Exhibit H

THE UNITED STATES DISTRICT COURT

FOR THE MIDDLE DISTRICT OF ALABAMA

NORTHERN DIVISION

JEFFERY LEE,

Plaintiff,

Vs. CASE NO.: 2:25cv680-ECM

GREG LOVELACE, et al.,

Defendants.

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BENCH TRIAL

VOLUME III

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BEFORE THE HONORABLE EMILY C. MARKS, UNITED STATES DISTRICT JUDGE, at Montgomery, Alabama, on Wednesday, April 29, 2026, commencing at 10:00 a.m.

APPEARANCES

FOR THE PLAINTIFF: Ms. Paige Hester Sharpe
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Proceedings reported stenographically;

transcript produced by computer

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EXAMINATION INDEX

JOSEPH ANTOGNINI

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(The following proceedings were heard before the Honorable Emily C. Marks, United States District Judge, at Montgomery, Alabama, on Wednesday, April 29, 2026, commencing at 10:00 a.m.:)

(Call to Order of the Court)

THE COURT: Good morning. We are here for day three of our two-day trial. I hope everyone had a nice evening and we are ready to get started. Any matters that we need to take up?

MS. SIMPSON: Just briefly, Your Honor. Of course, we learned yesterday that Commissioner Hamm will be retiring at the end of the week. Counsel had asked whether that had anything to do with this case. I have conformation from general counsel for DOC that his retirement is not at all related to this matter.

THE COURT: All right. Thank you.

Go ahead. We will resume testimony with Dr. Antognini.

MS. SIMPSON: Thank you, Your Honor.

THE COURT: And, Dr. Antognini, you're still under oath.

THE WITNESS: Yes. Thank you.

JOSEPH ANTOGNINI

The witness, having previously been duly sworn to speak the truth, the whole truth and nothing but the truth, further testified as follows:

FURTHER DIRECT EXAMINATION

BY MS. SIMPSON:

Q. Good morning, Dr. Antognini.

A. Good morning.

Q. So yesterday you testified that you submitted an expert report in this case; correct?

A. Yes, that's correct.

Q. Did you render an opinion in this case?

A. I did.

Q. And is that opinion held to a reasonable degree of medical certainty?

A. It is.

Q. What is your opinion in this case?

A. The nitrogen hypoxia protocol as it's written and implemented I believe will cause a rapid onset of unconsciousness and then eventually will cause the heart to stop and then will result in death. And I believe that it will occur with minimal to no suffering or discomfort or pain.

Q. Let's talk about the hypoxia system for a minute. Are you familiar with ADOC's nitrogen hypoxia system and how it works?
A. Yes.
Q. Could you give us a brief overview.
A. Yes. So the system is set up in a way to deliver either air or nitrogen, and it's going to come in through a tube that basically -- tubes that basically are pipes from the tanks that will go into the room, I guess the control room, and then eventually it's going to go to a flow meter that will be able to deliver the air or the nitrogen.

That flow meter has a tube that goes into the chamber, and there it's attached to a mask, the respiratory mask that we -- or respirator mask that we have been discussing. And that mask is going to fit very tightly onto the face, and it's going to be virtually airtight, so there's not going to be any, really, opportunity for there to be a leak.

There are two valves on this mask. One is an inlet valve, and the other is an exit valve or exhalation valve. So all the excess gas that is flowing into the mask can either be breathed in, or it can be exhaled or -- not exhaled, but it can just pass through and go out the exhalation valve or the exit valve.

And then at some point the air is switched to nitrogen, and then very quickly nitrogen will enter into the tube -- tubes or pipes, and then into the mask, and then the oxygen will be -- the air will be displaced, and then eventually the oxygen level

or concentration in the mask will plummet very quickly.
Q. Are you familiar with ADOC's nitrogen hypoxia execution protocol?
A. Yes.
Q. Have you ever worn the mask used in executions in Alabama?
A. I have worn the mask.
Q. Did you wear it with breathing air or with nitrogen?
A. Just breathing air.
Q. What flow rate did you use? Not giving me a number, but generally, what flow rate did you use?
A. It was a very high number. It was the number that they use for -- by my understanding, the amount that they use during the execution process or for the air part before the execution begins.
Q. Can you describe the experience of breathing in the mask at that flow rate.
A. It was easy to breathe. I didn't have any problems. I actually was able to hyperventilate, to take big breaths. That did not cause any problems for me. It was pretty easy to breathe.
And that's the way these masks are designed. The system is designed to be used in a workplace setting, so it has to be able to accommodate people who are not just sitting down, but they have to -- these are people that are working and doing manual labor, so it has to be able to manage that in terms of the

increased breathing that they might have.
Q. Did you experience any pain?
A. I did not.
Q. Doctor, what is an inert gas?
A. This is a gas that is basically not going to be metabolized or chemically altered. By that I mean in our bodies.
So, for example, nitrogen is an inert gas. We breathe it in. It's part of the air. It doesn't get metabolized or changed in our bodies. We inhale it and we can exhale it, so it's basically inert. It doesn't do anything to us, and we don't do anything to it.
Q. You said nitrogen. Can you give us some other examples of inert gases?
A. Helium, some of the noble gases like that, argon and so forth.
Q. Can the human body detect nitrogen?
A. No, it cannot.
Q. And why do you say that?
A. Well, we just don't have any receptors for that because we evolved, essentially, in a nitrogen rich atmosphere. Our atmosphere has about 21 percent oxygen and about 79 percent nitrogen, so if there was a problem with us sensing nitrogen, that would be an issue.
So evolution, through the evolutionary process, we have basically become immune to that nitrogen in terms of it having

any effect on us or us being able to smell it or anything like that.
Q. So to be clear, we can't smell nitrogen?
A. No.
Q. Can we taste it?
A. No.
Q. If we're in a nitrogen enriched environment normally, how does nitrogen kill?
A. That would be where it's basically the displacement of oxygen. We need oxygen to survive. So if you are in an environment where there is little to no oxygen, you're not going to get that oxygen, and so that will cause your -- our brain cells, for example, to start shutting down, essentially. They need oxygen to function, among other substances. And if they don't have that oxygen, then they will basically stop functioning, and that's why people would lose consciousness from nitrogen.
Q. So to be clear, in a nitrogen hypoxia execution, is it the presence of nitrogen that kills or the absence of oxygen that kills?
A. It's the absence of oxygen.
Q. Doctor, are you familiar with hydrogen cyanide?
A. Yes.
Q. What is it?
A. It is a, basically, cyanide, which would be a carbon and a

nitrogen. It's an ion. And then hydrogen, which is the cation or the proton, and basically they're chemically linked. But it is a poison. It basically disrupts the use of oxygen in our mitochondria. It prevents oxygen from being able to be used, and so it can kill in that way.

Q. Has hydrogen cyanide ever been used in this country as a method of execution?

MS. SHARPE: Objection, Your Honor.

THE COURT: What's the basis of the objection?

MS. SHARPE: Dr. Antognini has not disclosed any opinions about cyanide in his expert materials. He has no opinions on them whatsoever in his reports. These are undisclosed expert opinions, and he should not be allowed to testify on them.

MS. SIMPSON: Dr. Antognini is a scientist. I'm just asking if he knows about hydrogen cyanide and how it functions in the body. He testifies that he has a thorough knowledge of pharmacology, human anatomy, respiratory physiology.

But I can leave this line of questioning, Your Honor.

THE COURT: I would leave it. Sustained. Go ahead.

Q. Doctor, you said earlier that you have opinions about the hypoxia protocol in Alabama. Do you have an opinion on whether there is pain associated with the protocol?

A. Yes.

Q. And what is that opinion?

A. I believe that the protocol will not cause pain.
Q. Would you anticipate the inmate experiencing anxiety?
A. I would expect that to occur in any execution setting, but, yes, anxiety I would expect to occur.
Q. You have, obviously, been in the operating room before. Yes?
A. Yes.
Q. Have you ever been around anxious patients?
A. Yes.
Q. If you have a patient who is anxious, what sort of signs or symptoms does that patient exhibit?
A. Well, it can vary, of course, but they are often sort of fidgety or moving around. They can be hyperventilating. They can get sort of cool, clammy skin. They can have increased heart rate. And they can basically -- you can sort of sense that they're -- just in terms of their talking and so forth, that they're anxious.
Not all patients are like that. Some patients appear outside to be fairly calm, but they say, yes, I'm very anxious. But from an observation perspective, as I said, you can see them fidgeting, their heart rate is increased, breathing faster sometimes, things like that.
Q. Doctor, based upon your training and experience, would you expect someone breathing, just regular breathing air, under ADOC's protocol to experience a sense of suffocation?

A. No.
Q. What happens if an inmate holds his breath? Would your opinion change?
A. Well, when we -- we as in humans -- hold our breath, it eventually becomes uncomfortable. We do get that urge to breathe. And we've all -- I presume all of us have done that at one point in our lives. But yeah, I mean, eventually, if you hold your breath, you're going to be very, very anxious and have that urge to breathe.
Q. Dr. Bastarache claimed in her report that it would take many minutes for an inmate to lose consciousness under ADOC's protocol. Do you agree or disagree?
A. I disagree with that.
Q. And why?
A. Well, I think that she, as I understand it, established her opinion, essentially, on a few factors. Number one, she did use some of the data that I had put into my report about how quickly the nitrogen displaces oxygen. And then she talked about how that action, actually, that displacement or to breathe in that higher concentration of nitrogen gas has to occur in the lungs, and then eventually that means that the oxygen, as it's decreasing in the lungs, is going to cause a decrease in oxygen in the blood and eventually -- it's the blood that goes to the brain, so the brain begins to see a lower amount of oxygen in the brain.

So she does, essentially, an additive analysis where she says it takes about -- I'm not sure the exact figures that she used, but recollection is around maybe 30 seconds or so for the nitrogen in the mask to go down to less than I think she said 3 percent. And then she adds on to that that under normal breathing, a young person might take around 35 seconds for the gas in the lungs to be replaced, basically, by the nitrogen in the mask. It's a little bit longer in someone who's older.

And then she talked about this time of 60 seconds that it takes for a -- and the example that she used of a red blood cell that goes from the lungs, up into the brain, and then returns back into the heart. So she adds those together.

