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Transcript of Orhan Talu, Ph.D.

Date: December 1, 2023

Case: GCE Gas Control Equipment, Inc. -v- VBOX, Inc. (PTAB)

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WORLDWIDE COURT REPORTING & LITIGATION TECHNOLOGY

Transcript of Orhan Talu, Ph.D.
Conducted on December 1, 2023

1 (1 to 4)

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22	1 UNITED STATES PATENT AND TRADEMARK OFFICE ----- BEFORE THE PATENT TRIAL AND APPEAL BOARD GCE GAS CONTROL EQUIPMENT, INC., Petitioner, vs. VBOX, INC., Patent Owner. ----- IPR Case No: IPR2023-00326 U.S. Patent No. 11,389,614 DEPOSITION OF ORHAN TALU, Ph.D. 400 West Maple Road, Suite 350 Birmingham, Michigan Friday, December 1, 2023 9:34 a.m. Job No.: 516754 Pages: 1 - 146 Stenographically Reported By: Alison C. Webster, CSR-6266, RPR, RMR, CRR, RDR	3 A P P E A R A N C E S ON BEHALF OF THE PETITIONER TIMOTHY P. CREMEN, ESQUIRE Sheppard Mullin 2099 Pennsylvania Avenue, N.W. Washington, D.C. 20006 202.747.1854 tcremen@sheppardmullin.com ON BEHALF OF THE RESPONDENT DAVID A. ATALLAH, ESQUIRE Carlson, Gaskey & Olds, P.C. 400 West Maple Road Suite 350 Birmingham, Michigan 48009 248.283.0729 datallah@cgolaw.com
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22	2 Deposition of ORHAN TALU, Ph.D., produced as a witness at the instance of the Petitioner, and duly sworn, was taken in the above-styled and numbered cause on Friday, December 1, 2023, from 9:34 a.m. to 4:09 p.m. Eastern Time, before Alison C. Webster, RPR, CRR, RMR, RDR, CSR-6266 (Michigan); License No. 14559 (California); License No. 084.004953 (Illinois); License No. 23001848 (Washington), reported by stenographic method, pursuant to the Federal Rules of Civil Procedure and the provisions stated on the record or attached hereto.	4 T A B L E O F C O N T E N T S Witness ORHAN TALU, Ph.D. EXAMINATION BY MR. CREMEN: 5 EXAMINATION BY MR. ATALLAH: 141 E X H I B I T I N D E X Exhibit Page (Exhibits not offered.)

Transcript of Orhan Talu, Ph.D.
Conducted on December 1, 2023

2 (5 to 8)

5 1 DEPOSITION OF ORHAN TALU, Ph.D. 2 Friday, December 1, 2023 3 4 STENOGRAPHER: Do you swear or affirm the 5 testimony you are about to give in this matter will be 6 the truth, the whole truth, and nothing but the truth? 7 DR. TALU: I do. 8 STENOGRAPHER: Thank you. 9 MR. CREMEN: Good morning, Dr. Talu. 10 THE WITNESS: Good morning. 11 ORHAN TALU, Ph.D., 12 was thereupon called as a witness herein, and after 13 having first been duly sworn to testify to the truth, 14 the whole truth and nothing but the truth, was 15 examined and testified as follows: 16 EXAMINATION 17 BY MR. CREMEN: 18 Q. Have you ever been deposed before? 19 A. No. 20 Q. So we'll go over a few things, just housekeeping 21 before we start. So you understand that I'll be 22 asking questions and you'll be answering them and the	7 1 A. Okay. 2 Q. And then your counsel might object from time to time 3 to one of my questions, but unless he tells you not to 4 answer the question, you know that you have to answer. 5 Right? 6 A. Yes. 7 Q. Is there anything that's preventing you from providing 8 truthful testimony today? 9 A. Nothing. 10 Q. And you understand you're testifying under oath. 11 Correct? 12 A. Correct. 13 Q. Do you understand that you're here today to discuss 14 the declaration you prepared in IPR 2023-00326 15 regarding U.S. Patent Number 11,389,614? 16 A. Yes. 17 Q. And you have a copy of your declaration with you. 18 Correct? 19 A. Correct. 20 Q. If I refer to that patent as the '614 patent today, 21 you'll know what I mean. Right? 22 A. Yes.
6 1 court reporter will be recording our conversation. 2 Right? 3 A. I understand. 4 Q. So to do that, we have to have verbal back and forth. 5 So if you nod your head or if I nod my head, just ask, 6 or I might ask you to say yes or no or answer the 7 questions. 8 Also, so we have a clear record, let's try 9 not to talk over each other. It will happen, so I 10 might start the question again or something like that. 11 A. I promise not to do that. 12 Q. I promise too. I'll try my best. And you understand 13 you can ask me to clarify any questions that you don't 14 understand? 15 A. Yes, I understand. 16 Q. I don't know how long we'll go today, but I'll try to 17 take breaks every 60 or 90 minutes or so. But if you 18 need a break before then, just let me know. Okay? 19 A. Okay. 20 Q. The only time that I'll ask to hold a break is if 21 there's a pending question, and then we can get an 22 answer and then we can take a break. Okay?	8 1 Q. Can you tell me how you prepared your declaration? 2 A. I studied the patent. I studied the other relevant 3 patents which are mentioned in the IPR. And then 4 back and forth with the lawyers, we went through 5 quite a few iterations, eventually came up with the 6 final document that you-all have. 7 Q. Rough percentage, how much of the document did you 8 write? 9 A. That's a really hard question to answer because I had 10 to go through it sentence by sentence, make sure 11 everything is within what I believe is correct, so my 12 guess is -- I really -- my guess is maybe 20 percent 13 of this is my writing. With respect to the concepts, 14 it's all of them I agree on. 15 Q. Do you know how many hours you spent preparing the 16 declaration? 17 A. Declaration or the case in total? 18 Q. Why don't we start with the case total. How many 19 hours have you spent on the case total? 20 A. Oh, right now I think we're approaching hundreds. 21 Q. 100 or hundreds? 22 A. Hundred. I think it's about hundred.

9 1 Q. And then how much time did you spend preparing the 2 declaration itself? 3 A. Written part or... 4 Q. Correct. 5 A. The written part, probably -- with all the back and 6 forth involved, probably one-third of that. 7 Q. Okay. If you can open your declaration and look at 8 paragraph 15. 9 A. Yes. 10 Q. That references your CV. Correct? 11 A. Correct. 12 Q. Do you have a copy of your CV with you today? 13 A. Yes, I do. 14 Q. Have you been a professor your entire career? 15 A. I have been in academia all my career. Correct. 16 Q. On page 2 of your CV, which is Exhibit 2002, you have 17 some research interests listed; is that right? 18 A. Yes. 19 Q. Was that -- were those interests the main focus of 20 your research over your career? 21 A. Yes, all through my career since 1978. 22 Q. Okay. We can set your CV aside. Let's go back to	11 1 Lately, over the last 10, 15 -- almost 15 2 years now, I start doing more academic research 3 rather than R&D with companies. So examples of that 4 is oxygen concentrators, nitrogen production from 5 air, actually some fundamental parts of the process 6 which is things like characterizing the materials, 7 material properties, to evaluate if they are maybe 8 feasible for a process somewhere, somehow. 9 A smaller portion has been with respect to 10 natural gas, natural gas sweetening, as we call it, 11 removing acid gases from natural gas. 12 Q. And that falls within a pressure swing adsorption? 13 A. It can be done with pressure swing adsorption. It 14 can be done with temperature swing adsorption also. 15 Q. If you have to put a percentage on, over the course of 16 your career, how much of your research has related to 17 pressure or vacuum swing absorption [sic], what would 18 that be? 19 A. Well, you -- it is -- a process is not just simply 20 the process itself. There is the materials that goes 21 into it, there is the design of the process itself, 22 there is the design of the apparatus. So if you put
10 1 your declaration, paragraph 18. 2 A. Yes, sir. 3 Q. Okay. Why don't you go ahead and read that to 4 yourself and then I'll ask you some questions about 5 it. Just let me know when you're ready. 6 A. Please go ahead. 7 Q. Okay. Is the first sentence of paragraph 18 about to 8 summarize the research you've done over your entire 9 career? 10 A. Yes. The first sentence reads, "I did research in 11 the area of gas separation processes, adsorption, gas 12 separation materials, et cetera." Correct. 13 Q. Have you done research in the area of pressure or 14 vacuum swing adsorption? 15 A. Yes. Pressure and vacuum swing adsorption is one of 16 the main methods of practicing adsorption for the 17 betterment of human kind in engineering. 18 Q. Can you give me some examples of that research? 19 A. Pressure swing adsorption. Most of my research 20 related to pressure swing adsorption early in my 21 career were confidential with a variety of gas 22 companies.	12 1 all of them together, 90 percent will be somehow 2 related to pressure swing adsorption because, as I 3 mentioned, that is the main application of adsorption 4 actually. 5 Q. Okay. The last sentence in paragraph 18 starts, "In 6 my work, I have studied, reviewed, and designed oxygen 7 concentrators." 8 Do you see that sentence? 9 A. Yes, I see. 10 Q. So you use the phrase "oxygen concentrators." Is that 11 meant to cover both the stationary and portable 12 concentrators? 13 A. Correct. 14 Q. What -- have you -- 15 A. I should qualify that, saying oxygen concentrators 16 for medical purposes. 17 Q. Okay. What portable oxygen concentrator have you 18 "studied, reviewed, and designed"? 19 A. Could you restate that again, please? 20 Q. Have you studied any portable oxygen concentrators? 21 A. As products out of the market? Is that what you're 22 asking me for?

13 1 Q. Yes. 2 A. I studied -- I believe I pulled apart four of them. 3 Q. Which ones? 4 A. A SeQual machine. 5 Q. What's that? I'm sorry? 6 A. SeQual, and two Invacare machines, I studied them 7 heavily, and an Inogen machine for my own curiosity 8 because my wife uses that machine. 9 Q. What timeframe did you -- did you look at those 10 machines? 11 A. Mostly in -- well, the SeQual is old; I'm going to 12 guess something like in early 2000s. Invacares are 13 around 2010. The Inogen is about six, seven years 14 ago. 15 Q. Do you remember which Inogen model that was? 16 A. That's a G3. 17 Q. Can you think of any other portable oxygen 18 concentrators that you have studied? 19 A. When I joined the university back in 1986, the 20 professor prior to me which I inherited the lab from 21 had a stationary oxygen concentrator. So he left it 22 in the lab and I kind of played around with that one	15 1 Q. Yeah, well, you anticipated my question. I was going 2 to ask you what "studied" meant, so... 3 A. Yeah. 4 Q. So we're good. Does -- 5 A. I hope that's what you meant. 6 Q. Yes. 7 A. Okay. 8 Q. Exactly what I meant. Reviewed. So you used the word 9 "reviewed" after "studied." Is "reviewed" different 10 than studied or is that the same universe of customs? 11 A. I used "review" as looking at open literature papers, 12 product brochures, patents, whatever is disclosed by 13 the companies. I will use "studied" as having the -- 14 physically having the product or the apparatus, or 15 whatever, and bringing it into my lab and taking a 16 deeper look at it. 17 Q. So you mentioned that you've designed oxygen 18 concentrators as well. Correct? 19 A. Yes. 20 Q. Which oxygen concentrators have you designed? 21 A. It is not in the market. The company chose not to 22 pursue that because of some issues.
14 1 also. 2 Those are the medical ones. I also did 3 quite a bit of characterization with a nonmedical 4 concentrator for welding and muffler shops and things 5 like that from AirSep, a company called AirSep. 6 Q. And those two examples were stationary concentrators. 7 Correct? 8 A. Yes, they were larger capacity. 9 Q. But -- so other than the SeQual, two Invacare, and 10 Inogen portable oxygen concentrators that you studied, 11 you didn't study any others? 12 A. No. Let me clarify that again. By "studying," if 13 you mean pull it apart and look inside to see if I 14 can learn anything from it or to demonstrate to my 15 students, I did not look at any others. But, of 16 course, when you do research in a specific area, as 17 an engineer, the first things we look at is what is 18 out there as products. So I went through quite a bit 19 of literature, open literature, product brochures and 20 performance characteristics and so on and so forth, 21 so I did look at quite a few of them, but not studied 22 in detail.	16 1 Q. Was it stationary or portable? 2 A. It was portable. 3 Q. What year was that? 4 A. I worked on it from 2012 to -- can I take a look at 5 my CV to refresh my own mind? 6 Q. Sure. 7 A. Yeah, 2018. 8 Q. That -- 9 A. December 2018. 10 Q. That work is listed in your CV? 11 A. Yes. It was a -- actually a contract, industrial 12 contract, through the company. 13 Q. Which company? 14 A. Invacare. So it is -- it shows up as my research 15 funding. 16 Q. What parts did you design? 17 A. From zero all the way up to operating prototype, I 18 would call it. From zero, meaning choosing the 19 adsorbent and characterizing some adsorbents to see 20 which one is the best, et cetera. 21 Q. Was anyone else involved in the design? 22 A. A bunch of my students were involved, of course, all

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17 1 the way from Ph.D. level to some hourly undergraduate 2 students to do routine, like, characterization work, 3 so there was quite a few people. Also another 4 faculty was involved who is – himself is actually a 5 modeler, mathematical modeler of the processes, so he 6 was involved heavily also. 7 Q. How about anyone from Invacare? 8 A. Invacare, we kept them up to date with the results, 9 but they were not involved with the day-to-day 10 operations. Some of my students ended up in 11 Invacare. 12 Q. Do you know why the device was not brought to market? 13 A. I would say it's business decisions. Invacare 14 started having some problems with their finances. I 15 mean, they were – they did not disclose why, but 16 that's my suspicion. 17 Q. Is Invacare a going company today? 18 A. Invacare went bankrupt end of last year. 19 Q. Did you develop a working prototype for the Invacare 20 project? 21 A. Correct. 22 Q. Where is that prototype now?	19 1 on the materials and how the process should run, 2 et cetera, and then with close collaboration with 3 mechanical engineers, electrical engineers, product 4 designers, and packaging, making it look attractive, 5 et cetera. 6 But the main parts of an oxygen 7 concentrator is essentially some kind of a compressor 8 or a vacuum pump; the adsorbent columns to do the 9 actual separation; and a bunch of other auxiliary 10 things like filters and small heat exchangers and so 11 on. 12 And if it is portable, then there is the 13 battery and the power management, and there is always 14 some kind of a control board to control the process 15 because it's an intermittent process. It's a 16 transient process. 17 Q. So did the Invacare device use pressure swing 18 absorption [sic] or vacuum spinning? 19 A. It was a PVSA, so was pressure. 20 Q. Did it have removable adsorbent [sic] beds? 21 A. I think we are getting too much into the detail, so 22 I'm not sure if I can discuss items like that. But
18 1 A. I think it's still in my lab, although I vacated my 2 labs. After I retired, I had to give up my lab, of 3 course, but I think it's still there somewhere in the 4 lab. Academia is not very good at cleaning up stuff. 5 They like to keep stuff, I should say, just so if it 6 becomes useful they don't have to buy it again or 7 redo it again. 8 Q. What -- can you give me a brief overview of the 9 structure of the Invacare device? 10 A. The structure of the device? 11 Q. Yes. 12 A. Like all oxygen concentrators, it depends on 13 adsorption phenomena. Takes in air and makes a 14 pressure change. It has adsorbent material in it 15 which will take out the nitrogen. So typically there 16 will be a compressor involved. There are filters. I 17 mean, if you want to be more specific I will be glad 18 to explain it in more detail, but one thing to 19 appreciate is that these machines are rather 20 complicated. It's probably one of the most 21 complicated processes in chemical engineering. 22 And so we designed the process, we decide	20 1 in the prototype it was not removable. I'll put it 2 that way. 3 Q. How many adsorbent [sic] beds did it use? 4 A. I know exactly how many it had, but I don't know if 5 have the liberty of disclosing that much detail about 6 the machine which was developed for industry. 7 Q. Why not? 8 A. Because of confidentiality agreements and so on. I 9 already I think disclosed more than I should have. 10 Q. Okay. Can you tell me whether it used more than one? 11 A. Sorry? 12 Q. Can you tell me whether it used more than one 13 adsorbent bed? 14 A. It used more than one adsorbent bed. 15 Q. Okay. Earlier, we talked about you tearing apart a 16 number of portable concentrators. Were there -- was 17 there specific things you were looking for in those 18 concentrators? 19 A. Each concentrator has something unique about it. 20 Like the SeQual, for example, had a rotary valve on 21 it which was interesting at its time. So we were not 22 looking at specific things in them, we were looking

