plurality of commands from the server system, including the command, from an input format to a plurality of different formats and protocols configured to effectuate changes in states of a plurality of different fluid-handling devices at the first fluid handling site, the different fluid-handling devices including the first pump or the first valve.

106. Protocol translation is a method for transforming pieces of information from a source protocol into relevant target protocol formats in order to communicate between heterogeneous legacy systems in interoperability environments, such as fluid-handling sites.

<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>

107. Translation of protocols is required to support communication between different fluid-handling devices, controllers, IPCs, etc. I understand that the claimed translation of protocols is required to permit the data interface and bus to operate and communicate with various types of devices using multiple different types of protocols. <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.

108. A POSITA would understand that the use of different protocols by the protocol translator requires that the protocols including commands must be translated to be used by various fluid-handling devices. A POSITA would further understand that the translated protocols include commands to change the states in the fluid-handling devices including pumps or valves as claimed in the '403 Patent.

109. Thus, Almadi discloses the system of claim 1, wherein the first computer system is configured to translate a plurality of commands from the server system, including the command, from an input format to a plurality of different

formats and protocols configured to effectuate changes in states of a plurality of different fluid-handling devices at the first fluid handling site, the different fluid-handling devices including the first pump or the first valve.

g. Claim 10

[10] The system of claim 9, wherein translating the plurality of commands comprises steps for translating commands.

110. A POSITA would understand that the use of different protocols by the integrated node and remote subsystems necessarily requires that at least some of the protocols be translated and that the protocol translator performs steps for translating commands as claimed in the '403 Patent. Thus, Almadi discloses the system of claim 9, wherein translating the plurality of commands comprises steps for translating commands.

h. Claim 11

[11] The system of claim 9, wherein the plurality of different formats and protocols comprise: modbus protocol; and analog electrical signals.

111. A POSITA would understand that Almadi discloses a Modbus protocol; and analog electrical signals through its disclosure of Serial Modbus, Modbus over IP (Internet Protocol), and input/output unit 104 can support analog inputs and analog outputs. Thus, Almadi anticipates claim 11.

i. Claim 12

[12] The system of claim 9, wherein at least some of the plurality of different fluid-handling devices comprise proportional-integral-derivative controllers configured to drive respective fluid-handling devices to different target setpoints determined by the first computer system responsive to corresponding commands from the server system.

112. A POSITA would readily understand from the disclosures in Almadi that it discloses a PID configurative to drive fluid-handling devices to different set points determined by a first computer system. *See supra*, ¶ 61 (above discussion of PID controllers).

j. Claim 13

[13.1] The system of claim 9, wherein: the first computer system is coupled to at least some of the plurality of different fluid handing devices via a bus; and

113. Bus topology is a type of network topology in which all devices are connected to a single cable called a "bus." This cable serves as a shared communication medium, allowing all devices on the network to receive the same signal simultaneously. In bus topology, data transmission is achieved through a process known as "collision detection." When a device sends a signal, it is broadcast to all other devices on the network. If two devices try to send data at the same time, a collision occurs, and the signals are corrupted. The devices must then wait a random amount of time before trying to re-transmit the data.

<https://www.lenovo.com/us/en/glossary/bus->

[topology/?orgRef=https%253A%252F%252Fwww.google.com%252F.](https://www.google.com/)

114. A POSITA would understand from the disclosure in Almadi that it discloses the first computer system is coupled to at least some of the plurality of different fluid handing devices via a bus.

[13.2] the first computer system comprises means for controlling which fluid handling devices are permitted to transmit signals on the bus at a given point in time.

115. A POSITA would readily understand that Almadi's disclosure of using analog signals and digital networks to communicate via a bus is the plurality of the transmission of signals on a bus at a given time. *See supra*, ¶¶ 83, 89 (above discussion of bus topology).

k. Claim 14

[14] The system of claim 9, wherein the plurality of different formats and protocols comprise three different protocols communicated over three different types of control busses to corresponding fluid handling devices among the plurality of different fluid handing devices.

116. Almadi discloses three different protocols communicated over three different types of control busses to corresponding fluid handling devices among the plurality of different fluid handing devices through its disclosure of various protocols, including over serial and Ethernet physical interfaces. EX1006, 14:22-

28; EX1002, ¶ 95. A POSITA would understand from the disclosures in Almadi that it discloses three different types of control buses.