I don't agree with that analysis because the time during which there is this deep decrease in oxygen in the mask as the nitrogen is flowing in, the inmate is breathing unless they're holding their breath, you know, and that -- nothing can be done about that. But if they're breathing normally, then that oxygen in their lungs is decreasing during that 30-second period when the mask is beginning to fill with the nitrogen. And also because the oxygen is decreasing during that time in the lungs, then the amount that's getting into the blood is decreasing. So they're not additive. These things are occurring -- there's a lag period, basically, but they're not -- it's not as if, after 30 seconds, that's when the nitrogen starts to be replaced in the lungs -- I'm sorry. The oxygen begins to be replaced in the

lungs.

And then finally, I just want to focus on that 60-second part. I think that is confusing where she says that it's going to take 60 seconds for this red blood cell to return or the blood to return. That's just not accurate. The reason why is because -- she wants you to think that that blood is, again, you know, maybe taking ten seconds to get up to the brain, and then it's returning to pick up less oxygen; but when you think about that blood starting out that's getting less oxygen and that she says is traveling up, there's more blood behind it. You know, our circulatory system is set up in a way that blood is continuing to flow.

So while the blood -- that first part -- that section of blood or that red blood cell that she talks about is coming down, going up to the brain and then coming back down, there's blood behind it that is -- has less oxygen in it. It's picking up less oxygen from the lungs and then getting into the brain. So it's this additive addition that she does of these separate steps, but they're happening all at the same time.

Q. Dr. Bastarache testified that in sort of an ideal situation, you might have two minutes and 18 seconds to loss of consciousness. Do you think that number is too high or too low?

A. That's too high.

Q. What's your estimation to loss of consciousness?

A. My estimation is on the order of around probably 60 to 70

seconds. I said that the amount of time that it takes to get to less than I think 5 percent or so, which is the level that would not sustain consciousness, I think that takes about 30 seconds. I'd have to look at that chart that she referred to. And then 30 to 40 seconds after that, I believe, based on the studies that I've cited, I would expect the person to lose consciousness.

Q. And when you're giving that estimate of time, is that time from when the nitrogen in the mask reaches a certain level or time from when the nitrogen begins to flow?

A. The time that the nitrogen begins to flow.

Q. Dr. Schwartzstein compared ADOC's hypoxia protocol to smothering. Do you agree or disagree?

A. I disagree. Smothering is a term -- you could think of, you know, smothering somebody with a pillow. Asphyxiation, probably I have in the past thought that -- asphyxiation might be a bit pejorative as well, but I think that is probably a little bit more accurate a way from a medical perspective to say that.

But smothering is a term that we use when we think about putting a pillow over someone's head or something like that, and that is not what is happening in this setting.

Q. Changing topics a bit. Doctor, are you familiar with Louisiana's nitrogen hypoxia system?

A. I am.

Q. How are you familiar with it?

A. I was retained as an expert witness in that litigation, and I went to the correctional facility there to evaluate that system as well.
Q. Is that correctional facility Angola?
A. I think it's -- I'm not sure they call it Angola anymore, but I think that's where it is, yeah.
Q. When you say litigation, is that the Hoffman case?
A. Yes.
Q. Have you read Louisiana's hypoxia protocol?
A. I have.
Q. How does it compare to ADOC's?
A. They're very similar. I did not do a word-to-word comparison, but they're very similar.
Q. Have you ever observed testing of Louisiana's hypoxia system?
A. I have.
Q. During your deposition, you provided us with a list of files, documents that you considered. Do you remember that?
A. Yes.
Q. Among those was a video. Do you recall that video?
A. I do.
Q. How did you obtain that video?
A. That was done during the evaluation when I was there.
Q. By there, where were you?
A. I'm sorry. In the execution chamber in Louisiana. And I do

not recall who made the video. I'm pretty sure it wasn't me, because I think the video was sent to me, and I wouldn't have any reason to -- you know, if I had it on my own. So I think somebody else must have made the video, and it was sent to me. And as I said, I was there when that video was made.

Q. So you were present for the events depicted in that video?

A. Yes.

Q. Does the video -- have you reviewed the video lately?

A. No. I saw it at the deposition, but not since then.

Q. And when was your deposition, do you recall?

A. March 19th, approximately, sometime mid-March, I think.

Q. So a little over a month ago.

A. Yes.

Q. Do the events depicted in the video fairly and accurately reflect what occurred at the time?

A. Yes.

MS. SIMPSON: Your Honor, at this time, we would move Defendants' Exhibit 56 into evidence.

THE COURT: Any objection?

MS. SHARPE: No objection, Your Honor.

THE COURT: It's admitted.

MS. SIMPSON: Thank you. And this is not a highly confidential video. We would like to play it for the witness, Your Honor. May we publish it?

THE COURT: Any objection?

MS. SHARPE: No objection.

THE COURT: All right. You may.

Q. Doctor, I'm going to ask you to please watch this video.

(Video published.)

Q. So, Doctor, what is this video depicting?

A. Just to orient everybody, so there's -- you can see that there's a mannequin there, and the mask is placed on the mannequin. And there is an oxygen monitor.

And if I may ask that you put that back up, and just don't play it, but I can point out just a couple of things, if I may.

You can see that there's a plastic tube -- there are two yellow oxygen monitors there, one by the side that's on the far left, and then there's one that has a plastic tube that goes up into the mask. And one of the things that I was retained to do as well is I wanted to make sure -- and they as well wanted to make sure -- that there would not be a problem in terms of the nitrogen flowing out of the mask and potentially causing harm to any personnel. So I placed -- we placed -- I'm not sure who did this, but there's another oxygen monitor placed on the left side there. And it basically shows -- at the very beginning, you can hear someone say swap, and that means that's when they turned the nitrogen on. And then at about ten seconds, I believe, you can see that the oxygen in the mask starts to decrease. And then you see a very rapid drop in the oxygen level in that mask over that time.

You may also have noticed that the oxygen monitor on the far left, which is basically sampling the air right around where that oxygen monitor is located, that starts to decrease a little bit. It goes down to about 19.5. If you go to the very end of this video -- so it starts at 20.9. And if you just go to the very end, please, it's now at 19.8. So it's gone down a little bit. So there is some residual nitrogen, basically, around the mask. If we had -- if we had placed that oxygen monitor on the far left closer to the mask, probably we would have gotten even lower. So there is a potential risk for people that might be around that mask, but it's not great.

In any case, the decrease here that you see primarily I want to focus on is in the mask, and there's a rapid decrease in the oxygen there. And you can see it right now, it's at 0.8 at the end of the video.

Q. Doctor, is an atmosphere with 0.8 percent oxygen supportive of human life?

A. No.

Q. Based upon your training and experience, what would you expect to happen to a person exposed to an atmosphere of 0.8 percent oxygen?

A. They would become unconscious very quickly from that, and if it's sustained, they would die.

Q. Now, you said that there is some leakage of nitrogen based upon that second oxygen meter. Is that accurate?

A. It's not leakage. It's not leakage -- well, let me just make sure. I want to clarify a couple of things.

You see that opaque plastic tube that goes from the monitor into the mask? You can see that it has to go underneath that seal. So there is a bit of an artificial leak there.

Q. And that was my question. Does the mask have a perfect seal?

A. It doesn't. In this setting, it doesn't, but that's not the reason -- I want to make sure we're clear. That's not the reason why you might see the oxygen drop on the left side. Remember, all that nitrogen -- even before the nitrogen starts, if it's just air, so if you look at the mask, right to the left of the nose of that mannequin, you see sort of a white disk with a black dot in the middle. That is the inlet valve. It's basically just a piece of rubber. And so what happens is that that is where the gas is flowing into the mask. And on the left side of that mask you see a black object that looks like -- correct. It looks like a disk, looking from the side. That's the exhalation valve, basically, and all that excess gas that's coming into that mask flows out of that. So when the nitrogen starts, there's a lot of nitrogen gas that's flowing out of that. So there is nitrogen around the -- that area of the head, and it's actually flowing down, and that's why you see that decrease there on the far left.

So what that means, just in practical terms, if you were

leaning over and putting your face by that exhalation valve, there's a potential that you could become unconscious as well because all that nitrogen is flowing out.

Q. Doctor, is the mask Louisiana uses comparable in type and form to the one that Alabama uses?

A. Yes.

Q. Doctor, there have been some claims made of witnesses in this litigation and other litigation of movement being observed during hypoxia executions. Do you recall that?

A. Yes, I do.

Q. Considering your training and expertise and your research, are you surprised?

A. I am not surprised, no.

Q. Why not?

A. First, because it's unclear, at least to me, when the nitrogen starts. It's hard to know when some of these movements -- or if some of these movements are just spontaneous movement even before the nitrogen starts.

But even after the nitrogen starts and the inmate becomes unconscious, there can be a lot of movement associated with the decreased oxygen. So the brain and spinal cord are not getting enough oxygen, and the neurons in the brain and spinal cord, especially below the cortex and in the brain stem and so forth, those neurons can't function properly, so they start to fire off. And that causes twitching or can cause twitching motions,

and it can cause some of the muscles to -- or the motor neurons to start to fire in a sort of consistent pattern, so you can get very slow movements, leg raising and things like that. I'm not surprised that those observations have been made.

Q. Is unconscious movement common when a person is dying?

A. Yes. You can see people who are unconscious, and they will be moving.

Q. Have you ever seen a patient die?

A. I have.

Q. Based upon your training, knowledge, experience, is unconscious movement common during death by an inert gas asphyxiation?

A. Based on my review and understanding, yes, it is common.

Q. Should we correlate movement during these executions with pain?

A. No.

Q. Why not?

A. Because, as I said, these movements can occur from the firing of these neurons, irrespective of what's going on in the brain. So there are many classic examples of that where the central nervous system of mammals, and not just mammals but amphibians as well, the spinal cord is very capable of generating complex movements. The brain stem as well.

So we think about these movements, that there has to be some type of conscious process to cause that, but these types of

movements have been well documented in both human and animal settings in the absence -- of a brain with little to no brain function.

Q. And actually, Doctor, I'd like to direct your attention to an article that Dr. Williams talked about yesterday. This is Plaintiff's 88, the van Rijn article. Are you familiar with this article?

A. Yes, I am.

MS. SHARPE: Objection, Your Honor.

THE COURT: What's the objection?