21 1 at -- to see how the patent was -- all of them are 2 covered, of course, under the patents, how the patent 3 is implemented in real life, except the last one, 4 which is Inogen, and that was just for my own 5 information, actually. 6 Q. Other than the Invacare device, have you designed any 7 other portable oxygen concentrators? 8 A. No. We did some work computationally but not 9 physically with the devices. 10 Q. What do you mean "computationally"? 11 A. On the computer, there are general physical laws 12 that, of course, these machines follow, material 13 balances, energy balances, equilibrium kinetics, and 14 on the computer we can usually estimate within 15 20 percent of what the performance would be if you 16 put all the device together. 17 Of course, after that, you have to put the 18 device together and make sure you did not fool 19 yourself on the computer. 20 Q. Yeah, sure. Yes. So when you say "computationally," 21 you mean running a computer simulation, is that what I 22 hear?	23 1 A. Sorry? 2 Q. You never solicited his help with anything? 3 A. Can you repeat that? I'm sorry, I'm having a problem 4 with my hearing. 5 Q. Did you ever ask him for help with anything? 6 A. I don't recall anything. No. 7 Q. Okay. 8 A. I don't recall anything. 9 Q. Let's look at paragraph 26 of your declaration, and I 10 just would like to know what your hourly rate is? 11 A. It's the same rate I charge all the companies. It's 12 \$200 an hour. 13 Q. Do you know how much you have billed VBOX to date? 14 A. I still have to bill them more, but to date, I think 15 we are -- I received -- or billed and received, I 16 should say, about \$13,000. But then I didn't bill 17 for the last two months, so... yet. 18 Q. All right. Let's look at the '614 patent. You should 19 have a copy in your stack there. 20 A. Yes. 21 Q. Do you -- can you segment out in your mind how much 22 time you've spent just reviewing the '614 patent?
22 1 A. We write our own simulation programs. 2 Q. Do you know petitioner's expert Dr. Knaebel? 3 A. I know him. 4 Q. How do you know him? 5 A. I know him quite some time, since 1985 or '86. I 6 never collaborated with him technically, but I was 7 the chairman for the International Fundamentals of 8 Adsorption Conference back in 2004 in Sedona, 9 Arizona, and I was honored to be the chairman and I 10 was assigned the job, and Dr. Knaebel was the 11 secretary for the International Adsorption Society. 12 So at that time we were emailing or communicating 13 two, three times a week, especially as the conference 14 approached, on the organizational matters and so on. 15 And, of course, I kept on seeing him at the 16 conferences. We never collaborated unfortunately on 17 any technical matter. 18 Q. You never worked together at all? 19 A. No, not -- not on a technical matter. We don't have 20 publications or we don't have any collaborations. 21 It's all in the professional societies. 22 Q. You never solicited his help with anything?	24 1 A. Oh, that's going to be very hard to guesstimate, 2 but -- because I came to the patent many, many times 3 to look at specific items. The first time that I sit 4 down to look at it, I spent at least four hours on 5 it. But then over time, you know, every -- at every 6 sentence in the declaration or something when there 7 is a referral to it or clarify my mind, I came back 8 to it maybe 50 times, 100 times, so it's very hard to 9 estimate the total time I spent on it. 10 Q. Let's look -- if I say -- if I give you a column and a 11 line number, do you understand what that means? 12 A. Oh, this does have the column numbers, line numbers. 13 Okay. Yes. 14 Q. Okay. So let's look at column 1, lines 17 through 21. 15 It's the first paragraph after the title Background. 16 And why don't you go ahead and read that and let me 17 know when you're done. 18 A. Yeah, the first paragraph you said. Right? 19 Q. Yes. 20 A. Yes, go ahead, please. 21 Q. Okay. So do you -- before I ask you that question, do 22 you understand the concept of person of ordinary skill

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25 1 in the art in patent law? 2 A. Yes, I do. 3 Q. What's your understanding? 4 A. My understanding is – particularly for this patent, 5 is somebody who has an engineering degree, chemical 6 or mechanical or electrical or related fields, who 7 has worked in the field for a few years or done 8 research. They might have done more research than 9 actual practice, and so – with respect to in this 10 context. 11 Q. In the second sentence of this paragraph it refers to 12 a "wearable oxygen concentrator system." Do you see 13 that phrase? 14 A. Correct. I see it. 15 Q. Do you know what "wearable oxygen concentrator system" 16 would mean to a person of skill? 17 MR. ATALLAH: I'm just going to object, 18 calls for a legal conclusion. 19 Go ahead. 20 A. For a person of skill, wearable oxygen concentrator 21 could mean that the patient could actually carry it; 22 the person who's using it can carry it. It might be	27 1 A. Oxygen stream is a flow of oxygen. In medical 2 terminology, usually something more than 90 percent 3 oxygen or 88 percent oxygen. "Stream," in general, 4 is used for something flowing in conventional 5 language – conventional terminology, I should say. 6 Q. Is it a constant stream? 7 A. Can you elaborate for me? 8 MR. ATALLAH: Objection to form 9 Sorry. Go ahead. 10 A. Can you elaborate by "constant"? What is "constant"? 11 BY MR. CREMEN: 12 Q. How would you use the phrase "constant stream" when 13 you're talking about this technology? 14 A. Most oxygen concentrators actually will use what is 15 called a pulse mode, which will give out the oxygen 16 when the patient is inhaling. That's to conserve 17 power, so that way the requirement kind of drops by 18 health because, obviously, you're not taking any 19 oxygen when you're exhaling. 20 But the production in the machine is 21 constant, always a flowing stream. In fact, in an 22 adsorption, pressure swing adsorption process, there
26 1 regarded as or taken as something you physically wear 2 on you or it could be something that you put on your 3 shoulder, carry like a bag, shoulder bag. 4 But essentially I would understand it as 5 something which doesn't need wheels to be carted 6 around or a live voltage power. So a wearable 7 concentrator will have some kind of a battery for the 8 power it requires. 9 BY MR. CREMEN: 10 Q. At the time of the priority date of the '614 patent 11 back in 2005, was that a category of portable devices, 12 wearable versus nonwearable? 13 A. There was hope, a wish, to go in that direction so 14 that the patient will have mobility, but there was 15 really nothing in the market that was – all of them, 16 everything in the market was on wheels, actually. So 17 it was a goal, but it wasn't in practice. 18 Q. Okay. And then later on in that sentence it says, 19 "for creating an oxygen stream for ambulatory 20 respiratory patients." Do you see that? 21 A. Yes, I see that. 22 Q. What does "oxygen stream" mean?	28 1 is nothing constant. The properties of the gases, the 2 material, the adsorbent material, what is all the 3 adsorbent material, changes all the time always. So 4 there is a step where you are pressurizing and there 5 is a step where you're depressurizing, et cetera, so 6 nothing is constant. Constant, as would be 7 understood. 8 But the machine is running constantly, 9 continuously, and producing the amount of oxygen 10 necessary. Oxygen-enriched stream, I should say, 11 continuously to deliver it to the patient. 12 Q. Okay. Was "oxygen stream" a term of art back in 2005? 13 MR. ATALLAH: Objection. Form 14 Go ahead. 15 And calls for a legal conclusion. 16 A. Can you repeat that again? 17 BY MR. CREMEN: 18 Q. Was "oxygen stream" a phrase that was normally used in 19 the portable concentrator art back in 2005? 20 A. We will normally use "oxygen product," but the stream 21 would mean the same thing. It's an oxygen-enriched 22 gas, air, being delivered to the patient.

29 1 Q. And is -- would "oxygen stream" have been used back in 2 2005 to cover both a constant flow and a pulse flow 3 that you just talked about? 4 A. The devices are designed to give a certain amount of 5 oxygen over a period of time. If it is delivered in 6 the pulse mode or if it's delivered in the continuous 7 mode, doesn't really make a difference for the design 8 of the device. The overall demand rate, the total 9 demand rate of the oxygen stream is what is important 10 for the design of the device. These devices will 11 include -- almost all the devices I had seen or 12 looked at will include actually a tank, a product 13 tank. The patient [sic] will be delivered from the 14 product tank while the other side of the tank, the 15 device is trying to catch up with the demand rate and 16 produce a demand rate. 17 At certain times, there is no actual oxygen 18 production occurring. So the oxygen production occurs 19 at very small intervals during the entire period. And 20 this is cyclic, what we call cyclic state, so as 21 the -- after each cycle, we hit -- the device gets 22 into the same condition so it can sustain that product	31 1 delivered as pulse or as continuous as long as the 2 device itself is producing enough oxygen to satisfy 3 what the demand is. 4 In some machines, in fact, they have both 5 modes on them out of the same device. So for the 6 device, it doesn't matter how it's delivered to the 7 patient. 8 BY MR. CREMEN: 9 Q. Would "oxygen stream" have been used by a person of 10 skill back in 2005 to describe a pulsed flow? 11 MR. ATALLAH: Same objection. 12 Go ahead. 13 A. I cannot actually answer the question because I don't 14 know everything which is written about oxygen 15 concentrators out there in the literature or in the 16 patent literature. But the term is pretty clear, 17 even in 2005, for a -- to a person of ordinary skill 18 in the art. 19 BY MR. CREMEN: 20 Q. Clear in what way? 21 A. It's clear that it's the product of the process. 22 Q. The oxygen stream is the product of the process.
30 1 demand. 2 Did I answer your question? 3 Q. Kind of. 4 A. Okay. 5 Q. So I guess I'm more interested in what the phrase 6 "oxygen stream" meant back in 2005 to a person of 7 skill. 8 MR. ATALLAH: Objection. Form 9 Go ahead. 10 A. "Oxygen stream," for somebody who's knowledgeable, 11 would mean the product gas, which is oxygen-enriched 12 air, which is predominantly oxygen. 13 BY MR. CREMEN: 14 Q. As provided to the patient? 15 A. As provided to the patient. 16 Q. And would a person of skill consider oxygen stream to 17 cover either a constant flow or pulse flow at the -- 18 in 2005? 19 MR. ATALLAH: Objection. Form 20 Go ahead. 21 A. A person in -- who is knowledgeable, for the person 22 who is knowledgeable, it doesn't matter if it's	32 1 A. Correct. 2 Q. But you don't know if a person of skill would have 3 used it to describe a pulsed flow? 4 A. As I said a minute ago or two minutes ago, for a 5 person who's designing the process itself and the 6 device, it really doesn't matter if it is delivered 7 as a pulse or continuous. Some devices will have 8 both modes on them which is coming out of the same 9 device, so that automatically tells somebody that it 10 doesn't matter. 11 Q. Is an oxygen stream and a pulsed flow synonymous? 12 A. I did not state that. 13 Q. I'm asking. 14 A. Oh. Can you speak a little bit louder, please? 15 Q. Sure. Is an oxygen stream and a pulsed flow 16 synonymous? 17 A. Oxygen stream would refer to the product of the 18 process. The terminology is a pulsed flow device and 19 a continuous flow device. So once again, how it's 20 delivered to the patient, in my expertise in the 21 chemical engineering area, really doesn't matter how 22 it's produced. The delivery method does not have any

33 1 bearing on the -- how it is produced in the machine 2 itself, and we concentrate in part on how it is 3 produced. 4 And the delivery part, it can be 5 continuous, it can be pulsed, and it can be both in 6 the device. 7 Q. I guess what I'm trying to understand is, would you 8 call either a pulsed flow or a continuous flow an 9 oxygen stream? 10 A. I will call both of them an oxygen stream. There is 11 oxygen -- there is oxygen flowing somehow, so they 12 are both oxygen stream. 13 Q. Okay. That's all I was trying to understand. 14 So let's go to Column 2 -- 15 A. Column 2... 16 Q. -- line 33, the paragraph that starts, "The industry 17 has developed a set of recommendations." Do you see 18 that paragraph? 19 A. Uh-huh. 20 Q. Okay, why don't you go ahead and read that paragraph. 21 A. Yes. 22 Q. Okay. In the third line of the paragraph, it	35 1 BY MR. CREMEN: 2 Q. Yes. Why would a standard at that time set forth the 3 equipment must weigh less than ten pounds? 4 MR. ATALLAH: Same objection. 5 Go ahead. 6 A. The weight is important for ambulatory patients. 7 They are already suffering from lack of oxygen in 8 their body. Obviously if you carry a lot of weight 9 you need more oxygen to produce that energy, so the 10 lighter the better. The ten pounds, at that time, 11 was actually a pretty ambitious target, but it was a 12 target. 13 BY MR. CREMEN: 14 Q. The second standard says that "Equipment must provide 15 the equivalent of 2 liter/min of continuous flow of 16 oxygen." 17 Do you see that? 18 A. I see it. 19 Q. What does continuous flow mean? 20 A. Continuous flow, like we were discussing about ten 21 minutes ago, is a way of delivering oxygen to the 22 patient continuously in contrast to delivering the
34 1 references a Fifth Oxygen Consensus Conference. Do 2 you see that? 3 A. Yes. 4 Q. Were you involved with the Fifth Oxygen Consensus 5 Conference? 6 A. No, I was not, but I knew of it. 7 Q. Were you involved in any oxygen consensus conference? 8 A. Actually, no. 9 Q. So after -- that reference to the Fifth Oxygen 10 Consensus Conference, the patent indicates that that 11 conference set forth three standards. Do you see 12 those? 13 A. I see them. I wouldn't categorize them as standards. 14 I would categorize them as goals at that time. 15 Q. For the first, what the patent calls a standard, it 16 says, "Equipment must weigh less than ten pounds." Do 17 you see that? 18 A. Yes, I see that. 19 Q. Why would you want a product to weigh less than ten 20 pounds? 21 MR. ATALLAH: Objection. Form. 22 A. Can you speak louder -- a little bit louder again?	36 1 patient oxygen when they are just inhaling. 2 Q. And then the third standard says, "The flow rate must 3 be maintained for four hours or more." 4 Do you see that? 5 A. Yes, I see that. 6 Q. Is that referring to the flow rate of 2 liters per 7 minute? 8 A. 2 liters per minute for four hours is -- was the 9 target. 10 Q. Okay. In the next sentence it refers to "personal 11 oxygen systems (POS)." Do you see that? 12 A. Yes. 13 Q. Is POS synonymous -- I'm sorry, let me start over. 14 Is a personal oxygen system synonymous with 15 a personal oxygen concentrator? 16 A. No. Actually, I think "personal oxygen systems" is a 17 more general term than "oxygen concentrator." 18 Q. What would be the difference? 19 A. Personal oxygen systems will include things like 20 compressed oxygen tanks that you may see in the 21 shopping areas. Used to be much more common that 22 people will cart a cylinder of oxygen or cryogenic