I. Claim 15

[15] The system of claim 9, wherein two of the plurality of different formats and protocols comprise binary frames with redundant bits used to detect errors.

117. In computing and electronic systems, binary-coded decimal (BCD) is a class of binary encodings of decimal numbers where each digit is represented by a fixed number of bits, usually four or eight. Sometimes, special bit patterns are used for a sign or other indications (e.g. error or overflow). Weighted codes and non-weighted codes are used to represent the decimal numbers. Alphanumeric codes are used to represent the numeric and non-numeric data (characters). Error detection codes are used to detect the errors during the data transmission. Weighted codes use 4 binary digits to represent (0-9) decimal numbers. See <https://www.techtarget.com/whatis/definition/binary-coded-decimal>.

118. In addition, Almadi discloses two of the plurality of different formats and protocols comprise binary frames with redundant bits used to detect errors through its disclosure that the DRM 166 includes instructions to detect gross errors in reconciled measurements 715 to determine a confidence level for reconciled values and a probability of gross error existence and, further, can flag 716 values that exceed a preselected confidence level 713. Ex. 1006., 26:41-49. Almadi further

discloses that DRM 166 has instructions for eliminating gross errors by removing measurements 717 with detected gross errors according to a preselected priority scheme 718, which includes: (i) giving the priority to remove measurements with larger magnitude of corrections; or (ii) giving the priority to 60 remove measurements with highest impact on the total sum of reconciliation run penalty. Ex. 1006, 26:50-61.

119. A POSITA would readily understand that the techniques disclosed in Almadi and/or the use of binary coded decimal can be used to detect errors.

m. Claim 16

[16] The system of claim 9, wherein the plurality of different formats and protocols comprise command code format, an on-off signal format, and an application-program interface format.

120. Almadi discloses the plurality of different formats and protocols as disclosed above in Claim 14. A POSITA would understand that protocols described in Almadi include different protocol formats including command code format, on-off format, and application program interference.

n. Claim 17

[17] The system of claim 9, wherein the first computer system is configured to operate in an automatic mode, a mixed automatic mode, and a manual mode.

121. In automatic mode, a device shall be controlled entirely by the control system. Starting and stopping pumps or closing and opening valves shall be

performed automatically and in accordance with the relevant sequence- and control algorithms. The operator shall not have the capability to issue a command individually to a device while it is in automatic mode. However, the current status of the device shall be monitored and indicated on the display devices of the SCADA system. See e.g., <https://hansaconsult.com/control/modes-of-operation/#:~:text=In%20the%20manual%20mode%2C%20a,limits%20the%20extent%20of%20operations>. In manual mode, a device shall be operated by issuing commands from the operating console of the SCADA system utilizing dialogue boxes, buttons, and other appropriate tools. The level of authorization identified by log-in-code limits the extent of operations. Only operators logged in with a sufficient level of authorization shall be allowed to perform particular operations. Safety interlocks associated with such operations shall be activated and executed within the second (PLC) layer of the control system. See e.g., <https://hansaconsult.com/control/modes-of-operation/#:~:text=In%20the%20manual%20mode%2C%20a,limits%20the%20extent%20of%20operations>.

122. A POSITA could readily understand that Almadi's disclosure of self-monitoring, self-regulating, and self-calibrating is equivalent to the operation of an automatic mode of the '403 Patent. A POSITA would further understand that the above-described protocols include different formats including command code

format, on-off format, and application program interference. Thus, Almadi discloses the first computer system being configured to operate in automatic, mixed automatic, and manual modes.

o. Claim 18

[18] The system of claim 17, wherein the automatic mode comprise executing s process recipe in which a collection of set points are targeted.

123. A process recipe defines a series of parameters assigned to internal HMI registers (non-volatile memory locations) that are downloaded to corresponding PLC registers for a predefined control process.
<https://www.maplesystems.com/supportcenter/faq?qid=254&q=What%20is%20the%20Recipe%20Feature%3F%20>

124. Recipes are a collection of data that belongs together, e.g. Machine parameter settings or production data. A recipe has a fixed data structure. The recipe structure is defined during configuration. A recipe contains recipe data records. These differ in terms of their values, but not their structure.
<https://engineerscommunity.com/t/recipe-management-siemens-wincc-scada/6172>

125. A POSITA would readily understand that Almadi's disclosure of providing instructions for exception detection by comparing exception criteria is executing a process recipe targeting set points in the '403 Patent. Thus, Almadi

discloses wherein the automatic mode comprise executing s process recipe in which a collection of set points is targeted.

p. Claim 19

[19] The system of claim 9, wherein translating the plurality of commands comprises steps for identifying protocols and control busses.