MS. SHARPE: Dr. Antognini has offered no opinions on this article in his expert reports. This is an undisclosed expert opinion. He had the opportunity, if he wanted to, to respond to Dr. Williams' opinions on this, which were disclosed in his expert report. He did not do so. This is undisclosed expert testimony that should not be permitted.

THE COURT: What's your response?

MS. SIMPSON: This is a response to the testimony that was given yesterday.

THE COURT: So is it rebuttal testimony?

MS. KENNY: It's rebuttal.

MS. SHARPE: Your Honor, he has never testified about this article or offered opinions. He served a rebuttal report. Dr. Williams disclosed this article in his report. Dr. Antognini did not rebut it at the time. He should not be

permitted now to offer new opinions on it.

THE COURT: Is this not a new opinion?

MS. SIMPSON: I would say it's an opinion simply based in rebuttal from the testimony that was given yesterday.

MS. SHARPE: Your Honor, he had an opportunity in his rebuttal report to respond to it. Dr. Williams disclosed this article in his opening report. Dr. Williams does not have this article in his reliance materials. He's never given an opinion on it.

THE COURT: I'm going to permit him to testify on rebuttal, subject to a motion to strike after I hear the testimony.

MS. SIMPSON: Thank you, Your Honor.

Q. Dr. Antognini, have you read this article?

A. Yes, I have.

Q. Is there a discussion in this article about lab rats?

A. Yes.

Q. What happened to the lab rats?

A. So if you go to page -- I think it's maybe the prior page, maybe page 3 or 4 -- page 3 -- let's try page 2. Maybe that's where our -- okay. Little bit higher up.

There we go. The first paragraph of results. After the animals had been decapitated, you can see that the -- it says, in all animals -- that's sort of in the middle of that paragraph -- in all animals, this low amplitude EEG activity is

interlarded with the repetitive smaller artifacts which coincided with chewing movements of the animal's mouth.

So this is -- the animal has been decapitated, and its mouth is chewing. And that lasted for about 15 seconds.

And then the headless body -- it says, in observing the headless body of the rats, a repetitive synchronous jerking of the hind legs is visible, lasting for about one minute.

So I don't know whether I can render an opinion or not. I'm just reading what that paper says. It essentially says you decapitate the rat, the head's been removed, and it's jerking and twitching for a minute. So obviously, it can't be conscious movement.

Q. Thank you, Doctor.

MS. SHARPE: Your Honor, I would move to strike any testimony on the van Rijn study by Dr. Antognini. That article is in evidence. We do not need Dr. Williams to simply read from it, and he did offer an undisclosed expert opinion with respect to what the rats were exhibiting. Dr. Antognini produced 200 articles, 200 files to us after his deposition. This article has never been an article on which he's relied.

THE COURT: What's your response?

MS. SIMPSON: Dr. Antognini simply read a paragraph in the article, Your Honor. He did not render an expert opinion. He simply read a paragraph in the article.

THE COURT: The objection is overruled. I'm going to

permit the testimony. Go ahead.

MS. SIMPSON: Thank you, Your Honor.

Q. Doctor, what is decorticate movement?

A. That is a movement where you have what's called decortication, which means that the -- basically, the cortex of the brain has been rendered nonfunctional, and that can --

Q. Help me out here. What's the cortex?

A. I'm sorry. Yes. The cortex is the outer layer of the brain, basically. That's where all the action occurs in terms of processing of information and sensory stimuli and so forth. So in a decortication, what that means is that the cortex has been rendered nonfunctional, either from trauma or from some type of injury like hypoxic injury or some type of drug injury of some sort, things like that.

Q. We heard a brief discussion yesterday of something called the Lazarus response. Are you familiar with that?

MS. SHARPE: Objection, Your Honor.

THE COURT: What's your objection?

MS. SHARPE: Dr. Antognini has offered no opinions on a Lazarus response. It is an undisclosed expert opinion on which he should not be allowed to testify at this time.

MS. SIMPSON: It's going to a description of different kinds of unconscious movement, Your Honor, but I can move on.

THE COURT: All right. I want to go back. Dr. Antognini -- Sustained.

I want to go back to Dr. Antognini's discussion of the article. At one point during his testimony he said, I'm not offering an opinion, but then ultimately offered an opinion about the movement being unconscious. I'm going to strike that last opinion.

MS. SIMPSON: Yes, Your Honor. Thank you.

Q. Doctor, based on your training and experience, can brain dead humans exhibit movement?

A. Yes.

Q. Have you ever observed this?

A. I don't think I have personally observed this, as I recall. I don't think I've personally observed it.

Q. How do you know that to be an accurate statement, then, that brain dead humans can exhibit movement?

A. Just review of papers that I've seen relative to the research that I did.

Q. Can unconscious people ever produce noise?

A. Well, they certainly can in terms of their breathing, and sometimes the breathing can be very irregular or obstructed, so they can definitely make noise.

Q. Doctor, are you familiar with something called agonal breathing?

A. I am.

Q. What is agonal breathing?

A. It is basically a breathing pattern that occurs at the very

end of life. It essentially represents periods where you might have periods of what is called apnea, A-P-N-E-A, which basically means you're not breathing, and then you can have some breathing patterns occur or breaths being taken, and they can be irregular. And then you can have periods where, again, you're not breathing, and then you can have some of these breaths occurring, and some of them can be big. Often they're not big. They're small. Could be gasping.

Q. Doctor, Dr. Bastarache opined about inmate consciousness based upon media reports, lay witness reports. Do you recall that testimony?

A. Yes.

Q. Would you do likewise?

A. I am a little bit wary of taking media reports, because I'm not sure that they are accurately describing what's occurring. I'm not doubting that they might be seeing something, but some of the words that I have seen used to describe some of these movements or whatever is occurring seem a little bit pejorative, I guess. So I have to be very careful about what I read in the media related to these executions in terms of forming my opinion.

Q. Doctor, what is pulmonary edema?

A. Pulmonary edema is the collection of fluid and to some extent blood in the lungs. So normally the lungs are very sort of airy and spongy like. And if you get fluid in there, they

can get very boggy and heavy, and that's a result, as I said, of fluid building up. There can be a variety of causes of that.
Q. Based upon your training and experience, does the presence of pulmonary edema always indicate pain?
A. No.
Q. Why is that?
A. Well, pulmonary edema, obviously, in an awake person can cause shortness of breath, air hunger and things like that. But often people who have pulmonary edema can be unconscious, and so they are not going to be experiencing that sensation.
Q. Doctor, what is dyspnea?
A. That is a medical term just describing having uncomfortable breathing, essentially; that you just don't feel like your breathing is comfortable. You're having problems with breathing.
Q. Is it a common or an uncommon phenomenon in your experience?
A. I don't see a lot of patients or in the past in terms of coming to the operating room. Most of the patients are pretty healthy. As I said yesterday, a lot of patients are sick. But certainly I have seen patients that have had dyspnea.
Q. And in what context have you seen patients with dyspnea?
A. Well, it could be somebody who is actually, as I said, very sick coming to the operating room, and they're having problems breathing, so they're feeling very short of breath. I've certainly seen that a lot in the intensive care unit. We as

anesthesiologists -- and this is, I think, true at most hospitals, maybe not all -- when a patient in the hospital, maybe in the intensive care unit or in the ward or whatever, they need to be -- have their airway managed, and often that means having to place an endotracheal tube, we have to go evaluate them. Many times we'll just say, yeah, this patient needs to be intubated. Sometimes we'll have a discussion with the physician about whether this patient needs to be intubated or not, and sometimes we'll demur and say we don't think that this patient needs to be intubated. Of course, many of these patients are dyspneic, and we are evaluating them and helping to care for them. So I have experience in that area.

Q. If you have a patient who is dyspneic, is that a condition that you can treat without a pulmonologist present?

A. Yes.

Q. Doctor, based upon your training and experience and what you know of ADOC's hypoxia protocol, would you expect an inmate being executed via nitrogen hypoxia to experience dyspnea?

A. In general, no. There's always a small possibility that somebody could experience some shortness of breath with it. Mild I would think. But in general, I would not expect it to be a common occurrence.

Q. Would you expect an inmate under those circumstances to experience pain from dyspnea?

A. No, I don't think they would experience pain.

Q. Were you here for Dr. Schwartzstein's testimony -- excuse me -- Dr. Antognini?
A. Yes, I was.
Q. Did you hear him testify that dyspnea is an extreme pain because the person fears dying?
A. I did hear that, yes.
Q. How do you respond, given the execution setting?
A. Well, I don't deny that there are patients who are severely short of breath. Again, these are awake patients. And they do have high anxiety because of the breathing issue. But I don't think that's going to occur, as I said, in the execution setting.
I'm sorry. I may have gone off a little bit, so if you could repeat your question. I want to make sure I answer it to its fullness.
Q. Given the fact that these are inmates about to be executed, and Dr. Schwartzstein's testimony that dyspnea can be so severe because the person fears that he is dying while he is suffering from dyspnea, how do you respond given that this is an execution setting?
A. Right. So it's an execution setting. I imagine no matter what the setting, somebody's going to be very anxious. So it's going to occur no matter what, in my opinion, I would think.
Q. Doctor, over the last two days, we have heard testimony about unconscious pain. Can you experience pain if you're

unconscious?

MS. SHARPE: Objection, Your Honor.

THE COURT: What's the basis of the objection?

MS. SHARPE: Dr. Antognini has not disclosed an opinion on the question of whether an inmate can suffer -- or a person can suffer pain during unconsciousness. This was an opinion that was fully disclosed in Dr. Schwartzstein's expert report. Dr. Antognini served rebuttal to that report. He did not disclose an opinion with respect to pain during unconsciousness.

THE COURT: What's your response?

MS. SIMPSON: Dr. Antognini is a trained physician. He has produced his list of references; his publications. He is qualified to talk about pain. It's certainly something that he deals with in the operating room and in the PACU setting as an anesthesiologist. He has general familiarity with pain. This is also rebuttal testimony as to what has been given by their experts over the last two days.

MS. SHARPE: Your Honor, whether or not he's qualified, he has not disclosed this opinion previously, and he should not be allowed to testify to it now. He did not offer it in rebuttal to Dr. Schwartzstein's expert report when he had that opportunity.

THE COURT: He didn't.

MS. SIMPSON: Very well, Your Honor. I'll move on.