37 1 oxygen tanks. That will be part of the personal 2 oxygen system. It might even actually refer to the 3 cannula that the patient is wearing on their nose. 4 That's part of the system. 5 Q. Okay. Would a -- 6 A. It's a much general term. 7 Q. Would a portable oxygen concentrator be a type of 8 personal oxygen system? 9 A. Correct. 10 Q. In the next to last sentence of the paragraph, it 11 starts, "Ideally, a POS is small, lightweight, quiet, 12 and flexible." 13 Do you see that? 14 A. Yes. 15 Q. What does "flexible" mean? 16 MR. ATALLAH: Objection. Calls for a legal 17 conclusion. 18 Go ahead. 19 A. I think what is flexible, is explained there, which 20 says -- which allows the device to be concealed from 21 the public. I think that's what they meant, at least 22 in this patent. It is -- I'm not familiar with that	39 1 break. 2 MR. CREMEN: Yep. 3 MR. ATALLAH: Whenever you get to it. 4 MR. CREMEN: Just do this paragraph and 5 then we can take one. 6 BY MR. CREMEN: 7 Q. So column 3, line 45, this paragraph starts, "Figure 1 8 is a front view." Do you see that? 9 A. Yes, I see that. 10 Q. Why don't you go ahead and read that paragraph and 11 then I'll ask you a couple of questions about it. 12 A. 95 percent, yes. 13 Q. Okay. And the next to last line, it says, "Can 14 produce a product stream of gas." Do you see that? 15 A. Yes. 16 Q. Is "product stream" the same thing as "oxygen stream" 17 that we were talking about earlier? 18 A. Correct. 19 Q. And in the line before that, it says -- or two lines 20 before that, it starts out, "Oxygen concentrator 100 21 is compact and light." 22 Do you see that?
38 1 term, but... I mean, I know what the "flexible" 2 means, but I think in this context they are trying to 3 say it is -- it can be concealed easier. That's what 4 it says in there already. 5 BY MR. CREMEN: 6 Q. Okay. Then in the last sentence, it starts, "The 7 present invention." Do you see that sentence? 8 A. Yes. 9 Q. Okay. It says that it "meets and exceeds these 10 standards." Do you see that? 11 A. Yes. 12 Q. Do you know what standards it's referring to? 13 A. Throughout the paragraph, the standards is used as 14 the -- what I termed as the targets from the Fifth 15 conference, Oxygen Consensus Conference, so I will -- 16 since it refers to it, those three items as 17 standards, so I think that's what he means in that. 18 The authors mean those three things. 19 Q. Okay. Let's go to column 3 -- 20 MR. ATALLAH: Tim, no big rush, but 21 whenever you reach a decent just break point, we've 22 been going for about an hour, just for a comfort	40 1 A. Yes, I see it. 2 Q. And then later on in that sentence, it says, "so as 3 not to interfere with ambulatory movement of patient 4 P." 5 Do you see that? 6 A. Yes. 7 Q. Do you know what "ambulatory movement of patient P" 8 means? 9 MR. ATALLAH: Objection. Legal conclusion. 10 Go ahead. 11 A. In medical terminology, "ambulatory" means somebody 12 who needs oxygen. "Ambulatory patient" means this 13 person needs oxygen outside a hospital environment, I 14 think. 15 MR. CREMEN: All right, why don't we take a 16 break. 17 MR. ATALLAH: Great. 18 (Off the record at 10:32 a.m.) 19 (Back on the record at 10:44 a.m.) 20 BY MR. CREMEN: 21 Q. Okay. One housekeeping thing from earlier. I think 22 each of us heard it a little differently. How many

41 1 hours did you spend -- have you spent in connection 2 with preparation of your declaration, roughly? 3 A. In preparation of the declaration. Writing it, going 4 over the drafts and clarifications, I spent 20 hours 5 maybe. But in preparation, total preparation, 6 examining the patents and other documents involved in 7 this case, at the point where I was -- actually 8 signed the declaration, we were up to 60 hours. 9 Q. I think you had said you spent up to 100 hours -- 10 A. Total. 11 Q. -- total. Right? 12 A. Yeah. 13 Q. So it's about 100. Correct? 14 A. 100 is up to today. 15 Q. Okay. 16 A. Up to the signing of the declaration is 60, 70 hours. 17 Q. Okay. All right. Let's look at this '614 patent, 18 column 3, line 60, the paragraph that starts, 19 "Figure 2 is a perspective view." 20 Do you see that? 21 A. Yes, I see it. 22 Q. Okay. Why don't you go ahead and read that paragraph.	43 1 all of them that I had examined or looked at, 2 studied, will have an oxygen tank, and I-- that 3 reservoir is same as what -- they used the word 4 "reservoir" rather than a oxygen tank, and the main 5 reason for that is the oxygen concentration by 6 pressure vacuum adsorption does not produce oxygen 7 continuously. 8 It intermittently produces oxygen, and so 9 that -- there's a buffer tank is what the chemical 10 engineering people call it so that the oxygen can be 11 supplied to the patient when the process is not 12 actually producing it at that instant. 13 Q. And if we look at Figure 2, each of those modules 14 that's discussed in the paragraph we were just talking 15 about, they're provided separately on the belt. 16 Right? 17 A. In this patent, yes. 18 Q. Is there an advantage to providing the modules 19 separately on the belt? 20 A. It is a convenience for the patient that distributes 21 the weight around rather than -- on a shoulder strap, 22 for example, here. You have all the weight on one
42 1 A. Yes, go ahead. 2 Q. Okay. And feel free to reference the figures that 3 it's referenced -- that's discussed in this paragraph. 4 A. Yeah. 5 Q. But my question is -- actually, let me start -- let me 6 start with a different question. So the sentence 7 identifies a -- the first sentence of this paragraph 8 identifies a "power pack reservoir" and "user 9 interface." Right? 10 A. Not -- well, first sentence, yes. 11 Q. Was using a power pack in a portable oxygen 12 concentrator known by 2005? 13 A. 2005 timeframe, most of the oxygen devices were what 14 they come to call them as transportable, which would 15 mean they have wheels. It's like a carry-on luggage. 16 And power pack, they had batteries in them, but I 17 can't tell you if anybody used the words "power 18 pack." 19 Q. What about "reservoir," was that used in personal -- 20 A. Yeah. 21 Q. -- by 2005? 22 A. Yes. As I mentioned before, these devices, almost	44 1 strap, so that is an obvious advantage. 2 Usually the devices were not designed as 3 separate modules like this. They are usually packed 4 into a single cover. So in that respect, this patent 5 is unique. Or different, I should say. I can't say 6 if it's the only one. 7 Q. Let's go to the section starting in column 6. There 8 is a column titled "vacuum swing" -- I'm sorry. 9 There's a section titled "vacuum swing adsorption" 10 starting at line 37 and it runs for several paragraphs 11 through column 7, line 19. So why don't you review 12 that, those paragraphs, and let me know when you're 13 ready for some questions about them. 14 A. Yes, sir. 15 Q. What are these paragraphs discussing? 16 A. They are discussing, in general, the phases that are 17 involved in vacuum swing adsorption. As the title 18 suggests, it says Overview. Later on, they actually 19 discuss in more detail some of the other phases that 20 are involved, it's just the overview in here. 21 Q. Was the VSA process known before 2005? 22 A. Yes.

45 1 Q. Do these paragraphs talk about any new elementation of 2 the VSA process in this patent? 3 MR. ATALLAH: Objection. Vague. 4 A. Any new what? Any new -- 5 BY MR. CREMEN: 6 Q. Let me rephrase that. Is there anything different 7 about the way the VSA process was implemented in the 8 '614 patent as compared to the prior art, to your 9 knowledge? 10 MR. ATALLAH: Same objection. 11 A. I do not see a substantial difference. There might 12 be some small differences. Like this one is -- since 13 it is a patient-worn device, the weight is very 14 important. So it's a very miniature oxygen plant, 15 essentially. VSA has been in practice for oxygen 16 production, at the industrial scale, has been 17 practiced since mid-1990s. Yeah. 18 But the just overview of it and there is 19 nothing very different that jumps on me, substantially 20 different, I should say. 21 BY MR. CREMEN: 22 Q. So these paragraphs talk about three phases: a feed,	47 1 depends on the particular design, particular design 2 of the device. It's all dictated by how much 3 adsorbent is in there and what pressure levels are 4 being used and so on. So there is no general -- I 5 cannot generalize it. 6 And as I said, it's the art of the -- of 7 these processes, so it is extremely important for 8 producing the oxygen. If I said two seconds as an 9 example, if you missed that by half a second, the 10 device will not satisfy the specifications. 11 Q. I'm not so much interested in the -- an absolute 12 amount of time. I'm more interested in the ratio of 13 time for a particular column between feed, evacuation, 14 and repressurization. 15 A. I still cannot generalize it. Usually pressure 16 change steps are faster, like repressurization and 17 evacuation are faster than the -- than the feeds 18 that we're -- the end of the feeds that you're 19 producing oxygen usually. But again, it depends on 20 the specific design. 21 Q. Okay. The last paragraph of this section, starting at 22 column 7, line 13, begins, "This constitutes the
46 1 evacuation, repressurization. Right? 2 A. Yes. 3 Q. Were those the phases you were discussing earlier? 4 A. Yes. Each machine, depending on the design, can have 5 up to eight phases. This one they are disclosed in 6 this patent is based on three phases. 7 Q. Generally speaking, how much time is each column in a 8 particular phase? 9 A. Depends on the production rate, how large the unit 10 is. These in-person oxygen concentrators, it can be 11 as short as a couple of seconds, three seconds, two 12 seconds. 13 Q. Is it -- for a -- for a particular column, is -- are 14 the phases split equally so is the feed 33 percent or 15 is it something different? 16 A. Oh, it's pretty much never the same time. That's the 17 art of the process design. So, again, depending on 18 which particular design, but they don't have to be 19 around, and, in fact, most of them they are not. 20 Q. So what would be a typical percentage of time that a 21 column in the VSA process would be in the feed phase? 22 A. I really can't answer that question because it	48 1 general principles." Do you see that? 2 A. In column 5? 3 Q. I'm sorry, column 7. 4 A. Column 7. 5 Q. Starting at line 13 is a paragraph that says, "This 6 constitutes the general principles." 7 A. Yes, I see that. 8 Q. And you have cited this paragraph in your declaration. 9 Right? 10 A. Yeah. Probably. 11 Q. There's lots of paragraphs. 12 A. Yes. 13 Q. The first sentence says, "This constitutes." Do you 14 see that? 15 A. Yes, I see the paragraph. 16 Q. Do you know what general principles the -- is being 17 referred to in that sentence? 18 A. The sentence is pretty clear. It says, "General 19 principles of vacuum swing adsorption for gas 20 separation." 21 Q. Is it talking about the general principles that were 22 discussed in the previous two paragraphs?

49 1 A. The previous few paragraphs are also about the vacuum 2 swing adsorption, so I would say yes. 3 Q. The next sentence starts, "All phases." Do you see 4 that? 5 A. Yes, I see that. 6 Q. When it talks about phases, is it talking about the 7 feed evacuation and repressurization phases that were 8 discussed earlier? 9 A. Correct. Yes. 10 Q. So is this sentence saying that a single column or 11 multiple columns can perform all three phases? 12 A. Correct. 13 Q. The final sentence says, "If a plurality of columns 14 are used." Do you see that sentence? 15 A. Yes, I see it. 16 Q. Okay. The end, it says, "constant product flow." Do 17 you see that? 18 A. Yes. 19 Q. Is constant product flow synonymous with continuous 20 flow? 21 MR. ATALLAH: Objection. Form. 22 Go ahead.	51 1 A. That is what the inventors claim. I personally do 2 not see any particular advantage of that. There is a 3 big jump in efficiency of the product going -- 4 efficiency of the process -- I'm sorry, efficiency of 5 the process going from one to two columns. 6 After two columns, there are small 7 efficiencies which can be gained by additional 8 columns. Of course there are penalties also. 9 Penalties, in this case, being -- most obvious one 10 being the weight of the device. 11 So I cannot read the mind of the author 12 exactly. I can only go with what they are writing 13 here, and I personally do not see any big advantage of 14 three or multiples of three. 15 Q. You mentioned an efficiency gain in going from one to 16 two columns. What is the efficiency gain? 17 A. Not within the process disclosed here, but there is a 18 step in pressure swing and vacuum swing adsorption 19 which is called equalization, which stands for 20 equilibrating or connecting two columns together at 21 either one end or both ends to save some mechanical 22 compression -- power required for compression.
50 1 A. Give me a second. I want to refer to something. 2 BY MR. CREMEN: 3 Q. Of course. Take your time. 4 A. Constant product flow, my understanding of that is 5 the constant product flow to the patient, not 6 necessarily the constant product flow that is being 7 used to make oxygen. That's where the tank comes in, 8 the buffer tank. 9 Q. Okay. So this constant product flow mentioned in 10 the -- at the end of the paragraph we're looking at 11 now means constant product flow to the patient? 12 A. That's how I understand it. 13 Q. And is that the same concept as continuous product 14 flow? 15 MR. ATALLAH: Objection. Form. 16 Go ahead. 17 A. I do not think this '614 patent actually talks about 18 continuous versus pulse flow at all, so in that 19 respect, I will assume that's the continuous flow. 20 BY MR. CREMEN: 21 Q. Why would it be preferable to have a multiple of three 22 columns sequenced on a phase?	52 1 That's what I referred to. 2 So going from one to two -- at least two, 3 at least, will give -- will enable that phase. They 4 call it phase here, but it's normally called step. 5 It will enable the equalization step. That's where 6 the advantage will be. 7 Q. Are there any other advantages for providing two 8 columns as opposed to one? I'm sorry, let me start 9 over. 10 Are there any other advantages by providing 11 multiple columns as opposed to one? 12 A. Yes, there is. The product tank will be smaller 13 because through the overall time instead of, let's 14 say, two versus three, for the overall time of the 15 cycle, instead of producing at two intervals you will 16 be producing at three intervals, which means there 17 will be more frequent oxygen coming into the tank, 18 which means you can actually design the tank to be a 19 little bit smaller. That's one of the obvious ones. 20 There are others also. 21 Q. Can you think of any others? 22 A. Equalization, I mentioned, is an important one. In

53 1 some processes there are 10, 12 columns. Some 2 processes that use adsorption, which is not practiced 3 in personal oxygen concentrators to accomplish them, 4 but certain industrial processes, they will have 12 5 columns so they can step down the equalization 6 pressures in small increments, et cetera. 7 So there is advantages, although not as 8 big as going from one to two. 9 Q. And are there any other advantages you can think of 10 from going from one to two? 11 A. That's too general. If you ask a specific 12 implication of one to two columns on a specific 13 parameter, performance parameter, I can probably 14 answer this question better. 15 Q. Okay. What kind of-- 16 A. But if you're talking about power versus weight 17 versus adsorbent inventory, which affects the cost of 18 the device and so on, so it's just too general. 19 Q. So what kind of parameters are important when you're 20 designing a personal oxygen concentrator? 21 A. When we are evaluating the chemical process for these 22 machines, there is actually two parameters we look	55 1 A. For personal oxygen concentrators, there are other 2 parameters of course: the weight, the heat generated, 3 how convenient it's designed, the patient feels 4 comfortable. There is many, many parameters, but 5 those two I mentioned are how we will evaluate a 6 process developed for a specific adsorbent performing 7 with respect to chemical engineering aspects. 8 Other aspects, if it's wearable, if it's 9 comfortable, is not within our expertise of course. 10 Q. Does going from one column to two columns affect 11 recovery? 12 A. Yes. 13 Q. How so? 14 A. Usually two columns are more efficient. Better 15 recovery. Efficiency and recovery are two sides of 16 the same coin, so two columns are more efficient, 17 hence the recovery -- because the recovery is higher. 18 Q. How about productivity going from one to two columns? 19 A. Actually, productivity goes down because you are -- 20 it utilizes more adsorbent for the same amount of 21 production rate. 22 Q. How about weight?
54 1 at. Two very important -- most important parameters. 2 One is called the recovery, which is how much of the 3 oxygen in the feed air is actually being produced as 4 the product. 5 So the more you produce out of a batch of 6 air, the more efficient the process is. So the higher 7 the recovery, the better off the device is. That 8 relates to the power requirements. 9 The other parameter, which is the first 10 evaluated, is called -- in oxygen literature it's 11 called the bed size factor. In scientific language 12 it's called the productivity, which is how much 13 product flow is produced -- how much product flow rate 14 is produced per weight of the adsorbent material in 15 there, which determines or relates to, as you would 16 appreciate, to the weight of the adsorbent material. 17 Those are the two main parameters. 18 Q. Are there other -- 19 A. And, of course, these are all for a specified purity. 20 That is the purity of the product. 21 Q. Are there other physical parameters that are important 22 to a personal oxygen concentrator?	56 1 A. Going from one to two, the weight increases 2 obviously. And the weight and productivity, just 3 like recovery and efficiency, are two sides of the 4 same coin. 5 Q. How about weight of the overall device when you go 6 from one to two? How about weight of the overall 7 device when you go from one to two columns? 8 MR. ATALLAH: Objection. Vague. 9 Go ahead. 10 A. Typically, the adsorption columns with the adsorbent 11 and the internals such as spring, filters, and the 12 empty shell, they are not a big fraction of the 13 overall device weight, but they still contribute of 14 course. The large part of the weight is with the 15 battery in these devices. The invent of lithium-ion 16 batteries actually caused a big leap in these oxygen 17 concentrators. That's actually enabled the portables 18 rather than transportables. 19 BY MR. CREMEN: 20 Q. How about the reservoir, what kind of percentage does 21 that add to the weight? 22 MR. ATALLAH: Objection. Vague.