126. A POSITA would understand that configuring the protocol translation includes steps for identifying protocols and control buses. *See supra*, ¶¶ 106-107 (above discussion of protocols and protocol translation). Thus, Almadi discloses steps for identifying protocols and control buses.

q. Claim 20

[20] The system of claim 1, wherein the first computer system comprises a protocol multiplexer.

127. Multiplexing, or muxing, is a way of sending multiple signals or streams of information over a communications link at the same time in the form of a single, complex signal. Multiplexing is a method used by networks to consolidate multiple signals -- digital or analog -- into a single composite signal that is transported over a common medium, such as a fiber optic cable or radio wave. When the composite signal reaches its destination, it is demultiplexed, and the individual signals are restored and made available for processing.

<https://www.techtarget.com/searchnetworking/definition/multiplexing>

128. A POSITA would readily understand that Almadi's disclosure of the combination of the TCP/IP Ethernet Switch, PLC logic, and input/output interfaces necessarily requires a protocol multiplexer to combine the aforementioned protocols. Thus, Almadi discloses the first computer comprising a protocol multiplexer.

r. Claim 21

[21] The system of claim 1, wherein the first computer system comprises a site-management module implemented with multiple threads.

129. A thread is a single sequential flow of control within a program. a thread of execution is the smallest sequence of programmed instructions that can be managed independently by a scheduler, which is typically a part of the operating system. thread is the basic unit to which the operating system allocates processor time. A thread can execute any part of the process code, including parts currently being executed by another thread. A job object allows groups of processes to be managed as a unit. <https://learn.microsoft.com/en-us/windows/win32/procthread/processes-and-threads>.

130. A POSITA would understand Almadi's disclosure of a set of instructions executed on the processor is equivalent to a site-management module with multiple threads which is a sequence of programs and instructions. Thus, Almadi discloses a site-management module implemented with multiple threads.

s. Claim 22

[22] The system of claim 1, wherein the first computer system comprises means for implementing remotely issued commands, such that once remotely issued commands are issued and received, the remotely issued commands are executed to completion even if Internet access is lost before the commands are fully executed.

131. A POSITA would readily understand from the disclosure in Almadi that commands sent to the fluid-handling device would continue to be executed if a network connection is lost because the fluid-handling device will continue to operate based on the last complete set of instructions until new instructions are sent. Thus, Almadi discloses executing remotely issued commands to completion even if internet access is lost.

t. Claim 23

[23] The system of claim 1, wherein the first computer system is configured to receive another command, determines the another command will cause the first fluid handling site to violate a constraint, and determine not execute the another command.

132. A POSITA could readily understand that Almadi's disclosure of detecting measurement data outside of the preselected bounds is equivalent to the determining whether a command will violate a constraint and determining not to execute the another command of the '403 Patent. Thus, Almadi discloses determining whether another command will cause the first fluid handling site to violate a constraint.

u. Claim 25

[25] The system of claim 1, comprising: a second computer system disposed at a second fluid handling site that is remote from the first fluid handling site, the first fluid handling site being an oil or gas well and the second fluid handling site being a saltwater disposal facility, the second computer system being configured to control a second pump or a second valve at the second facility responsive to commands from the server system.

133. A POSITA would recognize from Almadi's discussion of multiple hardware products that a second computer system can be configured to control a second pump or value of a second facility.

v. Claim 26

[26] The system of claim 1, wherein: receiving a first fluid level sensed by the fluid-level sensor comprises receiving a buffered fluid level reading pushed by the first computer system to the server system along with alarms and measurements from other sensors, the other sensors including a temperature sensor and a pressure sensor.

134. In addition to process fluid, all multiple seals use an external fluid. Depending on the sealing arrangement, this external fluid is called buffer fluid or barrier fluid. American Petroleum Institute (API) Standard 682 specifies that unpressurized dual seals, also known as traditional tandem seal arrangements, use buffer fluid. Pressurized dual seals, on the other hand, use barrier fluid, which isolates the pump process liquid from the rest of the system.