Q. Doctor, are you familiar with the use of nitrogen or other

inert gases in suicide or accidental death?
A. Yes.
Q. How are you familiar with them?
A. As part of my -- certainly even before I began doing expert witness work in this setting, I was aware of inert gas deaths just as part of the training that medical students and residents and so forth get. So we're all aware of the tragic circumstances of some industrial accidents, so to speak. But I certainly also am familiar with the suicides that have occurred with inert gases and how that has become more common, I guess, for people to do.
Q. And generally what sort of sources do we have for information on this topic?
A. Well, we have reports in the literature of people who have committed suicide using inert gases, and we have the reports in the industrial hygiene area, which is what we call that, just basically workplace accidents.
Q. How does -- based upon your research, how does an inert gas suicide work generally?
A. Well, there is a method or way in which the person either wears a mask, or they can put a bag over their head and secure it tightly and use a tube that goes into the mask or into the bag. Then they will turn on the inert gas. Sometimes they will actually fill the bag with the gas first before they put it over their head, and presumably, they hold their breath while they're

securing it. That's the general mechanism.
Q. Doctor, in your expert report in paragraph 30, you mentioned a Dr. Philip Nitschke. Do you recall that?
A. Yes.
Q. Who is he?
A. He is a physician. I believe he originally trained in Australia, and then he became a proponent of basically, I think, a peaceful death as he terms it. But just helping people commit suicide. He has authored some materials to help people through that process. Currently he advocates for the use of nitrogen hypoxia or -- I'm not sure that's the term that he uses, but to use nitrogen for someone to have -- to commit suicide.
Q. Have you ever met him?
A. I have, yes.
Q. Under what circumstances?
A. The first case in this state for the nitrogen hypoxia was with Kenny Smith, and he was an expert witness on behalf of Mr. Smith.
Q. Are you familiar with a publication called The Peaceful Pill Handbook?
A. Yes, I am.
Q. Are you familiar with something called the Sarco euthanasia capsule?
A. Yes.
Q. I'd like to go over some of your sources with you now. If

you would please turn to defendant 17. It's tab 17 in your binder.
A. I don't know if I have a binder here. I have a binder, but I'm not sure if it's the one I'm supposed to have.
Q. I beg your pardon. I have a binder for you.
MS. SIMPSON: May I approach, Your Honor?
THE COURT: You may.
MS. SIMPSON: The Court should have a binder.
THE COURT: I do.
MS. SIMPSON: And from this point, Your Honor, the exhibits have been preadmitted.
THE COURT: All right. Go ahead.
MS. SIMPSON: Thank you.
Q. Doctor, do you recognize this document?
A. Yes. This is -- I do.
Q. What is this document?
A. This is a chapter out of an anesthesia equipment textbook, basically, relating to breathing systems.
Q. And did this chapter inform your expert opinion in this case?
A. Yes, it did.
Q. How so?
A. Well, I wanted to be able to sort of document what type of system this mask is that's used in the nitrogen hypoxia protocol. It is not specifically mentioned in this chapter, but

the type of system it is, essentially, the way it works, is very similar to some of the systems that are described in this chapter. And I wanted to be able to show that the buildup of carbon dioxide in the mask, the nitrogen hypoxia mask, would not occur.

But also I just -- it's important to understand that, again, these are masks that are used in industrial settings, so you wouldn't want to have carbon dioxide building up in that mask while people are working, so it has to be designed in a way to prevent that.

Q. Thank you. If you would please turn to Defendants' 18.

A. Yes.

Q. And I believe this one has been mentioned before, but, Doctor, what is this article?

A. This is a paper that was published by Luft and others, and it describes the latency of hypoxia at different altitudes or simulated altitudes to find out what happens to people when they get exposed to these very high altitude-like conditions and what happens to their consciousness and other behaviors.

Q. Is this the pilot study we heard about earlier this week?

A. Yes, it is.

Q. Okay. If you would please turn with me to page 122.

A. Yes.

Q. What did the authors conclude about hypoxia high altitude and rapid decompression?

A. Basically, that there can be rapid -- there can be rapid loss of consciousness if they're exposed to this very low concentration -- or I should say low partial pressure of oxygen.

And if I just may clarify because sometimes we will say concentration, and sometimes it's partial pressure. The concentration of oxygen in the air right now is 21 percent, but if you go up very high, it's still 21 percent, it's just that the overall amount of air up there is so low, that that 21 percent represents a very low partial pressure of oxygen. So hopefully, if I use those terms interchangeably, I'm clear about why I'm using them.

Q. Did the authors' conclusions about rapid decompression at altitude affect your opinion in this case?

A. Yes, it did.

Q. How so?

A. Well, they showed that the decompression, the loss of oxygen, partial pressure, resulted in loss of consciousness after about -- in this case probably in the order of five, six, seven seconds. And then once they got to that point, then people would start to lose consciousness.

Q. You heard Dr. Schwartzstein's testimony, and he criticized your reliance on this study because it was small and involved relatively healthy young pilots. Do you recall that?

A. Yes, I do.

Q. What is your response, if any?

A. Well, the studies like this, of course, you have to be very careful in terms of exposing people to what obviously is a very dangerous situation. You're taking people down to the point where they lose consciousness. So you're not going to have a large number of subjects in any of these studies because it's just not going to be safe to do that. And because the response is pretty consistent, probably it's not important to study a lot of subjects.

And so in science we talk about the variability. And if there is a lot of variability, then you do need larger numbers of subjects. But when the response is very consistent, you don't need a large number of subjects, especially, as I say, in a dangerous condition like this.

Q. Would you consider exposing volunteers to execution conditions with nitrogen in Alabama's system to be dangerous?

A. Volunteers?

Q. Yes.

A. Yes. That would be very dangerous.

Q. Let's go to Defendants' 19, please. Doctor, do you recognize this document here?

A. Yes, I do.

Q. What is this article?

A. This is a paper published by Ernsting, who did a lot of work in this area, along the same lines of trying to understand how hypoxia affects cerebral function. And he exposed some subjects

to very low oxygen levels or partial pressures to see what happens to them in terms of their functioning, and he found that the exposure to nitrogen very quickly, on the order of around I think it was 15 to 20 seconds, produced loss of consciousness.
Q. And do you recall how many participants were in this study offhand?
A. I believe it was three. I'm not sure, but I think it was around three. That's my recollection.
Q. That's a fairly small number for a study; correct?
A. Yes, it is. But again, like I said, these are dangerous conditions.
Q. And if you look on page 295 of the study, do you see the results section here?
A. I do.
Q. And what did Ernsting observe in terms of loss of consciousness from his participants?
A. So he observed that at around 15 -- let me just go to the bottom of that paragraph. The onset of symptoms was around 12 to 14 seconds. But in the middle of the paragraph, he writes that in the experiments with nitrogen at around 15 to 16 seconds, there was general clouding of consciousness and impairment of vision. And then I believe elsewhere he writes about some of these subjects actually -- or they did lose consciousness and then also had convulsions, as I recall.
Q. Doctor, how, if at all, does this study, in your opinion,

translate into the nitrogen hypoxia context?
A. Well, again, it shows that the rapid uptake of nitrogen or more nitrogen and the displacement or loss of oxygen in the air will cause a rapid onset of unconsciousness.
Q. And knowing that the study only had three participants, does that in any way concern you in terms of relying upon it?
A. No, it does not.
Q. Why not?
A. Well, again, these are consistent findings, and it's not just one single study that has found this. It's been other studies. Again, small numbers of subjects, but other studies have very similar findings. So it would be unethical, certainly, in current times, I think, to expose people to conditions that would cause them to become unconscious.
Q. Doctor, would you please turn to Defendants' 20.
A. Yes.
Q. All right. What is this document?
A. This is a white paper, basically, that describes the hazards of oxygen deficiency from a variety of different causes. It's been published by the Fermilab.
Q. Let me stop you there one second, Doctor. What is a white paper?
A. Well, generally speaking, it's going to be a document that's been produced by a group of experts in an area to describe a particular -- usually a technical topic. Basically a review of

the literature and the context and so forth, and then recommendations in terms of what should be done in that -- for that particular problem or whatever they're looking at.
Q. Did you review this document in connection with your expert report?
A. Yes, I did.
Q. And I guess more specifically, how did this document, this white paper, inform your opinion?
A. Well, essentially, the conclusion here, the overall conclusion, is that humans exposed to an oxygen deficient environment can lose consciousness very quickly. And they reviewed other work -- they put together sort of a way of approaching this in terms of understanding it that is that as the oxygen concentration is decreasing, you get increasing amounts of symptoms and different symptoms until you -- if you are breathing basically 100 percent nitrogen or whatever inert gas you're talking about, you could lose consciousness very quickly.
Q. Doctor, I would like to direct your attention to page 22, table one. It's also there on your screen if you would prefer that.
A. Yes, I see that.
Q. What is this table showing?
A. This shows the thresholds in terms of what type of symptoms you would expect to find in healthy individuals at sea level in

terms of the volume percent or the concentration of oxygen.
So you see at 17 percent, you might see reduced night vision, accelerated heartbeat, and then dizziness at 16 percent and so forth, until you can have loss of consciousness and inability to move, spasmodic breathing, convulsive movements, and then finally death in five to eight minutes.
Q. Is this the only place that you've seen these sort of numbers, data?
A. No, it is not.
Q. Where else have you seen it?
A. I've seen that in textbooks. Other papers have had similar types of tables. So it's a well accepted idea, I guess. I'm not sure that's the best word, but I know I've been labeled as being sort of an outlier in this, but this -- the effects of low oxygen and the danger of low oxygen have been described for decades if not more. And it's just very clear that these things can occur. So there are a lot of people out there, like these authors and many others, who say that it is very dangerous to be in an oxygen low -- or oxygen deprived environment.
Q. I would like to direct your attention specifically to that last entry there where, At 6 percent oxygen. Do you see that?
A. Yes.
Q. What happens at 6 percent oxygen? What are the effects?
A. As listed here, you can have spasmatic breathing and convulsive movements and then eventually death.