57 1 Go ahead. 2 A. It is a small fraction. It's just a empty tank. It 3 contributes to the size more than the weight. It's 4 just a tank. And the pressures used in these 5 processes are not very high, therefore they don't 6 have to be a very thick wall, so it's a small 7 fraction of the weight. 8 BY MR. CREMEN: 9 Q. All right. Are there any negative performance aspects 10 in your understanding from going from one column to 11 two columns? 12 A. I already mentioned the weight. The device gets more 13 complicated. You have more tanks to connect. After 14 all, these devices are made out of hundreds of parts, 15 as I mentioned. And one design goal is always to 16 make it simpler, so it gets more complicated 17 somewhat. There's more valves involved, the cost 18 goes up. You name it, sir. 19 Q. Do you know of any commercialized portable oxygen 20 concentrators that used a single column? 21 MR. ATALLAH: Objection. Form 22 Go ahead.	59 1 A. Sorry? 2 Q. How so? 3 A. You can perform all the phases of pressure swing or 4 vacuum swing or pressure vacuum swing adsorption in 5 one column, so it can be -- a device can be designed 6 with only one column which will provide constant 7 flow. 8 Q. How does a single column provide constant flow if it's 9 not always in a feed phase? 10 A. It has a tank which stores the oxygen for the time 11 while it's not being produced by the device, by the 12 process, to provide to the patient and that concept 13 is commonly called as a buffer tank in our 14 profession. 15 Q. Is that synonymous with a reservoir? 16 A. Correct. 17 Q. Going back to the paragraph at column 7, starting at 18 line 13 that we've been talking about, is it your 19 opinion that this paragraph would indicate to a person 20 of skill that a single column embodiment could be used 21 in the '614 patent? 22 MR. ATALLAH: Objection. Form
58 1 A. Not that I know of. There are a few patents out 2 there and it's been covered in scientific 3 literatures. 4 BY MR. CREMEN: 5 Q. Do you have any knowledge as to why a manufacturer 6 would not offer a portable oxygen concentrator using a 7 single column design? 8 A. I can't really speak to other people's minds, but my 9 suspicion is because of the inefficiency, which makes 10 the battery larger, which makes the -- harder for the 11 patient to carry it. 12 Q. Is the use of multiple columns in a -- I'm sorry, 13 strike that. 14 Back in 2005, was the use of multiple 15 columns in a personal oxygen concentrator necessary to 16 provide constant flow to the patient? 17 MR. ATALLAH: Objection. Vague. 18 Go ahead. 19 A. The technology can be performed with the constant 20 flow to the patient with only one column. 21 BY MR. CREMEN: 22 Q. How so?	60 1 Go ahead. 2 A. The patent reads, "All phases can be accomplished 3 with a single column." So it is stating that it can 4 be done with one column. 5 BY MR. CREMEN: 6 Q. Do you recall if any other portions of the '614 patent 7 indicate that its process can be performed using a 8 single column? 9 A. Yes, Claim 1 actually. It doesn't say single column, 10 but it says, "separation cartridge selectively 11 removable from a receptacle by movement relative to 12 the receptacle in a first direction, the separation 13 cartridge comprising an inlet oriented in a second 14 direction opposite to the first direction, and a bed 15 of adsorbent material configured to preferentially 16 adsorb nitrogen." 17 It talks about adsorbent bed or column in a 18 singular manner. 19 Q. Other than Claim 1 and the paragraph in column 7 that 20 we've been talking about, do any other portions of the 21 '614 patent indicate that a single column can be used 22 in this invention?

61 1 A. I do not recall anywhere else than those two 2 instances, but there might be, but I do clearly 3 recall those two instances where it's mentioned. 4 If you'd like, I can read the patent again. 5 Q. No, that's okay. Maybe at the end of the deposition. 6 A. Okay. 7 Q. What -- if we looked at the embodiment shown in the 8 figures of the patent, Figure 2. 9 A. You said Figure 2? 10 Q. Yes. 11 A. Okay. 12 Q. You can pick any of the figures. How would a person 13 of skill, back in 2005, have modified the design shown 14 in Figure 2 to utilize a single column? 15 MR. ATALLAH: Objection. Form 16 Foundation. 17 Go ahead. 18 A. I cannot honestly answer that question. There is one 19 million ways to modify on any design, so I am sure if 20 I am asked to modify it somehow, I will find a way to 21 modify it somehow. After all, everything is based on 22 prior knowledge and prior art, and any improvements	63 1 That implies the compressor has to be 2 larger or the vacuum pump in this case has to be 3 larger. As I said, it's all tradeoffs among many 4 different parts. 5 BY MR. CREMEN: 6 Q. If you had to increase the pump and battery size, do 7 you know if the design in Figure 2 would still be less 8 than ten pounds? 9 MR. ATALLAH: Objection. Form Vague. 10 Go ahead. 11 And it assumes facts not in evidence. 12 A. The weight numbers are not given in this patent. The 13 only thing that's relevant to weight is mentioned 14 with the results of the oxygen conference, so I 15 really don't know what the weight is as designed. 16 You are asking me if I can make something, 17 which I don't know how much it weighs, less than ten 18 pounds with a single column. I cannot answer the 19 question. 20 BY MR. CREMEN: 21 Q. Were you aware of any single column personal oxygen 22 concentrators before 2005 that weighed less than ten
62 1 can be effected. So that's just too general for me 2 to answer. 3 BY MR. CREMEN: 4 Q. Is there something first you would look to to modify? 5 A. Once again, it's just too general. Modify what? If 6 you want me to modify, reduce the battery size, 7 there's ways of doing that. If you want to reduce 8 the weight, there's ways of doing that. Of course 9 these are all tradeoffs, but there is ways to modify 10 anything. 11 Q. I guess my question was, if you wanted to use a single 12 column design in the embodiment shown in Figure 2, are 13 there particular aspects of the design that you would 14 have to change? 15 MR. ATALLAH: Objection. Form 16 Foundation. Mischaracterizes. 17 Go ahead. 18 A. Well, two of them are obvious from our discussion 19 over the last five minutes. One is, the tank needs 20 to be larger to perform or to provide the same amount 21 of oxygen. And the battery needs to be larger 22 because the efficiency will be lower.	64 1 pounds? 2 A. No. There is no single column oxygen concentrators 3 in practice; there are patents and publications about 4 them. 5 Q. Okay, let's look at column 11. 6 MR. ATALLAH: Did you say 11? 7 MR. CREMEN: Yes. 8 BY MR. CREMEN: 9 Q. 11, the paragraph that bridges column 11 and 12, 10 starts at line 61 of column 11, "Figure 7 shows." 11 A. What "Figure 7 shows," yes. 12 Q. So why don't you read that paragraph and let me know 13 when you're done. 14 A. Yes, go ahead, please. 15 Q. And then it refers to Figure 7. So if you -- 16 A. Yeah, I already looked at it. 17 Q. Okay. So Figure 7 shows cartridge 206 removed from 18 receptacle 208. Right? 19 A. Correct. And also the power pack removed from its 20 own receptacle. 21 Q. And the receptacle is located in module 116. Right? 22 A. 116 for the separation cartridge and 106 for the

65 1 power pack. 2 Q. Are there -- so at -- I think in your report you 3 described the receptacle as a "space." Right? You 4 can refer to it. 5 A. Yes. 6 Q. Are there -- are there physical features that define 7 the space? 8 A. There are physical features, yes, around that space. 9 Q. And what are those features? 10 A. Depending on which receptacle we are talking about, 11 there will be other things. Something probably to 12 hold it in place so it doesn't fall off as the 13 patient is walking. The shapes of the cartridge and 14 the receptacle has to be compatible, et cetera. 15 Q. Okay. In the last sentence of the paragraph we were 16 looking at a moment ago, which is column -- 17 A. 12. 18 Q. Yeah, it's at column 12, yeah. The first full 19 sentence in column 12. It says, the "Adsorbent 20 cartridge and power pack 108 are easily removable to 21 facilitate replacement." 22 Do you see that?	67 1 Would easily removable cover a -- strike 2 that too. Sorry. 3 Would cartridge 206 still be easily 4 removable from receptacle 208 if there was a cover you 5 had to remove first? 6 A. If it doesn't involve specific tools to remove the 7 cover. This patent is talking about a cartridge, and 8 the cartridge, in the common language, is usually 9 easily removable, although there might be some lids 10 to open and clips to unclip and things like that. We 11 all know about print cartridges, for example. They 12 are -- they do not involve special tools. Some 13 might, but I don't think those printers would be 14 sold. 15 Or easily removable is a -- is somebody 16 that is -- a common person can remove it, is how I 17 take it. In the print cartridge example, I have seen 18 printers where there is a -- some kind of a tool to 19 pop it out or something like that. But the user can 20 actually remove it pretty easily. 21 Q. Would cartridge 206 still be easily removable if it 22 was threaded into the receptacle?
66 1 A. Yes. 2 Q. Does "easily removable" mean something to a person of 3 skill? 4 MR. ATALLAH: Objection. Calls for a legal 5 conclusion. 6 A. There is no specific meaning to "easily removable" in 7 the art because it's common language. Easily 8 removable means something that can be removed easily. 9 BY MR. CREMEN: 10 Q. Is cartridge 206 easily removable from receptacle 208 11 in Figure 7? 12 A. That is what the patent claims, and from the figures 13 and descriptions, it looks like it's easily 14 removable. 15 Q. Does the '614 patent indicate how cartridge 206 is 16 secured in receptacle 208? 17 MR. ATALLAH: Objection. Vague. 18 Go ahead. 19 A. I don't think it's mentioned anywhere in the patent 20 specifically how it's secured in the receptacle. 21 BY MR. CREMEN: 22 Q. Would you consider something -- strike that.	68 1 A. I would say so. 2 Q. Is there a borderline, in your opinion, as to when 3 cartridge 206 would become not easily removable? 4 MR. ATALLAH: Did you say a borderline? 5 Objection. Form. Vague. 6 Go ahead. 7 A. Yes. If I need to have my wife try to remove her 8 oxygen concentrators cartridge and she has to use 9 screwdrivers and pliers and tools and take a bunch of 10 pieces off to access the cartridge in the first 11 place, that will not be easily removable and I will 12 not advise that to her because easily can damage the 13 machine itself. 14 BY MR. CREMEN: 15 Q. So is it -- is it fair to say, in your opinion, that 16 something becomes not easily removable when you have 17 to use tools to remove it? 18 MR. ATALLAH: Objection. 19 A. When you start disassembling. 20 BY MR. CREMEN: 21 Q. Is there a difference in your mind between something 22 that is easily removable as opposed to just something

69 1 that's removable? 2 A. There is a difference. Everything in these devices 3 are removable. They are assembled by trained people 4 in particular fashion, so everything in them is 5 removable. So easily removable is quite different 6 than removable in my opinion. 7 Q. And when cartridges -- sorry. Strike that. 8 If you look back at Figure 7, when the 9 cartridge is inserted into the receptacle, is it in 10 fluid connection with the remainder of the 11 concentrator? 12 A. Can you repeat that, please? 13 Q. When you insert the -- when you insert the cartridge 14 into the receptacle, is it then in fluid communication 15 with the rest of the concentrator? 16 A. To perform its job to separate the nitrogen out of 17 air, it has to have fluid connection with the rest of 18 the device so it can receive compressed air or vacuum 19 or whatever. 20 Otherwise, it will be a meaningless part of 21 it. 22 MR. ATALLAH: Tim, no rush. Whenever you	71 1 there some other feature in there? 2 MR. ATALLAH: Objection. Vague. 3 A. "Hermetically sealed," in this context, means it 4 doesn't have contact with the ambient air, so it can 5 be pressurized and depressurized or vacuumed. 6 BY MR. CREMEN: 7 Q. Okay. Let's look at Figure 16 for a second. So the 8 adsorption columns in Figure 16 are labeled 130a, b, 9 and c. Right? 10 A. Yes. 11 Q. Are those columns hermetically sealed by the structure 12 of the cartridge 230 when it's assembled? 13 A. And the cap. It is, of course, in that -- this is 14 expanded view, so it shows that they are normally in 15 230. It also has a cap on it which is not really 16 given a specific number, but it is where 103 is 17 connected. 103 is showing here the oxygen port. 18 There would be a gasket in between the cap 19 and the columns. Those will seal it from the 20 environment. 21 Q. And in Figure 16, the columns 130a, b, and c are shown 22 with a cylindrical shape. Right?
70 1 get to another decent breaking point... 2 MR. CREMEN: Let's go for a few more 3 minutes here. 4 BY MR. CREMEN: 5 Q. Let's look at column 18. There's a paragraph starting 6 at line 30, it begins "Figure 15 is a perspective 7 view." Do you see that? 8 A. Yes. 9 Q. Okay. Go ahead and read that paragraph and I'll ask a 10 few questions when you're done. 11 A. Yes, sir. 12 Q. Okay. So this paragraph talks about the features of 13 the separation cartridge of the '614 patent. Right? 14 A. Yes. Some of the features, yes. 15 Q. It says in here, about halfway down, there's a 16 sentence on line 36-ish, it says, "each adsorption 17 column 130a - 130c is in a hermetically sealed 18 container containing a bed of adsorption material." 19 Do you see that? 20 A. Yes. 21 Q. Is the hermetically sealed container in this 22 embodiment something different than the cartridge? Is	72 1 A. Correct. 2 Q. Would that shape be maintained when the absorbent 3 [sic] is removed from the cartridge? 4 MR. ATALLAH: Objection. Form. 5 A. The adsorbent is actually particle material, and in 6 the paragraph you mentioned in column 18, page -- 7 line -- this is line 43, "the adsorbent bead size is 8 thirty by sixty mesh," so it gives what 30 by 60 mesh 9 means in common measurements, inches and centimeters. 10 So the adsorbent is actually particles. The artist 11 chose to depict it as a cylinder because the 12 container of the particles is a cylinder. 13 BY MR. CREMEN: 14 Q. Okay. 15 A. So, no, they won't be. The particles will fall 16 apart. 17 Q. Do you know what a spin inducer is? 18 A. Yes, I do. It induces mixing of gases or liquids 19 when they are flowing through it. 20 Q. Do you know how it functions? 21 A. It's by fluid dynamics, so it depends on how much 22 detail you want to go into, but -- I've taught fluid