<https://www.johncrane.com/en/resources/blog/2012/buffer-and-barrier-fluids>

135. A POSITA would understand that Almadi discloses receiving a first fluid level sensed by the fluid-level sensor comprises receiving a buffered fluid level reading pushed by the first computer system to the server system along with alarms and measurements from other sensors, the other sensors including a temperature sensor and a pressure sensor through its disclosure of field devices that perform sensor functions to sense operational information and variables such as temperature, pressure, pH, or flow rate and deliver that information to the system-level controller devices. Thus, Almadi discloses other sensors including a temperature sensor and a pressure sensor.

w. Claim 27

[27] The system of claim 1, wherein: receiving a first fluid level sensed by the fluid-level sensor comprises receiving a buffered fluid level reading pulled by the server system from the first computer system along with alarms and measurements from other sensors, the other sensors including a temperature sensor and a pressure sensor.

136. A POSITA would understand that Almadi discloses receiving a first fluid level sensed by the fluid-level sensor comprises receiving a buffered fluid level reading pushed by the first computer system to the server system along with alarms and measurements from other sensors, the other sensors including a temperature sensor and a pressure sensor through its disclosure of field devices that perform sensor functions to sense operational information and variables such as temperature, pressure, pH, or flow rate and deliver that information to the system-level controller

devices. Thus, Almadi discloses receiving a fluid level and alarms and measurements from other sensors including a temperature sensor and a pressure sensor.

x. Claim 28

[28] The system of claim 1, comprising: a controller by which the first computer system is coupled to an actuator of the first pump or valve, wherein the controller is configured to exercise feedback control of the actuator according to setpoints corresponding to respective target states of the sequence of different target states.

137. A POSITA would readily recognize from Almadi's disclosures that the remote subsystems can output measurement data which is then verified and reconciled. The verified measurement data is then used by the controller to exercise feedback control of the actuator based on set points.

y. Claim 29

[29.1] The system of claim 1, wherein: the first computer system comprises a site master controller;

138. A POSITA would readily understand that Almadi discloses site master controllers of the '403 Patent through its disclosure of remote subsystems 120.

[29.2] the server system comprises a command-center server configured to provide user interfaces by which a plurality of users monitor and control a plurality of different site master controllers, including the site master controller of the first computer system, associated with a plurality of different accounts.

139. A POSITA would readily understand that Almadi discloses the server system comprises a command-center server configured to provide user interfaces by which a plurality of users monitor and control a plurality of different site master controllers, including the site master controller of the first computer system, associated with a plurality of different accounts of the '403 Patent through its disclosure of the multiple computer programs and hardware products which would include a plurality of users and plurality of site master controllers.

z. Claim 30

140. Almadi discloses each and every limitation of Claim 30, anticipating Claim 30. Claim 30's preamble is analogous to limitation 1.1, limitation 30.2 is analogous to limitation 1.2, limitation 30.3 is analogous to limitation 1.3, limitation 30.4 is analogous to limitation 1.4, limitation 30.5 is analogous to limitation 1.5, limitation 30.6 is analogous to limitation 1.6, limitation 30.7 is analogous to limitation 1.7, limitation 30.8 is analogous to limitation 1.8, limitation 30.9 is analogous to limitation 1.9, limitation 30.10 is analogous to limitation 1.2, limitation 30.11 is analogous to Claim 3, and limitation 30.12 is analogous to Claim 9. Each of

Claim 30's limitations are disclosed by Almadi for reasons provided above, and incorporated here. *Supra* section (VII)(A)(II)(a). Almadi anticipates Claim 30

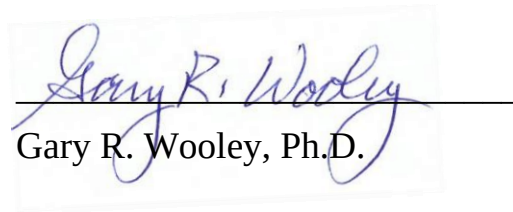
VII. CONCLUSION

141. For the reasons set forth above, in my opinion, all of the limitations of Claims 1-23 and 25-30 of the '403 Patent are rendered unpatentable as anticipated or obvious by the above-cited prior art.

VIII. OATH

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

Dated: February 27, 2025



Gary R. Wooley, Ph.D.