Q. Again, do you recall how low Louisiana's mask test got?
A. .8 percent
Q. Thank you. And let's go on to pages 25 and 26, please.
A. Okay.
Q. All right. So looking here at 25, and then 26 is the figure on the next page. Do you see that?
A. Yes, I do.
Q. Okay. What is this figure showing?
A. On the X axis on the bottom, you have the concentration of oxygen. So normally, of course, at the far right, it's at about 21 percent or so. At the far left, it's zero percent oxygen. The time on the Y axis, you have the time to unconsciousness. And that's in a sort of a logrhymithic scale. By that I mean if you look at the numbers at the top, we're talking about hours of time, whereas if you look at the numbers on the bottom, we're talking about seconds of time.
Q. So to be clear, are those equal intervals on that left-hand axis?
A. No, they're not.
Q. Thank you.
A. And the authors here have accumulated data from various sources to show the time to unconsciousness if you are exposed to a certain concentration of oxygen. So, for example, if you look at the very top there, there's a triangle there, a black triangle. And they are having that on that sort of hyperbolic

curve that you see there.

What that means, at 10 percent oxygen, if you look at the bottom, approximately, it would take over two hours -- probably three, three hours or so, if not more, to lose consciousness. So it takes a long time if you're at 10 percent.

But as you decrease the oxygen, and you get down into the level of, say, around 7 percent, if you look at the 7 percent there, which is two over from the five, and you draw a line straight up, it looks like it takes about 45 seconds for unconsciousness to occur. So that one there that you see right above the 30, that's one minute. So at about 7 percent, you can maintain consciousness for about 45 seconds. Then if you go below 5 percent or at 5 percent, consciousness can only be maintained for about 20 seconds.

Q. Thank you, Doctor.

Let's go to Defendants' 21. And what is this document?

A. This is a paper that was published by Hudnall and others, looking at a review of some incidents of deaths occurring from airline respirators, I think mostly in industrial settings.

Q. And to be clear, was this original research from these individuals, or was it more of a review of the literature?

A. It was a review of the reports from OSHA.

So I would call this a research paper in the sense that they looked at these reports, and they categorized these reports. They have a methods section, for example, and they describe the

results -- I'm sorry -- the cases that occurred and then come to some conclusions. So these are not -- these authors, obviously, did not go out and observe these deaths, but these reports had occurred, and they accumulated these reports and then described what had happened to these individuals.

Q. And did this study inform your opinion in this case?

A. Yes, it did.

Q. How so?

A. Well, again, these are cases where individuals were working with the type of respiratory mask that is used in this protocol, and there were usually, unfortunately, times when the -- either the individual plugged their airline into a nitrogen line, or there was a mix up somehow and the nitrogen tank was attached to the airline. So when they plugged their hose basically into the air line, it was actually nitrogen coming out and not air. So they had the mask on, they got nitrogen, and they died very quickly.

Q. I would like to direct your attention to the bottom of that first page there, please, that very last paragraph. Do you see that, Doctor?

A. Yes, I do.

Q. What did Hudnall, et al., have to say about what drives breathlessness primarily?

A. So this is going to be primarily the carbon dioxide level in the blood rather than the level of oxygen, at least certainly --

I don't dispute that we can have -- during -- a large range of oxygen as we decrease oxygen. We may not be able to sense that, but certainly when you get to very low concentrations of oxygen, people will start breathing faster. They may or may not have any shortness of breath with that, but they certainly can sense that they are breathing faster. But these authors are essentially saying that the sensation of breathlessness is primarily from the buildup of carbon dioxide when it occurs and not from oxygen deprivation.

Q. And based on your training and experience, do you agree or disagree?

A. I agree with that. Again, I'm not disputing that some people can have a sense of breathlessness if they have a low oxygen level, but the -- sort of the window of where that can occur is very close to when they would lose consciousness, especially in this setting. So that certainly could occur.

Q. And by this setting, do you mean an industrial accident or execution?

A. In an execution. Well, I guess in either one, I suppose, but in an execution the time between when they could start developing symptoms from hypoxia in terms of their breath sensation, it's going to very rapidly go into unconsciousness, and they're not going to be able to sense that.

Q. Doctor, let's turn to Defendants' 22, please. Do you recognize this?

A. Yes.
Q. Thank you. Do you recognize this article?
A. I do, yes.
Q. And can you explain this article.
A. This was a case report of a suicide by inhalation of nitrogen gas.
Q. Did this article inform your opinion in this case?
A. Yes, it did.
Q. And how so?
A. Well, this was an unfortunate individual who committed suicide by the use of nitrogen tank. You can actually see on the second page, there's a figure there or two figures. So that's the individual that has died. And he used a -- basically a milk carton container or -- for milk cartons, and he covered it with plastic, and then he put his head in there. I guess he must have cut out a hole so he could put his head in there, and he covered that with plastic. Then he had the nitrogen tank turned on or had the nitrogen tank there, as you can see, and the tube is going into that apparatus. Then he turned that on, presumably, and he was found dead.
Q. Thank you, Doctor. Dealing with inert gas suicides, let's turn to Defendants' 23, please.
A. Yes.
Q. Do you recognize this article?
A. I do.

Q. What is this document?
A. This is a paper that was published looking at two suicides by helium inhalation. As it says in the title, a prefilled environment. This is an observation of that. Essentially, the individuals committed suicide using helium to do that. And the description of what occurred is in the paper.
Q. I would like to turn to page 157, which should be the second page there. And I guess just a question here. This paper -- who is this paper by, first of all?
A. The author is Russell Ogden.
Q. Was Mr. Ogden present for these suicides?
A. It looks like he was, based on the way he describes what occurred.
Q. Okay. Looking at pages 157 and 158, what do we know about the decedents in these suicides?
A. Well, these were individuals who had some medical issues and decided that they didn't want to continue to live, especially -- I think one of them was to the point where she was still functional -- I think they were both fairly functional, but the trajectory was not good, they thought, so they were going to commit suicide.
Q. So let's start with just case one on page 158 here. How did this decedent kill herself?
A. So she took -- she was able to buy helium. And then she had a bag, and that bag she was able to put around her head,

basically, and there was a way to tie it. Then she had a tube that went into the bag, and she was able to turn on the helium to displace the air. I don't recall -- I think she may have actually prefilled the bag, I'm not a hundred percent sure, I'd have to look, but basically that's essentially what she did.
Q. Okay. And looking here at the next page, page 159, does Mr. Ogden say how quickly she lost consciousness?
A. In about ten seconds. That's on the first paragraph, about in the middle he writes, unconsciousness occurred in 10 seconds.
Q. Does he give any description of the dying process?
A. He talks about there, you can see that the lips turned blue, and she rested back into a -- went backwards into a resting position, and her skin turned pale. And then the observations shown there, which was that there was loss of consciousness at ten seconds. As I say, after about three breaths, became accelerated, the heart rate accelerated as well with the drop of the oxygen saturation. That's the SPO2. At about two minutes, the breathing had stopped. Then there was gasping, terminal gasping or that agonal breathing that I discussed earlier that occurred. But this patient or this subject did not at any point have any extension or contraction of the arms or legs.
Q. And how about the second decedent? What do we know about how quickly she lost consciousness?
A. And that's going to be, I think, moving to the next page. You have a description of what happened there. That occurred in

about 12 seconds. That's the second paragraph where the individual started taking the first breath, and -- this is the individual that had the prefilled hood. Started taking her first breath. Once the hood was in place, there was loss of consciousness at about 12 seconds, then increased respirations, and then there were at around 40 seconds reflexes in the right arm and both legs. So obviously, there was movement as he describes there, a single slow contraction of the elbow of the right arm, and the extension reflex in the legs that lasted for about 15 to 20 seconds.

Q. Thank you, Doctor. And looking in that next paragraph where it says, at 1:44 -- do you see that sentence?

A. Yes.

Q. Could you just read that, just the first part of that sentence before the parentheses.

A. At 1:44 there was a loud gurgling expiratory breath, possibly due to carbon dioxide escaping.

Q. Would that have been agonal breathing?

A. Possibly, although he does note that this individual had some sparkling wine earlier, so it might just be that gas coming up. But the agonal breathing I think is going to be described more towards the end of that paragraph where you see -- or the middle to the end. You see very faint gasps occurring, then you see some muscle twitching, and then a hardly audible snort. Then faint oral gasping. That's at the very bottom of that

paragraph. And then further faint sinus snorts in the times that are given there.
Q. Doctor, how if at all does this study from Mr. Ogden inform your opinion about Alabama's nitrogen hypoxia protocol?
A. Well, again, the types of breathing patterns that have been described in the executions are very similar to what has been described in these two suicides.
Q. Let's move on to Defendants' 24, please. Do you recognize this document?
A. Yes, I do.
Q. Who are you authors?
A. This is Russell Ogden, again, and then William Hamilton, who was an anesthesiologist, a very famous anesthesiologist at UC San Francisco. And then Dr. Charles Whitcher, who was also a famous anesthesiologist that was at Stanford. Both Hamilton and Whitcher are now dead.
Q. Did you review this article in connection with your expert report?
A. Yes, I did.
Q. Did it inform your opinion?
A. Yes.
Q. And how so?
A. Well, along the similar lines of the first report, you see this is a report of four individuals who developed -- or I should say wanted to commit suicide, and they used in this case

helium to do that.
Q. Let me stop you right there one second, Doctor. Was Mr. Ogden able to view these suicides?
A. He did not. He was not present. He did this by videotape. It was a videotaped suicide, so he and Hamilton and Whitcher reviewed the videotapes.
Q. Go on to page 177 here, page 2 -- I'm sorry -- all right. Doctor, I'd like to direct your attention to table three on page 177. Do you see that?
A. Yes, I do.
Q. What is table three showing?
A. This is the summary of findings that relate to what happened during these suicides. So there are four individuals there. You can see what is listed there in terms of the estimated time to loss of consciousness, intermittent, gross extremity movements, time to cessation of breathing, and then terminal gasps or breaths. And that's given by the time in number.
So just to walk through what they're describing here, in case one, the estimated time to loss of consciousness was 36 seconds. There was intermittent, gross extremity movements that occurred at one minute and then finished at two minutes.
Q. And what is gross extremity movement?
A. Well, it basically describes movements that are not slight. We use that term in terms of the movements that we see in an experiment, if we're testing for anesthetics, this very -- we

talk about gross purposeful movements. So these are not slight movements. They're actually movements that are very obvious to see. And of course, they're of the extremities, so it's going to be of the arms or the legs.

Then they list the time to cessation of breathing, which is around three minutes, but there are terminal gasps and breaths that start at three minutes and five seconds and end at six minutes and 30 seconds, and there were a total of eight of those types of breaths.