73 1 dynamics many times. 2 Q. In the embodiment shown in Figure 16, how would the 3 spin inducers function? 4 A. In my opinion there is no reason to put a spin 5 inducer in these columns, but the inventors chose to 6 put them in there and disclose it. I cannot 7 rationalize what -- I cannot know what their 8 rationalization was. I'm presuming there was a 9 rational reason for it. 10 One thing for sure, though, we always have 11 to include some space in between solid walls at the 12 inlet and outlet and the packing for the gases to 13 distribute. Otherwise, parts of the adsorbent around 14 the inlet, for example, away from the inlet connection 15 itself, will not be exposed to the changes and that 16 part will be useless. 17 So we -- there is usually some kind of a 18 spacer because inlets or outlets are in smaller 19 diameter. Some kind of a spacer so that the -- 20 actually, the particles don't sit all the way to the 21 wall where the inlet is connected, for example. 22 Q. And what forms that space?	75 1 so that the particles will not -- cannot move. We do 2 not want the particles moving. It will hurt the 3 process. Also the particles may break up because of 4 the movement. So it's never desirable to have the 5 particles moving, and they keep the particle packing 6 compact or compressed. 7 Q. How strong are the springs? 8 MR. ATALLAH: Objection. Vague. 9 A. Usually we shoot for a spring constant -- back it up. 10 We definitely shoot for a spring constant 11 which will not exceed the crush resistance, which is 12 measured in pressure but the conversion of the area. 13 We do not want to exceed the crush resistance of the 14 particles in there, which the manufacturers will test 15 and specify. 16 BY MR. CREMEN: 17 Q. Is there a reason the spring is placed on the 18 right-hand side in Figure 16 of the column? 19 A. I addressed that issue in my declaration. The spring 20 is usually placed at the end of the column where the 21 particles are filled into the column. 22 Q. Do you know if other -- sorry. Strike that.
74 1 A. I guess the inventors here were using the spin 2 inducers, S spacers, but it can be -- it doesn't have 3 to have veins on it. In this figure, if you look 4 carefully, on those things you will see some -- how 5 do I call it? You will see some slots. Those serve 6 as veins actually to mix the gases up. Most of the 7 time it will be just a simple spacer between the wall 8 of the bottom of the column, for example, and with 9 the -- where the adsorbent packing starts. I hope I 10 made that clear. 11 Q. Yes. Does the spacer help retain the adsorbent or 12 does it just provide a space of some kind? 13 A. Well, it's -- the name is spacer. Some spacers will 14 retain the adsorbent also. Depends on what type of 15 spacer is placed in there. It could be as simple as 16 just a ring with the retainer on top of it just to 17 provide some volume for the gases to distribute. 18 Q. And there are springs shown at 286a, b, and c. 19 Correct? 20 A. Yes. 21 Q. What do the springs do? 22 A. The springs keep compression on the particle packing	76 1 Do you know if oxygen -- strike that again. 2 Do you know of personal oxygen 3 concentrators that use a spring on the opposite side? 4 MR. ATALLAH: Objection. Vague. 5 A. Once again, it is included at the side where the 6 particles are packed from. So from this expanded 7 view I can tell you that the particles are packed 8 from the right-hand side of the figure where the 9 label 103 is. If they were at the bottom, it would 10 be next to impossible to pack them and to have a 11 uniform compaction or uniform compression throughout 12 the column. 13 BY MR. CREMEN: 14 Q. You said impossible? 15 A. Next to impossible. 16 Q. But do you know of any other personal oxygen 17 concentrators that use a spring on the side of the 18 adsorbent column opposite to its direction of loading? 19 A. I cannot speak for all oxygen concentrators and I 20 cannot speak to how all oxygen concentrators are, the 21 material is packed in them, but the skilled in the 22 art will not do that because it complicates the

77 1 packing process and it can actually hurt the process. 2 MR. CREMEN: Let's take a break. 3 (Off the record at 11:54 a.m.) 4 (Back on the record at 12:12 p.m.) 5 BY MR. CREMEN: 6 Q. Okay. Let's go to Claim 1 in column 26 of the '614 7 patent. And you -- if I say "claim limitation," do 8 you know what that means? 9 A. Yes. 10 Q. So the first limitation of Claim 1 starting on line 15 11 begins, "a separation cartridge selective removal 12 from." 13 Do you see that? 14 A. Yes. 15 Q. And then let's look at column -- I'm sorry, at 16 Figure 7. We can look at the claim in Figure 7 at the 17 same time. 18 A. Yes, sir. 19 Q. Okay. In your opinion, does this -- does the first 20 limitation cover the embodiment shown in Figure 7? 21 A. The claim talks about the removal directions and 22 the -- how the removal direction is rated to the	79 1 A. Yes, it is the space in -- the space in 116. 2 Q. How do you determine if something is moving in a 3 particular direction away from a space? 4 A. From the drawing, the cap is larger than the opening 5 of that space in the receptacle. The cap of the 6 separation cartridge, I should say. So I am 7 presuming it is pulled out since it can't be any 8 other direction, physically limited. 9 Q. Okay, let's go look back at the claim language 10 limitation we were looking at in column -- in Claim 1. 11 Does the claim require any structure for 12 the receptacle? 13 A. No. It's just a receptacle. It doesn't specify any 14 structure. 15 Q. Does the claim require the receptacle to be arranged 16 anywhere in particular in the portable oxygen 17 concentrator? 18 MR. ATALLAH: Objection. Vague. 19 A. It does not specify where it should be. 20 BY MR. CREMEN: 21 Q. Does the claim require the receptacle to be accessible 22 from outside the personal oxygen concentrator?
78 1 inlet and outlet. Figure 7 doesn't show any 2 direction. So in Figure 7, it looks like they 3 removed it pulling it up out of the receptacle. 4 Q. Okay. Could you tell me what the separation cartridge 5 is in Figure 7? 6 A. In Figure 7, that is marked as 206. 7 Q. And could you tell me what the receptacle is in 8 Figure 7? 9 A. Receptacle is 208. I'm gonna -- give me a second. 10 Q. Okay. 11 A. I have to look at where Figure 7 is described. 208. 12 Q. And what would the first direction be in Figure 7? 13 A. In this depiction, it will be up. 14 Q. So vertically upward from receptacle 208, is that... 15 A. Correct. 16 Q. So the claim limitation we were looking at requires 17 that the separation cartridge be removable by movement 18 relative to the receptacle in a first direction. 19 Right? 20 A. Correct. 21 Q. And you have opined in your declaration that the 22 receptacle is a space. Right?	80 1 A. It does not say that. 2 Q. Does the claim language require the cartridge to be 3 removable from the personal oxygen concentrator? 4 A. Claim 1 starts with "A portable oxygen concentrator, 5 comprising: a separation cartridge," so it's part of 6 the oxygen concentrator. 7 Q. So the language we're looking at requires the 8 separation cartridge to be removable from the 9 receptacle. Right? 10 A. Yes. Receptacle is part of the oxygen concentrator. 11 Q. Does the claim require the separation cartridge to be 12 removable from the portable oxygen concentrator? 13 A. It doesn't specifically state from the oxygen 14 concentrator, but as I read this claim, "A portable 15 oxygen concentrator, comprising," and then comes the 16 first limitation, which, in my opinion, makes the 17 receptacle part of the oxygen concentrator. 18 Q. Okay. So this limitation we're looking at requires 19 the cartridge to be selectively removable from a 20 receptacle by movement relative to the receptacle in 21 the first direction. Right? 22 A. Correct.

81 1 Q. Would that description of movement mean anything 2 different to a person of skill than just saying 3 selectively removable from a receptacle in the first 4 direction? 5 MR. ATALLAH: Objection. Form 6 A. It defines the reference for the motion of movement. 7 It defines the receptacle as the reference to the 8 movement of taking the receptacle out. So all 9 movements are relative, but in "relative to" means, 10 we're talking about the movement to as the receptacle 11 taken as the stationary object. 12 It's a frame of reference. 13 BY MR. CREMEN: 14 Q. If you're removing the cartridge from the receptacle, 15 aren't you already moving it away from the receptacle? 16 A. Correct. 17 Q. So what does by movement relative to the receptacle 18 add to that description? 19 MR. ATALLAH: Objection. Asked and 20 answered. 21 A. Everything is moving with earth, so whenever talk -- 22 we're talking about movement, we always define -- in	83 1 MR. ATALLAH: Objection. Vague. Asked and 2 answered. 3 Go ahead. 4 A. Both might be moving, as I mentioned, in a different 5 frame of reference. But if a motion is described 6 relative to something, that motion is regarded as 7 that something is stationary in that frame of 8 reference. 9 BY MR. CREMEN: 10 Q. Does the claim language say that the separation 11 cartridge is moving? 12 A. It says removable, which implies there is movement of 13 that object if it's selected to be removed. 14 Q. Does the phrase, "a separation cartridge selectively 15 removable from a receptacle by movement relative to 16 the receptacle in a first direction" require the 17 cartridge to move or just have the capability of 18 moving? 19 A. "Removable" means, as I understand it, it has the 20 capability of being removed. 21 Q. So I just want to make sure I understand your opinion. 22 So if I were to say object A moves relative to object
82 1 physics, define a frame of reference. And the frame 2 of reference in this case is the receptacle, in this 3 language, the way I understand it. 4 BY MR. CREMEN: 5 Q. So in your opinion, this language sets the frame of 6 reference for the movement in terms of the receptacle. 7 A. Correct. 8 Q. Okay. If I say object A moves relative to object B, 9 that would cover movement of object A, object B, or 10 both. Right? 11 A. No. 12 Q. Why not? 13 A. Because you defined the frame of reference as object 14 B. If object B -- as I mentioned, the earth is 15 moving, so everything is moving. If object B is 16 moving also, it really doesn't matter. So when we're 17 talking about movements, we refer it to a frame of 18 reference, and in this case the frame of reference is 19 the receptacle. 20 Q. If I say object A has movement relative to object B, 21 does that -- could that movement be provided either by 22 object -- the movement of object A, object B, or both?	84 1 B, is it your opinion that requires object B to be 2 fixed? 3 A. It does not because, as I mentioned, we are all 4 moving. Earth is moving. So you fix the frame of 5 reference on object B. It doesn't imply anything 6 about object B's movements. 7 Q. So if I were to fix a frame of reference on object B, 8 and object B moves away from object A, object A is not 9 moving relative to object B? 10 A. But now you changed the frame of reference to object 11 A by saying that. 12 Q. So in your opinion, the frame of reference has to 13 remain fixed in this relative movement analysis. 14 A. When we are talking about the movement of two objects 15 related to each other, one of them is chosen as the 16 frame of reference. 17 Q. Okay. Let's look at the same limitation, but the 18 second half of it, that recites, & "the separation 19 cartridge comprising an inlet... an outlet... and 20 adsorbent material." 21 There's some other language there, but do 22 you see that limitation?

85 1 A. Yes. 2 Q. Now let's look at Figure -- let's look at Figure 15. 3 A. Yes. 4 Q. Does Figure 15 have an inlet, an outlet, and a bed of 5 adsorbent material? 6 A. Figure 15 is for a specific description for -- as an 7 example in this case, so it has -- it does not have a 8 single bed, it has three beds. So it is just one 9 example of -- for -- I should say, for that claim. 10 Q. But does Claim 1 -- 11 A. It's more general. 12 Q. Okay. Claim 1 covers the Figure 15 embodiment. 13 Right? 14 A. Figure 15, yes. 15 Q. Okay. Okay. Let's look at Claim 12. Claim 12 16 doesn't require a receptacle or any movement of the 17 cartridge. Correct? 18 A. Correct. 19 Q. And let's look at Claim 13. Claim 13 does not recite 20 a cartridge. Right? 21 A. Let me refresh my mind. 22 Yes, it's not mentioned. "Cartridge" is	87 1 done. 2 A. Yes, I read it. 3 Q. Okay. Was it known before 2005 that adsorbent 4 material degraded over time? 5 A. Yes, it was known particularly for oxygen separation 6 processes. The material degrades over time because 7 of the impurities in the feed which is air; feed for 8 the whole process, which is air. 9 Q. Okay. Let's look at paragraph 59. Read it and let me 10 know when you're done. 11 A. Yes, sir. 12 Q. Okay. I'm curious, on the first sentence you say, 13 "The claims of the '614 Patent are directed primarily 14 to the configuration of these beds with respect to the 15 remainder of the portable oxygen concentrator." 16 Right? 17 A. Correct. 18 Q. We just looked at Claims 12 and 13 a moment ago. 19 Right? 20 A. Correct. 21 Q. Do those specify "the configuration of"... "beds with 22 respect to the remainder of the portable oxygen
86 1 not mentioned in the claim term. 2 Q. Would a cartridge necessarily be present? 3 MR. ATALLAH: Objection. Vague. 4 A. Can you explain that? "Present" meaning... 5 BY MR. CREMEN: 6 Q. Yeah, does the -- does the bed of adsorbent material 7 that's recited in this claim have to be enclosed in 8 something? 9 A. Enclosed in something... bed of material needs to be 10 enclosed in its cover, by its cover, so that it is 11 hermetically sealed from the outside. 12 Q. And in the '614 patent, that cover is the cartridge. 13 Right? 14 MR. ATALLAH: Objection. Vague. 15 A. Part of the cartridge. There are many other parts of 16 the cartridge such as the cap. Of course the cover 17 is covering the adsorbent bed and all the internal 18 parts plus it's coupling with the cap. 19 BY MR. CREMEN: 20 Q. Okay, let's go back to your declaration and let's look 21 at paragraph 58. 22 Just read it and let me know when you're	88 1 concentrator"? 2 A. Each one of these claims starts with the sentence 3 saying, in one case, "separation cartridge for a 4 portable oxygen concentrator comprising," and then 5 follows. 6 And then 13 starts with "a portable oxygen 7 concentrator, comprising" and follows. So I will -- I 8 understand that it explains the relationship with 9 respect to the remainder of the oxygen concentrator. 10 Q. Okay, let's look at paragraph 60. 11 A. 6-0? 12 Q. 6-0, yes. Sorry. Read it and let me know when you're 13 done. 14 A. Go ahead, please. 15 Q. Okay. Does the content you have in paragraph 60 -- 16 sorry, let me start that over again. 17 Does the '614 patent teach any of the 18 information you included in paragraph 60 or is it your 19 opinion based on reading the '614 patent? 20 A. It's mostly my opinion as a person skilled in the 21 art, but I also recall that at one location it does 22 address the serviceability.

89 1 I would say serviceability. I don't know 2 the exact specific language they used, but I can 3 actually go through it and try to locate it for you, 4 if you wish. 5 Q. No, I think we can just move on from there. 6 Let's look at paragraphs 61 through 63 of 7 your declaration. Review those and let me know when 8 you're ready. 9 A. Yes. 10 Q. So the images you've reproduced in these paragraphs, 11 they're Figures 7 and 15 in the '614 patent. Right? 12 A. Yes. 13 Q. And we've discussed those earlier. Right? 14 A. We talked about these, yes. 15 Q. Other than the separation cartridge shown in these 16 figures, does the '614 patent illustrate any other 17 specific separation cartridge design? 18 MR. ATALLAH: Objection. Form. 19 A. It does not describe any other separation cartridges. 20 It does not show in the figure other separation 21 cartridges. But the Claim 1 language talks about a 22 singular -- single cartridge, as we discussed some	91 1 receptacle shown in Figure 7, does the '614 patent 2 illustrate any other specific receptacle design? 3 MR. ATALLAH: Objection. Form. 4 A. Actually, yes. I mean, they specifically call what 5 is marked as 106 in that figure as a receptacle for 6 the battery pack. Power pack, I think is the word 7 they used. 8 BY MR. CREMEN: 9 Q. Other than the receptacle specifically for the 10 separation cartridge shown in Figure 7, are there any 11 other designs shown in the '614 patent for a 12 receptacle for holding the separation cartridge? 13 MR. ATALLAH: Objection. Vague. Form. 14 Go ahead. 15 A. I didn't catch the last part of your sentence, I'm 16 sorry. 17 BY MR. CREMEN: 18 Q. So for purposes of this question, let's just focus on 19 the receptacle that holds the separation cartridge. 20 Okay? 21 A. Okay. 22 Q. Are there -- other than the Figure 7 illustration of
90 1 time ago. 2 BY MR. CREMEN: 3 Q. Does the claim -- does Claim 1 use the word "single"? 4 A. It uses the Article A, which I will take it as 5 single. 6 Q. Isn't Article -- isn't the Article A indefinite in 7 terms of number? 8 MR. ATALLAH: Objection. Form. Legal 9 combination -- or legal conclusion. 10 Go ahead. 11 BY MR. CREMEN: 12 Q. I'll reask it. Just as a matter of English language, 13 isn't the Article A indefinite as to number? 14 MR. ATALLAH: Same objection. 15 A. English is not my first language, but I've been here 16 long enough, so when it's an A input and A output, I 17 will take it as at least one. And by the way, in my 18 native language there is no articles, which makes it 19 much cleaner. 20 BY MR. CREMEN: 21 Q. Agreed. Other than the -- going back to the images 22 shown in your paragraphs 61 through 63, other than the	92 1 that particular receptacle, does the '614 patent 2 illustrate any other designs of a receptacle for 3 holding a separation cartridge? 4 MR. ATALLAH: Objection. Form. 5 A. My understanding is that the specifications are just 6 an example for the claims in a patent so they only 7 show one example. I have read other patents, many 8 other patents where there are more than one examples, 9 but there doesn't have to be, I guess. I'm not a 10 lawyer, but that's my understanding. 11 BY MR. CREMEN: 12 Q. Okay. Let's look at paragraph 66 of your declaration. 13 And go ahead and read it and let me know when you're 14 done. 15 A. Yes, sir. 16 Q. Did you review petitioner's definition of a person of 17 skill? 18 A. Petitioners... yes, it was in the original petition. 19 Q. Was there any portion that you disagreed with? 20 A. No. 21 Q. Okay. Let's look at paragraph 72 of your declaration. 22 A. Yes, sir.

93 1 Q. Are there any particular portions of petitioner's 2 definition that you disagreed with? 3 A. In this paragraph, I am talking about -- I am writing 4 about one of the statements in the petition and, in 5 my opinion, that is not correct. There are other 6 parts of the petition which I am not in agreement, 7 but if you would be more specific -- and all of those 8 other parts, I actually covered as much as I can. 9 Q. Okay. So petitioner's proposed construction was "a 10 housing that holds multiple adsorbent columns for gas 11 separation and provides separate inlet and outlet 12 ports for each adsorbent column." Right? 13 A. Right. 14 Q. Would you agree that a cartridge has to have a 15 housing? 16 A. Yes. A housing which isolates it from the 17 environment. 18 Q. Would you agree that a cartridge has to have at least 19 one inlet and outlet port for it to function? 20 A. At least one inlet and outlet for it to be performing 21 any kind of separation. 22 Q. So is it fair to say the main disagreement with	95 1 Q. And I think you mentioned earlier that it's also 2 inconsistent with Claim 1 in your view. Right? 3 MR. ATALLAH: Objection. Form. 4 A. The petitioner's petition says there has to be 5 multiple columns, and I do not see the requirement 6 for multiple columns in Claim 1 in the '614 patent. 7 BY MR. CREMEN: 8 Q. Okay. Sitting here, can you recall any other portion 9 of the '614 patent specification that is inconsistent 10 with petitioner's construction other than those two we 11 just talked about? 12 A. Other than those two, no. 13 Q. Okay, let's move on to paragraph 83. Just let me know 14 when you've had a chance to read it. 15 A. Yes. 16 Q. You know what? Sorry, I don't have a question about 17 that. Let's move on to paragraph 84. 18 A. 84. 19 Q. Yes. 20 A. Yes, sir. 21 Q. In the last sentence, you state, "In the asserted 22 claims, it is the separation cartridge that is
94 1 petitioner's construction is that it requires multiple 2 adsorbent columns? 3 A. Exactly. 4 Q. Have you ever used the term "separation cartridge" 5 before? 6 MR. ATALLAH: Objection. Vague. 7 A. Separation cartridge was not in the common language 8 in the art, in the skilled art back in 2005, but with 9 the introduction of separation cartridges actually in 10 the marketplace, it -- now somebody skilled in the 11 art will understand clearly what it means. 12 So at the time of '614 or the time relevant 13 to this IPR, it was not in the language. 14 BY MR. CREMEN: 15 Q. Okay, let's look at paragraph 73. 16 A. Go ahead, please. 17 Q. Okay. So it's your opinion that a multiple adsorbent 18 column construction is inconsistent with the 19 specification of the '614 patent based on the 20 paragraph at column 7, lines 13 through 20 that we 21 discussed earlier. Right? 22 A. Yes.	96 1 received and contained in the receptacle." 2 Is that right? 3 A. Correct. 4 Q. Do any of the claims require a separation cartridge to 5 be received and contained in the receptacle? 6 A. Can you elaborate a little bit more? 7 Q. Does Claim 1 require the separation cartridge to be 8 received and contained in the receptacle? 9 A. Claim 1 talks about "separation cartridge selectively 10 removable from receptacle," which implies to me, or 11 means to me, at least, that it is receiving the 12 separation cartridge. 13 Q. What about contained? 14 A. If something is receiving something, I will take it 15 as the receiving part is containing what it received. 16 Q. Does Claim 1 require the separation cartridge to be 17 wholly contained in the receptacle? 18 A. There is no mention of fully, but from the 19 description or the only example in the patent, it 20 contains "mostly." It contains up to the -- at least 21 up to the outlets in Figure 15, which are shown as 22 132a, b, and c.

97 1 Q. Is that construction required by the claim? 2 MR. ATALLAH: Objection. Vague. 3 A. It's just an example. The claim language does not 4 require that construction, obviously. 5 BY MR. CREMEN: 6 Q. All right, let's look at paragraph 92. 7 A. Yes, sir. 8 Q. It's your opinion that "selectively removable" means 9 something that is able to be chosen to be removed. 10 Right? 11 A. Correct. 12 Q. Is there a difference between something that is 13 removable and something that is selectively removable? 14 A. In the '614 patent, one may choose to remove the 15 separation cartridge when the cartridge is not 16 performing to what it is designed for. One would be 17 selectively removing the battery when the battery is 18 dead, for example. So -- which can be chosen -- as I 19 stated in the latter half, which shows components 20 such as separation cartridge or power pack, which can 21 be chosen to be removed. 22 Q. Those components are removable as well. Right?	99 1 Q. Okay. Let's look at paragraph 58, if you will. And 2 let me know when you've had a chance to read it. 3 A. Yes, sir. 4 Q. Okay. This paragraph teaches that Deane's components 5 can be assembled outside the shell. Right? 6 A. Without the shell, yes. Assembled outside. Correct. 7 Q. And it teaches that the components can be accessed for 8 "testing, repair and maintenance." Right? 9 A. Correct. 10 Q. Would Dean's components include manifold 512 and 11 adsorbent beds 508? 12 A. Yes. It includes everything in the -- except the 13 shell. 14 Q. Based on paragraph 58, would you agree that Dean's 15 components are removable from its chassis? 16 A. After they are disassembled. Obviously they are 17 removable. As such, the components can be assembled 18 outside. If they're assembled, they need to be 19 disassembled to be removed. 20 Q. Okay, let's look at paragraph 62. Please read that 21 and let me know when you're done. 22 A. Is it okay if I look at the figures also?
98 1 A. Correct. 2 Q. Is there -- 3 A. But -- 4 Q. Go ahead. Sorry. 5 A. But the user has to choose to remove it because they 6 won't move by themselves. 7 Q. Okay. 8 MR. ATALLAH: Tim, whenever you get into a 9 new section, we'll do a lunch break, whenever you 10 get... take your time. 11 MR. CREMEN: Actually, I think that's a 12 good spot. Let's take a break. 13 (Off the record at 1:01 p.m.) 14 (Back on the record at 2:00 p.m.) 15 MR. CREMEN: Welcome back. 16 BY MR. CREMEN: 17 Q. Let's switch gears and look at the Deane reference, 18 which is Exhibit 1004, I believe. 19 A. Yes, I've got it. 20 Q. And you reviewed this reference as part of your work 21 on this case. Correct? 22 A. Correct.	100 1 Q. Of course. Look at whatever you need. 2 A. I was referring to the figures. Yes, please go 3 ahead. 4 Q. In the first sentence, it says that "PSA Unit 506 5 generally includes a pair of adsorbent bed columns, a 6 product gas storage column, and an integrated manifold 7 512." 8 Do you see that? 9 A. Yes, I do. 10 Q. Is -- would you consider a PSA Unit 506 to be a 11 component of Deane? 12 A. Yes, this is part of the Deane. 13 Q. What does "integrated" mean in "integrated manifold" 14 to you? 15 A. I think they are referring to the fact that all the 16 walls to make the process perform are all in one 17 assembly. It was -- integrated manifolds became 18 pretty common around that time. 19 Q. Okay. Let's look at paragraph 63. Go ahead and read 20 that. Let me know when you're done. 21 A. Yes. 22 Q. So you would agree this paragraph confirms that --

101 1 sorry. Strike that. 2 You would confirm this paragraph teaches 3 that "integrated manifold 512 is mounted on the upper 4 end of the columns 508." Correct? 5 A. Correct. 6 Q. And I believe it's your opinion that, for disassembly, 7 one would remove the manifold 512 from the top of the 8 columns; is that right? 9 MR. ATALLAH: Objection. Misstates 10 testimony. 11 Go ahead. 12 A. That will be a natural way of accessing the columns 13 for this design. 14 BY MR. CREMEN: 15 Q. In the last -- second-to-last sentence of this 16 paragraph, it says that, "In one embodiment the valves 17 514 of the manifold 512 contain a plurality of contact 18 pins." 19 Do you see that? 20 A. Yes. 21 Q. What are contact pins? 22 A. The way I understand it is they are used to align the	103 1 ahead and read that and let me know when you're done. 2 A. Yes, go ahead. 3 Q. Okay. Would you agree that this paragraph teaches 4 that the PSA Unit 506 is mounted to chassis 202? 5 A. It is not mentioned in this paragraph actually, but 6 the PSA -- the PSA unit is assembled on the chassis, 7 was mentioned in the paragraph you cited two 8 questions ago. 9 Q. Uh-huh. 10 A. Yes, in paragraph 58 in relation to Figure 2. 11 Q. Is it your opinion that PSA Unit 506 cannot be 12 unmounted from the chassis 202 as a unit? 13 A. Yes, it's my opinion that 506, the PSA -- part of the 14 PSA unit which performs the separation cannot be 15 unmounted in a single piece -- as a single piece. 16 Q. Is it your opinion that it's impossible to do that? 17 A. From the information that's disclosed in the patent, 18 I do not see a means to support the bottom of the 19 columns. So a person skilled in the art would take 20 out the manifold first and then the housing that 21 contains the adsorbent and then maybe the bottom 22 filters and so on.
102 1 manifold with the housing that has the separate -- 2 the adsorbent to perform the separation. 3 Q. What is -- what's the physical structure? 4 A. Physical structure, from some of the figures parts of 5 it can be deciphered, but not the entire structure. 6 It does mention that it's -- the manifold is made out 7 of two plates, at least two plates are described, and 8 the paragraph we just looked at also discloses that 9 there are valves, solenoid valves on it. And there 10 are other parts in Figure 5 which are not identified, 11 but most of them are I think -- or at least some of 12 them are for alignment purposes and for mounting 13 purposes. 14 Q. Okay. And that's what contact pins 516 are? 15 A. The -- 516 is specific for the electrical contacts to 16 the circuit board to control the solenoid valves, 17 which are kind of depicted as rectangular objects on 18 this figure. 19 Q. Why would one use contact pins? 20 A. To pass the electricity so the solenoid valve will 21 switch position. 22 Q. Is there -- okay. Let's look at paragraph 65. Go	104 1 Q. When you say, "support the bottom of the columns," are 2 you talking about the structure of the column housing 3 or the contents of the column? 4 A. I mean the adsorbent material in the column. 5 Also it supports the housing as it sits on 6 the chassis. The bottom chassis supports the housing 7 also. 8 Q. Okay. Let's take a look at Figure 6. 9 A. Of Deane? 10 Q. Of Deane, yes. 11 A. Yes. 12 Q. What does Figure 6 of Deane show? 13 A. It shows a housing with three large openings. I'm, 14 of course, using the information in the patent also, 15 my recollection of it. It shows a spring, it shows 16 two porous plugs, the adsorbent material. It shows 17 filters at the top, fine particle filters at the top. 18 Although not shown in the figure, there are fine 19 particle filters at the bottom, filters at the 20 bottom. I think that's all. 21 Q. Do you recall what element 614 is? 22 A. 614 is a porous plug. It's a coarse particle filter.

105 1 Q. What is its function? 2 A. To hold the particles in place so that they won't 3 travel with the pressure changes and gushes of gas 4 that happens in the column during the PSA process. 5 Q. And then what about 616 and 618, do you know what 6 those are? 7 A. I have to look at the description of the figure. 8 Q. Go ahead. 9 A. 616a and 616b are annular gaskets positioned adjacent 10 to an end sealing the engagement with the ends. 11 Q. And what about 618? 12 A. What number did you say? 13 Q. 618. 14 A. It is a fine particle filter to hold the fine 15 filter – fine particle filter. It is – it looks 16 like it's a injection molded piece. Yeah, it says 17 it's an injection molded piece. It serves like a lip 18 and it holds the gasket and it holds the fine 19 particle filter, which is usually very thin. 20 Q. Does Figure 6 show all the components you'd expect to 21 be present in an adsorbent column? 22 MR. ATALLAH: Objection. Vague.	107 1 chassis. 2 Q. Does Figure 6 show the adsorbent columns removed from 3 chassis 202? 4 MR. ATALLAH: Objection. Vague. 5 A. Yes, it is a detail of the adsorption columns which 6 are shown as mounted in Figures 3 and 5. 7 BY MR. CREMEN: 8 Q. But in Figure 6, they're unmounted? 9 A. They are unmounted. It's unmounted. Well, I cannot 10 actually say it's unmounted. It's a detailed 11 drawing, so they wanted to enlarge and show more 12 detail with respect to the adsorption columns. 13 Q. Okay. Let's look at paragraph 105 of your 14 declaration. 15 A. Yes. 16 Q. Does Deane teach anything about the use of a jig to 17 assemble it? 18 A. No. The Deane patent doesn't disclose – doesn't 19 disclose any jig, but for the production efficiency 20 or production ease purposes, most of these 21 assemblies, when they are being assembled, are – 22 uses jigs to help alignment and to help the
106 1 A. Some systems will not use a porous plug and also a 2 fine particle filter. They will combine both 3 functions into a single unit. Other than that, 4 gaskets and spring and the adsorbent, so it has all 5 the essential parts. 6 BY MR. CREMEN: 7 Q. Is there a reason that a person of skill would use 8 both a porous plug and a fine particle filter? 9 A. Yes, there is a reason. That will help reduce the 10 thickness of the fine filter particle, so it will 11 adsorb less resistant to gas flow. 12 Q. Does Figure 6 show the adsorbent columns mounted on 13 chassis 202? 14 A. Figure 6 does not specifically show that. The prior 15 figure was showing it in Figure 3. 16 Q. So in Figure 3, you can see the columns mounted on 17 chassis 202. Correct? 18 A. Correct. 19 Q. Okay. And in Figure 6, it's not mounted on chassis 20 202. Correct? 21 A. Right. So Figure 6 is a more detailed drawing of -- 22 and, also, Figure 5 shows it as mounted on the	108 1 technician or the -- whoever might be putting it 2 together. That saves time. I'm speculating here. 3 Q. That was going to be my next question. 4 A. Correct. 5 Q. So does Deane teach anything about how its adsorbent 6 beds would be installed in the columns? 7 A. Correct. It doesn't -- I'm sorry, I shouldn't say 8 "correct." It does not teach anything about how it's 9 assembled or disassembled. Looking at the Deane 10 patent, the figures, the descriptions, that is how I 11 would assemble it as a skilled person in the art. 12 Q. How about back in 2005, same answer? 13 A. Same answer. 14 Q. Do you know if the Deane reference corresponds to any 15 Inogen product? 16 MR. ATALLAH: Objection. Vague. 17 A. From the -- from Figure 2, it looks like the first 18 Inogen product, actually. 19 BY MR. CREMEN: 20 Q. Did you ever tear down that Inogen product? 21 A. I did not tear down, but I have seen it with the 22 cover removed. But I didn't perform a teardown.