And so you can just continue to take a look or go down that table that describes what happened with each of the individuals. Now, subject to -- or case number four was somebody who had a mask that wasn't fitting properly, and that person took quite a long time to die. They became unconscious pretty quickly, but it took them quite a while to die, probably because of the poor fitting mask.

Q. To be clear, do you know anything about the masks used in these suicides?

A. Yes. They're described or shown, basically, in the previous page. Figure one, you can see that mask. That's sort of a typical hospital mask that we might use. It's not tight fitting at all.

Q. And do you know anything about whether these individuals who committed suicide had help fitting their masks?

A. I don't think they -- I would have to review this. I don't

think that they did. I think they had to do it themselves.
Q. So let's turn to page 178, please. Look here under the conclusions section. What did the authors determine about when these individuals lost consciousness?
A. Well, they, again, say that the loss of consciousness occurred very quickly. They put it at basically between 36 to 55 seconds. And that difference between what has been described from the Clayton and Clayton reference probably has to do with the fact that they didn't have a tight fitting mask. So it may not be exactly the same as what has been described in Clayton and Clayton.
Q. Did the authors document any attempts at self-rescue from the four suicides?
A. No, they did not.
Q. Did they document anything that you would consider, based on your training and experience, to be symptomatic of pain?
A. No. No. No, I don't see that here.
Q. There have been some references from media reports and discussed yesterday about synchronous leg lifting among people executed by Alabama's protocol. Do you recall that?
A. Yes, I do.
Q. Have you ever observed synchronous leg lifting in an unconscious person?
A. I don't think that -- I've seen movements, of course, of extremities, but I'm not sure I've seen the synchronous movement

of the legs in an unconscious person.
Q. Would you consider, based on your training and experience, synchronous leg lifting to be a sign of pain?
A. No, not necessarily.
Q. Why not?
A. Because patients who are in pain, they squirm. I guess that's not a medical term, but you can think about somebody just -- they're fidgety and they're moving around, except, of course, if it's -- you know, they're not going to be moving their -- whatever is causing their pain. If it's their left arm that's broken, they may not be moving their left arm, but they will fidget and move around. That's the type of movement that you would see basically.
Q. Okay. Doctor, let's go on to Defendants' 25. Do you recognize this document?
A. Yes, I do.
Q. And did this document influence your opinion in this case?
A. Yes.
Q. How so?
A. Well, this is another study looking at the effects of acute hypoxia. This is a simulated -- as it says, simulated high-altitude air drop scenario. And these are individuals that were exposed to decompression to simulate what would happen if you were in an airplane and, all the sudden, the pressure was lost in the airplane. They were looking at what happens to

people's cognitive function, among other things.
Q. And what did they find?
A. They found that there was a fairly rapid drop in the oxygen, and that the -- in some cases the -- I think at least one individual lost consciousness. I believe that's going to be in the results section on page 1445. About one-third down the paragraph, subject two lost consciousness after exposure to the oxygen environment.
Q. Subject two recovered; right?
A. Yes.
Q. Let's move on now to Defendants' 26. And, again, what is this document?
A. This describes the breathlessness that can occur during exercise, basically, on a bicycle, more or less, a stationary bicycle.
Q. How, if at all, did this inform your opinion?
A. Well, this is a study I cited, because I wanted to make sure that there was a good understanding around breathlessness and people that are having to undergo some type of exercise or something to cause them to have to breathe faster. And they, among other things, did testing essentially or asking the subjects how much shortness of breath did they have. And you can see that in people who are on a bicycle, and they're really pushing themselves, you know, they can get short of breath.
But the point I'm trying to make with this is that even if

you do have shortness of breath resulting from nitrogen hypoxia, it's not going to be any different, really, than what you would expect to have on an exercise bike.
Q. And by shortness of breath, are you talking about dyspnea?
A. Yes.
Q. Doctor, I would like to go now to -- this is Defendants' 42. This is, obviously, a very long document. I have given an excerpt of this document to counsel for their reference here, but I will -- I'm not going through this entire document.
Did you review this document, Doctor?
A. Yes, I did.
Q. Did it inform your opinion?
A. Yes.
Q. I would like to go to page 27, please. You should have an excerpt in your binder. Do you see page 27?
A. Yes, I do.
Q. Okay. What did the guidelines -- first of all, what is this document?
A. This is the Guidelines for Euthanasia of Animals that has been produced by the American Veterinary Medical Association. This is the 2020 edition of that.
Q. To be clear, does this document say anything about ending human lives?
A. It does not.
Q. So looking at page 27 and 28, who do the guidelines say

about using nitrogen to euthanize animals just in general?
A. Well, in general they say that in some animals, you shouldn't be using it. In other animals, it seems to be okay. But generally speaking, it has to do with some animals have an aversive reaction, I guess, to low oxygen environments.
So as an example, there are some animals that are burrowing, you know, like gophers and things like that that go into the ground, and they have to be very careful about staying in an environment where the oxygen can get low. So they have developed that sensation, but that's not true for most mammals that are above ground.
Q. Looking there on that second paragraph down the page that begins, Rats are sensitive.
A. Yes.
Q. Can you use nitrogen to euthanize a rat?
A. Well, you could.
Q. Should you use nitrogen to --
A. I'm not seeing, according to what they're saying, that you really shouldn't do that.
Q. Looking down at the next paragraph, the one that begins, In contrast.
A. Yes.
Q. Can you ethically, I suppose, use nitrogen to euthanize turkeys or chickens?
A. Seems to be okay for turkeys and chickens. Yes.

Q. And if you go to the next page, looking at the first full paragraph there that says hypoxia produced. Do you see that, Doctor?
A. Yes, I do.
Q. All right. What's the effect of nitrogen, or I guess in this case argon, on swine?
A. It says that it appears nitrogen and argon appears to reduce but not eliminate the aversive response to pigs. Pigs seem like they can sense an exposure to something that is low in oxygen. So it's a little bit aversive to pigs.
Q. Finally, going down the next paragraph, the one that says mink. Do you see that?
A. Yes.
Q. How about mink? How do they react to nitrogen?
A. They also will be aversive; that is, that the low oxygen concentration causes a problem for them.
Q. So in other words, different species react differently to the presence of low oxygen?
A. That is correct. Yes.
Q. Should we draw any conclusions about the effect of nitrogen gas on humans from the veterinary medical guidelines?
A. No, I don't think so. The guidelines explicitly state that this should not be applied to anything other than what is described here, the animals that have been tested and they've reviewed.

Q. I'd like to move on now to Defendants' 43, please. Have you seen this document before, Doctor?
A. Yes, I have.
Q. And what is this generally?
A. This is a document that was produced by OSHA. And it has to do, as we've been discussing, with the incidence of people who have been injured or I should say died as a result of some type of industrial accident where they're wearing an airline respirator and then either plugged into -- well, plugged into the wrong gas source in one way or another.
Q. And when you say airline respirator, what is that?
A. That is basically the type of respirator that has been used for the Alabama protocol, but it's a respirator mask that is made to function in a way that you can work in an environment where there might be dust or abrasive material in the air, there might be paint, something like that, and you want to have a mask that is very tight fitting so that you don't breathe in whatever it is in the environment. So these are called here airline respirators, and, again, you have to have that high flow of the air into the mask so that the worker can breathe.
Q. Doctor, will you please go with me to page 2.
A. Yes.
Q. Does OSHA say how quickly unconsciousness can occur when plugging your airline respirator into the wrong line?
A. So on the left-hand side, the third paragraph down right

before the case history, you see that they describe that unconsciousness, if it's exposure to 0 percent oxygen atmosphere, can occur in about 12 seconds. And they reference the Hudnall paper that I talked about earlier.

So, again, there are multiple individuals over decades from different scientific -- or technical backgrounds who have described how dangerous it is when people hook up these masks into a nitrogen -- or an inert gas pipe, or they walk into an inert gas environment.

Q. Thank you, Doctor. And let's go now to Defendants' 44. So what are we looking at here?

MS. SHARPE: Objection, Your Honor.

THE COURT: What's the objection?

MS. SHARPE: Neither Defendants' Exhibit 44 nor Defendants' Exhibit 45 are in Dr. Antognini's reliance materials. They have not been disclosed by him previously as documents on which he is relying for his opinions, and he should not be permitted to testify about them now.

THE COURT: Is that correct?

MS. SIMPSON: I know he has discussed these in other cases. We can move on, Your Honor.

THE COURT: All right. You had indicated these were previously admitted.

MS. SIMPSON: They were previously admitted, yes, Your Honor, by agreement.

THE COURT: So they're admitted, but -- you don't have a problem with their admission, you just don't want him to testify; is that correct?

MS. SHARPE: Correct, Your Honor.

THE COURT: All right. Go ahead.

MS. SIMPSON: Thank you.

Q. Doctor, have you seen this article before? It's Plaintiff's 29.

A. Yes, I have.

Q. Did you consider it as any part of your opinion in this case or your rebuttal opinion in this case?

A. I have read the paper. Quite frankly, I am not sure it was one of the ones -- I would have to look at my report to see if I cited it. I don't recall. But I am very familiar with it. But it does not look like one that I cited in my original report. I might have cited it in my supplemental report, if I may just take a look at that.

Breath to Death. Yes, I did cite it. So I am familiar with it, and I did cite it in my rebuttal report, it looks like.

Q. All right. Thank you. Let's go to page 1311, which is that final page there. If you look at the conclusions section here, do you see the conclusion in the top left corner?

A. Yes, I do.

Q. Can you read that final sentence there, please. I'm sorry. The next to last sentence, the one beginning with ultimately.

A. "Ultimately, the use of nitrogen asphyxiation for execution or assisted suicide rests on a profound misrepresentation of human physiology."
Q. And would you continue with the next sentence.
A. "Far from being humane, painless, or peaceful, it provokes dyspnea, panic, suffering, and an unnecessarily violent death."
Q. Do you agree?
A. I do not agree with that.
Q. Why not?
A. Well, based on, as I said, the work that I've cited and my training and education and knowledge, I think that the use of nitrogen or some other inert gas in the setting of an execution or suicide would produce -- would not produce a painful death or some of these other, especially, for example, suffering. I think that especially the way that the execution protocol is set up and the system, it is such a rapid decline in the oxygen concentration, that any distress or suffering or whatever you might want to call it is going to be very, very brief if at all present because of the rapid onset of unconsciousness.
MS. SHARPE: Your Honor -- I withdraw. Pardon me.
THE COURT: All right. Go ahead.
Q. Doctor, I'm showing you Plaintiff's 72, an article by Moosavi, et al. Did you consider this in your supplemental report?
A. I don't think I did. I don't see it listed there.