109 1 Q. Okay. Let's look at paragraph 108 of your 2 declaration. 3 A. Yes. 4 Q. Do you -- so this reference is the Bernston reference. 5 Right? 6 A. Yes. 7 Q. Do you recall any teachings in Bernston about what 8 components must be in its cartridge? 9 MR. ATALLAH: Objection. Foundation. 10 A. It doesn't list the individual components which are 11 necessary to be in what they called ORAG, but the 12 name itself says oxygen-rich air generator Unit 32, 13 so it's -- I will read that as the parts necessary to 14 generate oxygen-rich air, which would be at least the 15 compressor, the columns, the valving, the tubing that 16 connects them. 17 It teaches to have the delivery part of the 18 oxygen-rich air to the patient. Those are with the 19 cover of the device that's described in the Bernston 20 patent. 21 BY MR. CREMEN: 22 Q. Okay. Look at the beginning of paragraph 17, if you	111 1 Q. Did you choose the image to reproduce after your 2 paragraph 112? 3 A. There are three figures in here coming from the Deane 4 reference. Are you referring to one of the figures 5 or the composition of the figures or... 6 Q. This group of annotated figures was provided in the 7 petition, and I'm asking if you selected this image to 8 use in your report. 9 A. I think the contents support -- of these three 10 figures together support the arguments I have in my 11 declaration, so I don't exactly remember if me 12 selected it or some of the lawyers suggested it. But 13 at the bottom line I think it demonstrates nicely 14 the -- one of the points in the -- or one or two 15 points in the petition, in the answer to the 16 petition, reply to the petition. 17 Q. Okay. 18 MR. CREMEN: Let's go off the record for a 19 second. 20 (Discussion off the record at 2:34 p.m.) 21 (Back on the record at 2:34 p.m.) 22 BY MR. CREMEN:
110 1 will, of Bernston. 2 A. Yes. 3 Q. And the first sentence in paragraph 17 says, "Some 4 components could be provided either as part of the 5 ORAG 32 or not." 6 Do you see that? 7 A. I see that. 8 Q. What does that mean to you? 9 A. That means that ORAG can contain or may not contain 10 also some parts of the oxygen-rich air generator. 11 But obviously the two most important parts are the 12 compressor and the columns, although they are 13 meaningless without the other parts being in there. 14 So when I read the Bernston patent, I 15 understand it as the heart of the device being in the 16 ORAG. As I mentioned a minute ago, part of the 17 delivery parts necessary for the delivery of oxygen 18 are actually incorporated into the -- into the shell 19 in these descriptions. 20 Q. Okay. Let's look at paragraph 112 of your 21 declaration, if you will. 22 A. Yes.	112 1 Q. All right, so I handed you a copy of Dr. Knaebel's 2 declaration, which is Exhibit 1003 in this IPR. Did 3 you review this declaration -- 4 A. Yes, I reviewed it. 5 Q. -- to prepare yours? 6 A. Yes, I did. 7 MR. ATALLAH: And just to note, I think -- 8 there's some pages in the back out of order, just for 9 the record. I was looking for the end page. 10 MR. CREMEN: Oh, let me see. Weird. I 11 don't think we're going to get to those pages. 12 MR. ATALLAH: Okay. 13 A. I have never seen it printed before. 14 BY MR. CREMEN: 15 Q. Fair enough. Fair enough. Let's look at paragraphs 16 318 and 319 of Dr. Knaebel's declaration. 17 A. Give me a second to get organized here. 18 Q. Sure. 19 A. 318 and 319, you said. Correct? 20 Q. Uh-huh. Go ahead and read those and let me know when 21 you're done. 22 A. Yes.

113 1 Q. Okay. So the image that Dr. Knaebel provided in 2 paragraph 319 has the manifold shaded green and the 3 housing shaded orange. Right? 4 A. The manifold, the circuit board, the shell, are 5 annotated as green, and the housing is in orange. 6 Q. And the image on the right-hand side of the drawing 7 shows the manifold and housing separated from each 8 other. Correct? 9 A. Correct. 10 Q. So would you agree that this image is a better 11 representation of Dr. Knaebel's opinion as to how the 12 components are separated than the image you reproduced 13 at your paragraph 112? 14 MR. ATALLAH: Objection. Form 15 A. The image, or two images on the right-hand side, show 16 the parts separately. It does not show anything 17 about how they are separated. So I don't know what 18 Deane and his coauthors, co-inventors meant it to be 19 removed or separated. In other words, it just shows 20 two detailed drawings of two parts in there and it 21 doesn't address anything about how they are 22 separated.	115 1 manifold and orange housing are separated? 2 A. You mean the figure in page 142? It does not show 3 anything about how they are separated. It shows 4 separate parts, but it doesn't address on how they 5 are separated. 6 Q. Okay. Let's skip ahead to paragraph 120 of your 7 declaration. 8 A. Can I close this? 9 Q. Yes, you can. I think. We might come back to it, but 10 I think you can close it for now. 11 A. Yeah, I just don't want to mix up these documents 12 with loose pages. 13 Okay. You said 120, paragraph 120. 14 Correct? 15 Q. 120. Correct. 16 A. Yes, go ahead. 17 Q. Okay. At the beginning of the paragraph 120, it says, 18 "While the invention of the '614 Patent permits a user 19 to readily remove and replace a separation cartridge." 20 Do you see that? 21 A. Yes. 22 Q. Does Claim 1 require the separation cartridge to be
114 1 BY MR. CREMEN: 2 Q. Let's look at -- you can keep that page of 3 Dr. Knaebel's declaration open because I'm going to 4 ask you a couple of questions about it, but let's look 5 at paragraph 113 in your declaration. 6 A. Go ahead. 7 Q. Okay. And then at the beginning you state that "there 8 is no evidence that the orange component which the 9 Petitioner calls out as Deane's separation cartridge 10 moves in the first direction at all, let alone 11 relative to the receptacle." 12 Is that right? 13 A. Correct. 14 Q. When you say "no evidence," do you mean nothing in 15 Deane or nothing in Dr. Knaebel's report or both? 16 A. Both because I don't think they are showing a 17 cartridge within the context of '614 patent. They 18 are showing adsorbent housing, not necessarily a 19 cartridge. So that will be a statement that applies 20 to both Dr. Knaebel's declaration and Deane patent. 21 Q. And you don't think that the image in Dr. Knaebel's 22 paragraph 319 shows his opinion as to how the green	116 1 readily removable and replaceable? 2 A. The claim specifically does not mention or does not 3 contain the word "readily." It says "removable." 4 But elsewhere in the cartridge in the description of 5 that specific application of the patent I do recall 6 it says readily removable somewhere. 7 Q. You're saying in the specification of the '614 patent. 8 Right? 9 A. In the specification. Correct. 10 Q. Okay. 11 A. So I will understand that '614 patent permits a user 12 to readily remove and replace a separation cartridge, 13 although include -- the word "readily" is not 14 included in the claims. 15 Q. So is it your opinion that the claims would cover a 16 situation where the cartridge is readily removable? 17 Correct? 18 MR. ATALLAH: Objection. Form. 19 A. The purpose of the '614 patent, the main purpose of 20 the '614 patent, which is pretty apparent in the 21 title of the patent, is a removable cartridge. And 22 in the description it does talk about it's readily

117 1 removable and makes a point on ease of removal of the 2 cartridge. 3 So the patent as a whole, with the claims 4 and descriptions, do allow for an easy to replace 5 separation cartridge which makes it readily removable. 6 BY MR. CREMEN: 7 Q. Is Claim 1 limited to a separation cartridge that's 8 readily removable? 9 MR. ATALLAH: Objection. Form 10 A. No, Claim 1 does not state that a readily removable 11 cartridge is -- or the -- Claim 1 does not include 12 that the cartridge should be readily removable. 13 BY MR. CREMEN: 14 Q. At the -- I'm sorry, were you finished? 15 A. But it restricts it to certain directions and ways of 16 how to remove the cartridge. 17 Q. Okay. At the end of paragraph 120 you offer the 18 opinion that "housing 602 and adsorbent columns 508a, 19 508b, are not something that I would consider to be 20 removable." Correct? 21 A. Yes. 22 Q. For the purposes of that sentence, what are you	119 1 previous testimony. 2 A. No. Usually cartridges and things like we talked 3 about in the morning will have a lid or some kind of 4 a restraining mechanism or something, so the answer 5 is no. 6 It seems like you are done with this line. 7 If you are, I would like to take a break. 8 MR. CREMEN: Sure, go ahead. 9 (Off the record at 2:54 p.m.) 10 (Back on the record at 3:04 p.m.) 11 BY MR. CREMEN: 12 Q. Okay, let's look at paragraph 121 of your declaration. 13 A. Yes, sir. 14 Q. Okay. In the first sentence, you say, "The alleged 15 receptacles of Deane must be completely removed before 16 the alleged separation cartridge can be accessed at 17 all." 18 Is that correct? 19 A. Yes. 20 Q. Is it your opinion that there's no possible way to 21 access the separation cartridges without removing the 22 alleged receptacles?
118 1 saying, removable from what? 2 A. Removable from the device, obviously. 3 I do not mean to say it's not -- cannot be 4 disassembled, cannot be taken out. Obviously it's all 5 put together so it can be taken out. Yeah. 6 Q. Is your use -- let me strike all that. 7 When you say they're not something you 8 consider removable, is it your intent to just use 9 removable or are you referring to the easily removable 10 concept or readily removable concept you used earlier 11 in the paragraph? 12 A. Let me reiterate what I said, and then I will try to 13 explain it further. By removable as a cartridge, I 14 mean it's intact. It is -- can be taken out in a 15 fashion described in '614 or maybe some other patent. 16 Not disassembled from the unit. It is a cartridge 17 that we are -- at issue here. So once you start 18 disassembling the unit and you remove a part of that 19 unit, I don't think it will constitute a cartridge. 20 Q. So a cartridge has to be accessible from outside the 21 concentrator, in your view, to be removable? 22 MR. ATALLAH: Objection. Misstates	120 1 A. Yes, that's my opinion, that the petitioner's diagram 2 shows the shell, the circuit board, the manifold, as 3 the receptacles, and they need to be removed before 4 access is gained into this alleged separation 5 cartridge. 6 Q. Okay. Let's look at paragraph 123. 7 A. Yes. 8 Q. So is it fair to say that, in your reading of Deane, 9 the first step to access columns would be removing the 10 cover? 11 A. Correct. 12 Q. If the columns 508 and 50b -- I'm sorry, if the 13 columns 508 and -- let me try it one more time. 14 If the columns 508a and 508b were removable 15 from the concentrator after this step, would you 16 consider them removable under your definition? 17 MR. ATALLAH: Objection. Vague. 18 Go ahead. 19 A. That will depend on how complicated it is to remove 20 the cover itself. If it's a simple lid which you can 21 open, then, yes. But if it is firmly connected to 22 the rest of the apparatus, which Deane seems to be,

121 1 the answer would be no. 2 BY MR. CREMEN: 3 Q. What do you mean, "firmly connected"? 4 A. Fastened somehow. At least fastened somehow with 5 some fastening screws and so on. 6 Q. So is it your opinion that if you have to use a tool 7 to remove a cartridge, it's not removable? Is that a 8 fair -- a fair synopsis? 9 MR. ATALLAH: Objection. Misstates. 10 Assumes facts not in evidence. 11 Go ahead. 12 A. Not necessarily. As I mentioned, some printer 13 cartridges, for example, will have a simple tool with 14 them, some kind of a lever, for example, to pop the 15 printer [sic] out. For removability, in this case I 16 am thinking of somebody who is not actually trained 17 removing -- particularly a patient, for example, 18 removing the separation cartridges as a whole. 19 BY MR. CREMEN: 20 Q. And earlier we talked about there being a distinction 21 between something that was easily removable and 22 removable. Right?	123 1 Go ahead. 2 A. Any part of Dean's apparatus can be disassembled into 3 its individual parts. So in that sense, everything 4 is removable. So when I look at the patents at issue 5 here, '614, Deane patent, others also, I am -- the 6 word "removable," in the context of if somebody who 7 was not trained to removing the pieces, that would be 8 destruction of the device. If a patient tried to 9 remove the housing in the Deane patent, the way it is 10 disclosed, the adsorption, adsorbent housing, I think 11 that entire device will be probably inoperational 12 because they have to put it back together and they're 13 not trained. 14 BY MR. CREMEN: 15 Q. So "removable" is used in Claim 1. Right? 16 A. Correct. 17 Q. Of the '614 patent. What is your definition of 18 "removable" in that context? 19 MR. ATALLAH: Objection. Form. Calls for 20 a legal conclusion. 21 A. As the claim states, it says, "a separation cartridge 22 selectively removable from a receptacle by movement
122 1 A. Correct. 2 Q. Does your answer to my previous question change based 3 on something being removable or easily removed? 4 MR. ATALLAH: Objection. Vague. 5 Go ahead. 6 A. If I go back to your previous question with the Deane 7 patent, even if you -- one removes -- not you, of 8 course, but even if someone removes the cover, there 9 is still more parts that needs to be removed before 10 accessing the adsorbent housing, such as the circuit 11 board and the manifold at least. There might be 12 other parts also which were not described or 13 disclosed in the Deane patent. That was a 14 clarification from a previous answer. 15 So your last question, can you repeat that, 16 please? 17 BY MR. CREMEN: 18 Q. Sure. No. I'll ask a different question. We're 19 trying to understand if you have an opinion as to the 20 difference between something that's easily removable 21 versus removable. 22 MR. ATALLAH: Objection. Form.	124 1 relative to the receptacle in a first direction, the 2 separation cartridge comprising an inlet oriented in 3 a second direction opposite to the first direction, 4 an outlet oriented in the second direction, and a bed 5 of adsorbent material configured to preferentially 6 adsorb nitrogen." That's the first limitation. 7 It is -- clearly talks about the cartridge. 8 It clearly talks about selectively removable and a 9 receptacle from which it is being removed. Does that 10 answer your question? 11 BY MR. CREMEN: 12 Q. I'm curious if you have an understanding as to when 13 something is removable or not removable in the context 14 of Claim 1. 15 A. Claim 1 does not specifically address what does 16 nonremovable mean, which was something you had in 17 your question, so I cannot speak to the nonremovable 18 part of your question. 19 Q. Okay. But you have indicated in your declaration that 20 the columns of Deane are not removable. Right? 21 A. Yes. Not easily removable without disassembling the 22 unit. So that's why I went into a way of removing

125 1 and showing how hard it will be, and also explaining 2 why it will be not removable. But obviously if they 3 are disassembled, if the unit is disassembled, it is 4 removed from the rest of the device. 5 Q. Okay. So that's the question I want to ask you. Why 6 would something that -- sorry. Strike that. 7 Why would a component such as the columns 8 508 in Deane, that is removable from Deane, not be 9 removable in the context of Claim 1? 10 MR. ATALLAH: Objection. Foundation. 11 Misstates. 12 Go ahead. 13 A. "Removable," as the claim states in this case, has 14 simple movements relative to the receptacle in 15 Claim 1 of '614. These are simple steps to simple -- 16 actually, one simple step, and it defines what 17 directions the movements should be. 18 It is not clear to me if the Deane patent 19 or the device described in the Deane patent can be 20 removed once again without disassembling the major 21 parts, I will say, of the device itself. 22 BY MR. CREMEN:	127 1 the separation cartridge were user removable, it would 2 fall within the scope of this element of Claim 1? 3 A. Yes. 4 Q. Is it fair to say that if the separation cartridge 5 required a tool to remove it, would it fall within the 6 scope of this element in Claim 1? 7 MR. ATALLAH: Objection. Form. Asked and 8 answered. 9 Go ahead. 10 A. A lot of cartridges come with simple tools. I 11 mentioned one is a lever. I know GCE has a knurled 12 nut to remove the adsorbent housing. There might be 13 many others. So simply the use of a tool will not 14 effect the removability. It's more on the ease of 15 removal and, particularly, patent '614 is the fashion 16 or the directions involved in removing the housing. 17 Hopefully that answers your question. 18 BY MR. CREMEN: 19 Q. Are you able to give me a definition of words as to 20 the outer bounds of something that's selectively 21 removable? 22 MR. ATALLAH: Objection.
126 1 Q. So I'm just trying to understand the definition of 2 "removable" that you're applying. So is it fair to 3 say, in your reading of "removable," that if you have 4 to -- if there's a disassembly step before you can 5 remove a component, it's not removable? 6 MR. ATALLAH: Objection. Misstates. 7 Go ahead. 8 And vague. 9 Go ahead. 10 A. It is -- if it's assembled -- if it is disassembled, 11 it is removed. But that's a much more complicated -- 12 that involves a much more complicated process, 13 actions, to be able to remove the housing for the 14 cartridge -- for the adsorbent material. 15 BY MR. CREMEN: 16 Q. Okay. If we go back to the '614 patent, Claim 1 -- 17 A. Yes. 18 Q. -- the first limitation we've been talking about 19 repeatedly today, it says, "the separation cartridge 20 selectively removable from a receptacle." Right? 21 A. Correct. 22 Q. And is it fair to say that it's your opinion that if	128 1 Hold on. 2 Objection. Vague. Calls for a legal 3 conclusion. 4 Go ahead. 5 A. "Selectively" -- "selectively" basically means 6 selecting to remove. So if I leave that part out, 7 there is some rational way of making that 8 distinction, so you have to -- if -- when posing a 9 question like that there has to be a specific device 10 that I can look at and, in my opinion, decide if that 11 is removable or disassembled part. 12 BY MR. CREMEN: 13 Q. So is it fair to say, then, you would have to look at 14 a particular device to determine whether something was 15 removable or not removable? 16 A. Correct. 17 Q. Okay, let's look at paragraph 127 of your declaration. 18 A. 127. Yes, sir. 19 Q. So is your understanding of Deane that there are 20 threaded fasteners that are installed along the red 21 dashed line of your annotated Figure 5? 22 A. I think it -- the Deane specifically says there are