Q. That's fine. We can move on.
So, Doctor, to be clear, could you ever participate in an execution in a medical capacity?
A. Could I -- I'm sorry. Repeat that.
Q. Could you ever participate in an execution in a medical capacity?
A. I would not do it. I mean, theoretically, I could, I guess, but I would never do that.
Q. Why not?
A. I just don't -- I don't want to participate in an execution to that extent, and I don't -- obviously, there are ethical guidelines around that, but I don't want to personally participate in an execution.
Q. So Mr. Lee has named firing squad as his alternative method of execution. Are you aware of that?
A. Yes.
Q. Are you familiar with how a firing squad execution is theoretically carried out?
A. I am.
Q. Have you ever witnessed one?
A. No.
Q. Based upon your training and experience, including your knowledge of human anatomy and physiology, do you believe that an execution by firing squad could or would be painful?
A. It could be, and I think to a high degree of probability, it

would be painful. Yes.
Q. Why do you say that?
A. Well, as I think I hopefully got across yesterday, I certainly have experience with patients who have had gunshot wounds, and they are painful. And when you look at the destructive capacity of these bullets, it's clear that the injuries that occur, the tissue that is damaged, is going to cause pain because of the transmission of the -- those impulses, basically, from that damaged tissue up into the brain before the inmate or the person dies -- I'm sorry -- loses consciousness.
Q. Doctor, did you consider any of the reports from the South Carolina botched firing squad execution in your report?
A. I did discuss the report that Arden had made.
Q. I would like to look at that just briefly. Did you read this report?
A. Yes, I did.
Q. Did you read and understand the damage to Mr. Mahdi that Dr. Arden described?
A. Yes, I did.
Q. Based upon your knowledge, experience, training as a physician, would you consider the damage described to have been painful?
A. Yes.
Q. Why?
A. Well, just based, again, on the fact that the tissue that

was damaged in this execution in the chest area, that's a significant amount of damage. And I would expect that to cause pain sensations to be transmitted or impulses to be transmitted up to the brain, and those would be perceived as painful.
Q. Looking at the bottom of page 2, are you there with me?
A. Yes, I am.
Q. Maceration of the left liver lobe. What does that mean?
A. So that is going to be where the -- the liver -- for those of you, for example, that may eat liver from time to time, and you get liver from the store where it's sliced, but you can see that it's -- the consistency of it, it's sort of a homogeneous -- it looks homogeneous, essentially, type of tissue. And maceration basically means a sort of term that would be used to -- it's ground up or broken apart in pieces. So instead of being homogeneous in this case, from the bullet or bullets the tissue has been disrupted. It's no longer homogeneous and has rough edges to it and has been mashed up, basically.
Q. Based upon, again, your training and experience, would you expect maceration of the liver to be a painful experience?
A. The liver -- it's not so much the liver itself, it's the tissues around it. I'm not sure actually that the liver has much in the way of innervation. But some of these tissues and organs -- the outside, basically, the covering of it, can have some pain fibers. Certainly people can have pain, for example,

if the gallbladder and the bile ducts are damaged. Obviously, people who have had gallstones, that can cause pain. So that damage to those bile ducts, which is in the liver itself, could cause pain.

Q. Based upon your knowledge, again, of human anatomy and physiology and of Alabama's hypoxia protocol, do you believe that firing squad will significantly reduce a risk of pain that hypoxia produces?

A. I do not think it would reduce the risk of pain because, as I said, I believe that the nitrogen hypoxia protocol doesn't really cause any pain. And because I believe and opine that the firing squad does cause pain, I would expect there to be more pain with firing squad than with nitrogen hypoxia.

Q. Doctor, I would like to turn briefly back to your supplemental declaration. That's Defendants' 2.

A. Okay. Yes.

Q. I'm sorry. Wrong page. I'm sorry. Page 7.

A. Yes.

Q. All right. What is your opinion as to Dr. Schwartzstein's findings concerning dyspnea in this setting?

A. Well, first off, what he wrote and opined relates to an experience with patients, hospitalized patients, and he cites those. But these were patients that were in the hospital for a long time. The average was 2.6 days and the minimum was one day and the maximum was 12 days. So I think it's not appropriate to

apply the experience of people who have dyspnea for days to a setting where we're talking about, in my opinion, essentially seconds that somebody might experience something with nitrogen hypoxia. So I just don't think -- it really is an apples-to-oranges comparison, in my opinion.

Q. Doctor, as an anesthesiologist, are you familiar with different states of human consciousness?

A. Absolutely. Yes.

Q. Would you say consciousness is a continuum or like a black and white state?

A. It's a continuum.

Q. Are you familiar, again, as an anesthesiologist, as to whether people can feel pain at various points along that continuum?

A. I am familiar with that, yes. That's something that we have to be aware of, absolutely, and certainly part of what I've done in my research. Yes.

Q. Is it important as an anesthesiologist to know when your patients are in pain?

A. Yes.

Q. Is that something you try to make note of in the PACU or anywhere else?

A. Yes.

Q. Doctor, have you reviewed the complaint Mr. Lee filed in this litigation?

A. I did, yes.
Q. Have you reviewed his amended complaint?
A. I think so. I'm not sure, actually. I'm not sure.
Q. Have you ever met Mr. Lee?
A. No, not until this hearing.
Q. Have you review any of his medical records?
A. I did.
Q. And what medical records are those?
A. They were provided to me by your office, and I don't -- there was a lot of medical records there.
Q. But did you review all of them?
A. I did.
Q. So based upon everything you have reviewed, your training, your experience, and your knowledge of Mr. Lee's individualized medical records, what is your opinion as to what, if any, pain and discomfort Mr. Lee is likely to experience during a hypoxia execution?
A. It is my opinion to a medical certainty, reasonable degree of medical certainty and scientific certainty, that he would not experience significant pain or suffering. I believe he actually will not experience any pain or suffering would be minimal.
Q. Did you see anything in his individualized reports that would give you concern, greater concern that he would experience pain?
A. No.

Q. Thank you, Your Honor. No further questions at this time.

THE COURT: All right. It is 11:48. Let's take a break until 12 o'clock, and then we'll resume with cross-examination.

(Recess was taken at 11:49 a.m. until 12:03 p.m., at which time the proceedings reconvened, as follows:)

THE COURT: Cross-examination. And just a reminder, we will need to take a hard break at 1:30. You can take a lunch. I will conduct a sentencing, and then we will return back.

MS. SHARPE: Yes, Your Honor. Thank you.

I have binders for both the Court and the witness. May I approach?

THE COURT: Go ahead.

CROSS-EXAMINATION

BY MS. SHARPE:

Q. Good afternoon, Dr. Antognini.

A. Good afternoon.

Q. We've met before; correct? I took your deposition a few weeks ago?

A. Yes, we did.

Q. And you recall that during your deposition, I showed you a number of articles from the medical literature to see if you agreed with their description of dyspnea and air hunger?

A. I do recall that, yes.

Q. And we, in fact, were able to agree on a number of those

descriptions; correct?
A. As I recall, yes.
Q. So I just want to walk through some of those descriptions now to confirm the points on which we agree.
You agree with me that dyspnea causes suffering?
A. It can, yes.
Q. You agree with me that generally speaking, dyspnea is a particularly traumatic experience in contrast with pain, which has been a major source of concern in the ICU?
A. There certainly are people that believe that, yes. Dyspnea can be distressing to people, similar to pain. Yes.
Q. And just so I heard you correctly, you agree with that?
A. Yes.
Q. You agree with me that dyspnea can be far worse than pain in that it is consistently associated with the fear of dying?
A. I can agree -- I agree to that to a certain extent, yes, that if someone's really dyspneic, they can have that sensation. Yes.
Q. And you agree with me that dyspnea can range from moderate in nature to severe?
A. Yes.
Q. You agree with me that air hunger is the most severe form of dyspnea?
A. I'm not sure if that's -- I agree with that. It certainly can be a very -- it can be severe.

Q. Your testimony is that air hunger can be severe?
A. It can be, yes.
Q. And you agree with me that air hunger is the conscious perception of the need for more air and is typically described by subjects as, quote, not getting enough air?
A. Yes, I agree with that.
Q. You agree with me that air hunger can cause distress?
A. Yes.
Q. Air hunger can cause terror?
A. I suppose in some cases, yes.
Q. Air hunger can cause panic?
A. Yes.
Q. You agree with me that air hunger is one of the strongest and most unpleasant forms of dyspnea?
A. It can be, yes. I would agree in some cases, that could be true.
Q. You agree with me that in general, dyspnea ranks among the most distressing experiences that human beings can endure?
A. It certainly is going to be among them, yes. Absolutely.
Q. So putting this together, you agree with me that if an inmate is experiencing air hunger and dyspnea during an execution by nitrogen hypoxia, he is experiencing one of the most distressing experiences that a human being can endure?
A. I will just say that you have to qualify that with the amount of air hunger. We know that air hunger and dyspnea can

be rated, so just to have a little bit of air hunger doesn't mean it's the most distressing thing that you could experience. If it's severe, I suppose that's true, but not if it's mild, for example.
Q. Your testimony is that there can be mild air hunger?
A. Yes.
Q. One basis for your opinion that nitrogen hypoxia does not cause air hunger is that air hunger happens with hypercapnia but not hypoxia; correct?
A. Generally you'll see it more with hypercapnia, but it can occur with hypoxia at certain levels. If you maintain those low levels of oxygen that maintain consciousness, you certainly can have people with air hunger as Dr. Schwartzstein said earlier.
Q. And you've never conducted a study on hypoxia; is that correct?
A. I have not that I recall.
Q. You've never published a paper on inhalation of pure nitrogen gas?
A. No.
Q. You've never conducted a study on dyspnea or air hunger; correct?
A. No.
Q. You've never published on hypoxia; correct?
A. Well, my very first publication was hypoxia in an anesthetized patient. Just one single patient. So technically,

I have published, but that was in an anesthetized patient, not an awake patient.
Q. You've never published on dyspnea or air hunger; correct?
A. No.
Q. That's correct?
A. I'm sorry. I'm just chuckling a little bit because we had this problem with the deposition where, is that correct, and I say no. Yes, that is correct.
MS. SHARPE: Court's indulgence, Your Honor.
THE COURT: Sure.
Q. You've never published any peer-reviewed articles in pulmonary medicine; correct?
A. That is correct. Yes. I have not done that.
Q. You're familiar with the American Thoracic Society?
A. Yes.
Q. And you're familiar with the American Journal of Respiratory and Critical Care Medicine?
A. Yes.
Q. You agree that ATS is a well-respected organization?
A. Yes, I agree with that.
Q. And you agree that the American Journal of Respiratory and Critical Care Medicine is a leading peer-reviewed journal focusing on research in pulmonary, critical care, and sleep medicine?
A. Yes.