129 1 threaded fasteners. I can try to locate it, if you 2 wish, but it is mentioned that the fasteners are 3 threaded to hold the housing and the chassis and the 4 manifold together. 5 Q. I think those are mentioned in paragraph 67. My 6 question, though, was whether it's your opinion that 7 there is a fastener that extends along the red dashed 8 line in your annotated Figure 5. 9 A. Oh, all the way? 10 Q. Yes. 11 A. Not necessarily. The idea there is that the housing, 12 adsorbent housing, is connected to the manifold and 13 to the chassis through threaded connectors may not be 14 a single piece that's extending all the way through. 15 Q. Okay. So there could be threaded fasteners that -- 16 I'm sorry, let me start over. 17 So you read Deane as teaching that there 18 could be threaded fasteners that connect the manifold 19 to the housing and different fasteners that contain -- 20 that connect the housing to the chassis? 21 A. I do not recall particularly Deane teaching on two 22 sets of fasteners, but it could be either way. It	131 1 MR. ATALLAH: Did you say 129? 2 MR. CREMEN: Yes. 3 MR. ATALLAH: Thanks. 4 A. Yes. 5 BY MR. CREMEN: 6 Q. In the second sentence, you say, "As the fasteners are 7 removed, these springs will pop up the manifold 512." 8 Correct? 9 A. Yes. 10 Q. How do you know the springs would be strong enough to 11 pop up the manifold? 12 A. As a person skilled in the art, that's what I would 13 expect because the manifold is providing the 14 compression on the springs. If they are strong 15 enough or not, I cannot comment to that because there 16 is no disclosure about how strong the springs are. 17 Q. Does Deane teach that the manifold is providing the 18 compression on the spring? 19 A. Deane does not specifically say that the manifold is 20 providing the compression on the spring, but the 21 spring is right below the manifold in the drawings, 22 and the purpose of the spring is to transmit that
130 1 could be a single fastener running all the way from 2 manifold down to the chassis or it could be fasteners 3 at the manifold and another set of fasteners at the 4 chassis end. 5 I think it mentions that -- they only 6 mentions that the housing is connected to the manifold 7 through threaded fasteners through one of the 8 depictions in Figure 6. I think it was 620. I can 9 clarify that in a second. Give me a second to look at 10 this, please. 11 Q. Okay. 12 A. Yeah. The end of paragraph 69 reads, "Moreover, 13 openings 620 are formed in each gasket" -- so that's 14 for the gasket openings -- "in each gasket 616a-b to 15 accommodate openings in the feed tubes and the 16 threaded mounting members." 17 So it could be one fastener or -- one set 18 of fasteners or two sets of fasteners from -- one set 19 for the manifold, one set for the chassis. It could 20 be either way. 21 Q. Okay. Let's look at paragraph 129 of your 22 declaration.	132 1 compression into the adsorbent particles through the 2 porous plug. 3 Q. Does Figure 6 of Deane show a housing 602 that is not 4 mounted to either manifold 512 or chassis 202? 5 MR. ATALLAH: Objection. Asked and 6 answered. 7 A. You said 620? Oh, 620. 8 BY MR. CREMEN: 9 Q. Let me -- 10 A. Or 602? 11 Q. I thought I said 602. Let me reask the question, 12 though. 13 Does Figure 6 of Deane show a housing 602 14 that is not mounted to either manifold 512 or chassis 15 202? 16 MR. ATALLAH: Objection. Asked and 17 answered. 18 A. Figure 6 is a detailed drawing, so it only tries to 19 illustrate how the housing looks like and the main 20 parts of that housing, so it could be connected to 21 the manifold or it may not be. It's just the drawing 22 of the part.

133 1 BY MR. CREMEN: 2 Q. In Figure 6, the spring does not dislodge the portion 3 618. Correct? 4 A. In Figure 6, the spring doesn't even touch the end 5 where the manifold is. And as drawn the spring will 6 not be compressed, and that will be contrary to what 7 the teachings in Deane are. 8 Q. Why do you think Figure 6 does not -- the spring in 9 Figure 6 does not contact the upper end? 10 A. Because there's a big gap in between the upper part 11 of the housing and the springs. 12 Q. It's your opinion that this drawing shows a gap 13 between the upper end of the spring and the bottom end 14 of element 618? 15 A. Yes. 16 Q. Okay. Let's look at paragraph 131 of your 17 declaration. 18 A. Yes. 19 Q. Why do you think the adsorbent material would "drop 20 out of the bottom of the columns" if there was -- if 21 they -- sorry, let me start over. 22 Why do you think the adsorbent material	135 1 columns 508a and 508b if those elements were in place? 2 A. Can you repeat the numbers again? 3 Q. Sure. 4 A. I lost the numbers. 5 Q. Why would the adsorbent drop out of the bottom of the 6 columns of 508a and 508b if housing 602 was removed 7 from chassis 202 if the elements 614b, 618b, and 616b 8 are installed in the column? 9 A. Those are not firmly attached to the housing in -- 10 for example, in particular, 618b is a gasket which is 11 actually -- I want to make sure that I am referring 12 to the numbers correctly. 13 Okay. 618b is a filter material for the 14 smaller particulate matter which is very thin, and 15 616b is a gasket which is sitting at the circumference 16 of the housing. The gasket does not support the 17 center of the columns. 18 And you said 614b is a porous plug which 19 may stay there due to friction, but also it may not, 20 and that's why I use the word "may" in the paragraph 21 you've been referring to in my declaration at 22 paragraph 131.
134 1 "would drop out of the bottom of the columns 508 and 2 508b" if one lifted the housing 602 away from the 3 chassis 202? 4 A. Because the bottom of the columns will not be 5 supported, and I am saying here that the material may 6 drop out. It may not. It may be just stuck in 7 there. But I wouldn't take that in my hand and run 8 to the next room because there's nothing supporting 9 the bottom of those big holes of the columns. 10 The chassis provides the support for the 11 bottom of the columns. 12 Q. Okay. Let's look back at Figure 6 of the '614 patent. 13 MR. ATALLAH: '614? 14 A. '614 or Deane patent? 15 BY MR. CREMEN: 16 Q. Yes. Sorry. Let me start over. Let's look back at 17 Figure 6 of Deane. 18 A. Correct. Okay. 19 Q. Are not elements '614b, 616b, and 618b arranged on the 20 bottom of the columns 508a and 508b? 21 A. They are at the bottom of the columns. Correct. 22 Q. So why would the adsorbent drop out of the bottom of	136 1 Q. Okay. So is it fair to say you don't know for sure 2 whether the adsorbent would fall out the bottom or 3 not? 4 MR. ATALLAH: Objection. Misstates. 5 A. It may or may not fall out, as stated in my 6 declaration. 7 BY MR. CREMEN: 8 Q. Okay. Let's look at paragraph 143 of your 9 declaration. 10 A. Yes, sir. 11 Q. I just want to make sure I understand your opinion on 12 this paragraph. Is it your opinion -- is it your 13 opinion that Deane teaches adsorbent in both the 14 column 508a and the feed tube 608? 15 A. Deane does not teach specifically that there is 16 adsorbent in the feed tube, but also it does not 17 specifically state that there is not adsorbent in the 18 feed tube, and this figure is taken from the 19 petition. And if I look at the figure, I see that 20 the line going through what's called the feed tube 21 does cross the adsorbent material, so it is somewhat 22 ambiguous what is happening with the feed tube.

137 1 There are examples of other processes where 2 there would be some kind of a material before the feed 3 gets into the main column. In that sense, I am using 4 the word "feed" in a general sense because, in 5 chemical engineering, "feed" is used in reference to a 6 unit in reference to some part of a device. 7 So maybe I should elaborate on that. The 8 overall feed for these devices is the ambient air. It 9 gets to be treated with the filters, becomes the feed 10 to the compressor typically. The exit of the 11 compressor obviously gets pressurized, so that becomes 12 the feeds to a column, and so on. 13 Specifically in the Deane, the feed tube is 14 shown, described as a side tube extruded to the 15 housing. There is no mention of if there is any 16 adsorbent in there or if there is nothing adsorbent in 17 there or any adsorbent in there. But looking at 18 Figure 6, by the petitioners, there is obvious contact 19 between the line drawn in green and the adsorbent. 20 Q. So is it your opinion that Figure 6 of Deane 21 illustrates adsorbent in the feed tube? 22 A. Looking at Figure 6, I cannot state either way if	139 1 depict -- I don't know if this figure is a cutaway, 2 it is an expanded view. There is some ambiguity 3 involved in Figure 6, I will admit to that. 4 But from the perspective that I'm looking 5 at it, given all its shortcomings, Figure 6 does show 6 some adsorbent in the feed tube. Not the entirety of 7 the feed tube, but it is out of the perspective 8 anyway. 9 Q. Okay. So it's your opinion that Figure 6 shows that 10 there's adsorbent in the feed tube and in the main 11 column 508. Right? 12 A. Yes. And the main column -- existence of the 13 adsorbent in the main column is clearly stated in the 14 patent. 15 Q. So two separate masses of -- sorry. 16 So two separate masses of adsorbent; one in 17 the main column and one in the feed tube. Is that 18 what you're saying? 19 MR. ATALLAH: Objection. Vague. 20 A. If it's two or one or if they are the same adsorbent 21 or not the same adsorbent, it is not clear. 22 BY MR. CREMEN:
138 1 there is or there is not, the way it's drawn. 2 Q. In paragraph 144, you say that Figure 6 shows 3 adsorbent in the feed tube 608. Right? 4 A. The green line is contacting the adsorbent in 5 Figure 6. 6 Q. I'm -- I'm more interested -- 7 A. Which will mean the -- which will be depicting the 8 flowing fluid. 9 Q. Okay, let's take this in steps, though. You say in 10 your report that Figure 6 shows adsorbent in the feed 11 tube 608. Right? 12 A. As the paragraph states, "Indeed the adsorbent 13 material 612 extends to the outer boundary line of 14 the feed tube 608, which shows the adsorbent is in 15 the feed tube." Yes. 16 Q. Because a few questions ago you said that you could 17 not state either way if there was adsorbent in the 18 feed tube or not. Right? 19 A. There is some ambiguity in Figure 6. I also 20 mentioned that the spring is not touching the 21 manifold end, which is -- which makes the spring 22 unfunctional. So there are some -- they tried to	140 1 Q. Okay. Is Figure 6 showing the adsorbent extending 2 through the wall that separates the main column in the 3 feed tube? 4 A. Yes, it does. 5 Q. Okay. So in your read of Figure 6, there's no wall 6 there anymore? 7 MR. ATALLAH: Objection. Misstates. 8 A. By the "wall," you mean the column wall? 9 BY MR. CREMEN: 10 Q. Yes. 11 A. If it's an expanded view, the column wall will not be 12 visible, or drawn, if you will. If it's a cutaway 13 view, the column wall will be visible. So as I 14 stated, from the perspective I am looking at it, 15 there seems to be at least in parts of the feed tube 16 which might contain adsorbent or may not also. 17 It is -- from my perspective, it looks like 18 it contains some adsorbent in parts of the feed tube. 19 MR. CREMEN: All right, why don't we take a 20 quick break. 21 (Off the record at 3:55 p.m.) 22 (Back on the record at 4:06 p.m.)

141 1 MR. CREMEN: Okay, Dr. Talu, thank you. 2 That's all I have on cross. 3 I don't know if you have anything. 4 MR. ATALLAH: I have a couple quick ones. 5 MR. CREMEN: Okay. 6 EXAMINATION 7 BY MR. ATALLAH: 8 Q. Dr. Talu, you were just looking at your declaration 9 there, I believe, paragraphs 143 and 144. Correct? 10 A. Yes. 11 Q. And those paragraphs, those are your opinions in this 12 case. Right? 13 A. Yes. 14 Q. And in that -- in those paragraphs there is a 15 depiction of Figure 6 of Deane. 16 A. Correct. 17 Q. And that came from the petition. Correct? 18 A. Correct. 19 Q. And in your experience, you were able to understand 20 what was shown in Figure 6. Right? 21 A. Yes. 22 Q. Okay. And per your declaration, Figure 6 does	143 1 Correct. Yes. 2 Q. And does this refresh your recollection about whether 3 the '614 patent actually does disclose a pulse flow? 4 A. Yes. 5 Q. And it does disclose that? 6 A. It does disclose a pulse flow and a continuous flow. 7 MR. ATALLAH: Okay. Thank you. I have 8 nothing further unless... 9 MR. CREMEN: Nope. 10 MR. ATALLAH: Okay. 11 (Proceedings concluded at 4:09 p.m.) 12 13 14 15 16 17 18 19 20 21 22
142 1 illustrate adsorbent in the feed tube as you state in 2 those paragraphs. 3 A. Correct. 4 Q. And do you agree that you cannot draw the line through 5 what the petitioners identify as the inlet without 6 contacting the adsorbent as shown in Figure 6? 7 A. As shown in Figure 6, correct. 8 Q. And do you have the '614 patent handy? 9 A. '614, yes. 10 Q. I believe that's Exhibit 1001. 11 A. Yes. 12 Q. And do you remember earlier you were asked some 13 questions about pulse mode or pulse flow? And I just 14 want to clarify something. If you could turn to 15 column 15 of the '614 patent, line 17. 16 A. I lost -- 17 Q. Column 15, starting at line 17, the first sentence 18 there. 19 A. Line 17, okay. 20 Q. Can you read that to yourself real quickly? 21 Does -- are you finished reading it? 22 A. Give me a second.	144 1 CERTIFICATE OF NOTARY 2 STATE OF MICHIGAN) 3) SS 4 COUNTY OF OAKLAND) 5 6 I, ALISON WEBSTER, certify that the 7 deposition of ORHAN TALU, Ph.D. was taken before me 8 on the date hereinbefore set forth; that the 9 foregoing questions and answers were recorded by me 10 stenographically and reduced to computer 11 transcription. 12 I further certify that the adverse party 13 was represented by counsel at the deposition. 14 I further certify that the deposition of 15 Orhan Talu, Ph.D., occurred at the offices of Carlson, 16 Gaskey & Olds, P.C., 400 West Maple Road Suite 350, 17 Birmingham, Michigan 48009 on Friday, December 1st, 18 2023, commencing from 9:34 a.m. to 4:09 p.m. 19 I further certify that this is a true, 20 full, and correct transcript of my stenographic notes 21 so taken; and that I am not related to, nor of counsel 22 to, either party nor interested in the event of

1 this cause. 2 3 <i>Alison C. Webster</i> 4 5 6 ALISON C. WEBSTER, CSR-6266, RPR, RMR, CRR, RDR 7 Notary Public, Oakland County, Michigan 8 My commission expires: May 1, 2029 9 10 11 12 13 14 15 16 17 18 19 20 21 22	145
1 ACKNOWLEDGMENT OF DEPONENT 2 3 4 I, ORHAN TALU, Ph.D., do hereby acknowledge 5 that I have read and examined the foregoing testimony 6 and the same is a true, correct, and complete 7 transcription of the testimony given by me and any 8 corrections appear on the attached errata sheet signed 9 by me. 10 11 12 13 14 15 16 _____ 17 (SIGNATURE) (DATE) 18 19 20 21 22	146

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