Q. You have never been asked to take part in a consensus statement by the American Thoracic Society; correct?
A. That is correct.
Q. You're familiar with the European Respiratory Society or the ERS?
A. Yes.
Q. And you've never written a position paper on dyspnea for a medical society; correct?
A. That is correct.
Q. You've never been on a writing committee like ERS with respect to dyspnea; correct?
A. Yes. That's correct.
Q. Never been on a writing committee like ERS with respect to hypoxia; correct?
A. Yes. That's correct.
Q. And you agree with me that there could be a period during which extreme hypoxia and air hunger could occur during a nitrogen hypoxia execution; correct?
A. Yes, there could be a few seconds where that might occur. Yes.
Q. In the execution setting, nitrogen hypoxia involves the forced inhalation of nitrogen?
A. Yes.
Q. In other words, the nitrogen displaces the oxygen that the person would otherwise be breathing?

A. Yes, that's correct.
Q. And you're familiar with the textbook Knight's Forensic Pathology by Pekka Saukko and Bernard Knight; correct?
A. Yes, I am.
Q. And you relied on that textbook in part for your opinions in this case?
A. Yes, I did.
Q. You rely in part on that book in your expert report; correct?
A. Yes.
Q. You consider Knight's Forensic Pathology to be an authoritative source; correct?
A. Yes, I do.
Q. You recall that Knight's Forensic Pathology provides a definition of terms that includes the term suffocation?
A. Yes, I do.
Q. And you recall that Knight's Forensic Pathology defines suffocation as, quote, a general term used to indicate death from deprivation of oxygen, either from a lack of the gas in a breathable environment or from obstruction of the external air passages.
A. Yes, I agree with that.
Q. And you agree with me that nitrogen hypoxia falls under this definition of suffocation in Knight's Forensic Pathology; correct?

A. Yes.
Q. Now, you've relied for your opinions on case reports of industrial accidents for your opinion that nitrogen hypoxia does not cause pain or distress; correct?
A. Yes.
Q. In your practice as an anesthesiologist, you've never relied on OSHA case reports for developing opinions or diagnosing patients; correct?
A. I don't recall if I've ever used that, so -- I might have at some point, but I don't recall that.
Q. Let me ask the question again. In your practice as an anesthesiologist, you never relied on OSHA case reports for developing opinions or diagnosing patients; correct?
A. I'm only thinking here because in the hospital we have pipelines for different medical gases, and we have problems, unfortunately, where those can get mixed up. I don't know whether, in sort of studying that, I had to rely on OSHA reports or not. So I think that would probably be -- that certainly isn't related to maybe diagnosing a patient. I mean, I guess it could be if you have -- we, unfortunately, had an incident at our hospital where there was a mix-up. Luckily, I think no one's died from that. But, again, I don't remember the details of that. So I just don't recall. It would not have been very often if I did rely on them.
Q. You recall that you gave your deposition on March 13th,

2026, under oath?
A. Yes.
MS. SHARPE: Your Honor, may I approach?
THE COURT: You may.
Q. Dr. Antognini, I would direct your attention to page 271 at lines four to eight. And the question at line four: In your practice as an anesthesiologist, did you ever rely on OSHA case reports for developing opinions or diagnosing patients? Answer: No, not that I can recall.
Do you see that?
A. Yes.
Q. Were you being truthful and accurate when you testified under oath on March 13th, 2026?
A. Yes, I was.
Q. In the case reports of industrial accidents that you cite, the victims did not know that they would be receiving a high concentration of nitrogen gas; correct?
A. Yes, that's correct.
Q. And you would agree that a person could have a different physiological reaction if they know that they will be receiving a high concentration of nitrogen gas; correct?
A. Yes, that would be correct. They're going to be anxious, of course, so, yes, that would be correct.
Q. In the case reports of industrial accidents on which you rely, there is no indication of whether the workers actually

experience distress or panic before dying; correct?
A. Partially correct. I would just qualify that I think -- and I can't recall, but I think some of those reports were ones where someone went into an oxygen-poor environment, collapsed, and then there was another worker who saw that, and there was no description of that collapsed worker yelling or screaming. I mean, I suppose it could have occurred, but there was no reported signs or symptoms of that person suffering or having pain. So I guess I would say that.
Q. Let me ask you the question one more time. In the case reports of industrial accidents on which you rely, there is no indication of whether the workers actually experienced distress or panic before dying; correct?
A. Yes, that's correct. I would say, no, there's no evidence there.
Q. In the work-related deaths, because they were unobserved, we don't know what exactly happened; correct?
A. That's correct.
Q. And because they were unobserved, there's no way you can tell at what point the workers become unconscious vis-a-vis their exposure to nitrogen; correct?
A. Yes, that's correct.
Q. You can't tell from the reports whether the workers struggled in any way; correct?
A. That is correct.

Q. You can't tell whether they tried to pull off their masks; correct?
A. That is correct, yes.
Q. These case reports don't report on whether the workers suffered in any way; correct?
A. Yes, that's correct.
Q. You also cite to a handful of case reports of suicide by helium gas for your opinion that nitrogen gas does not cause pain and suffering; correct?
A. Yes.
Q. And these case reports of suicide by helium gas are by a Russell Ogden?
A. He was the single author in one paper and then was a co-author on the other paper.
Q. And to your knowledge, Mr. Ogden does not have any clinical training in medicine; correct?
A. No, he does not, as far as I know.
Q. And you don't know whether subjects in the Ogden papers on which you rely were rebreathing carbon dioxide; correct?
A. I don't know that, but certainly the ones that had the bags over their heads, they're going to be rebreathing carbon dioxide for sure.
Q. And you agree that if they were rebreathing carbon dioxide, that could accelerate hypoxia; correct?
A. A little bit, by a few seconds, but I don't think more than

that.
Q. In some of the case reports of suicide, the individuals fully exhaled before placing a bag or mask over their heads; correct?
A. I'm sorry. Could you repeat that?
Q. In some of the case reports of suicide, the individuals fully exhaled before placing a bag or mask over their heads; correct?
A. Yes.
Q. Inmates executed by nitrogen hypoxia are not told to fully exhale before the mask is placed over their face; correct?
A. That is correct. As far as I know, that is correct.
Q. Inmates are not given any instructions in terms of inhaling or exhaling as far as you're aware; correct?
A. That is correct.
Q. And you would agree with me that suicides differ from executions because they are voluntary and not forced; correct?
A. Yes, that is correct.
Q. You understand that inmates who are executed by nitrogen hypoxia don't practice the execution beforehand; correct?
A. Yes, that's correct, as far as I know.
Q. You're familiar with the fact that individuals in some of these case reports of suicide have had severe underlying medical problems; correct?
A. Yes, that's correct.

Q. You would agree with me that individuals with severe underlying medical problems could have a different physiological response to hypoxia?
A. Yes, that's true. They could.
Q. And you've reviewed the medical records of Jeffery Lee, the plaintiff in this case?
A. Yes, I did.
Q. And based on your review of Mr. Lee's medical records, he does not have any severe medical problems; correct?
A. Based on my review, yes, he does not.
Q. You rely on aviation studies for your opinion that breathing gases with low oxygen will rapidly cause unconsciousness; correct?
A. Yes.
Q. These studies have small numbers of individuals?
A. That is correct.
Q. You're aware that these studies involve pilots with specific training in mitigating the effects of low partial pressures of inspired oxygen and any associated discomfort?
A. That is I think true to some extent. Most but not all of the papers, yes, they are -- not all of these papers -- I'm sorry. Not all the subjects are pilots. I believe, for example, in some of them, the authors are subjects as well. But most of them are going to be pilots, yes.
MS. SHARPE: Your Honor, I'm going to move to strike

that response, because I don't think the witness understood my question. If I may ask it again.

THE COURT: I'm not going to strike it, but I'll let you reask it.

MS. SHARPE: Thank you.

Q. In the studies involving pilots with specific -- I'm sorry. In the studies involving pilots, they have specific training in mitigating the effects of low partial pressures of inspired oxygen and any associated discomfort; correct?

A. Yes.

Q. These studies did not specifically measure degrees of dyspnea in any of the subjects; correct?

A. That is correct. Yes.

Q. And you agree with me that barometric pressure directly affects hypoxia?

A. Yes.

Q. Another way of saying that is oxygen saturation in the blood will decrease at higher altitude; correct?

A. Yes.

Q. And these pilot studies on which you were relying were examining hypoxia at high altitudes; correct?

A. Yes.

Q. And you're aware that the altitude level of Atmore, Alabama, where Holman Correctional Facility is located is not high altitude; correct?

A. That is correct.
Q. You testified on direct about a white paper written by a Miller and Mazur?
A. Yes, I did.
Q. And the title of the paper is Oxygen Deficiency Hazards Associated with Liquefied Gas Systems, Development of the Program of Controls; correct?
A. Yes.
Q. And if you look in your binder to pull that up, that's actually at Defendants' Exhibit 20.
A. Yes, I have it here.
Q. And this white paper is dated January 1983; correct?
A. Yes.
Q. This is a paper that studied the effects of liquefied gas; correct?
A. Yes.
Q. Nitrogen is not mentioned anywhere in the paper; correct?
A. I do not recall whether it is or not, but -- it may not be. I don't recall if it's mentioned or not.
Q. And if I represent to you that nitrogen is not mentioned anywhere in the paper, you would have no basis to dispute that; correct?
A. No. Unless I read it word for word, I have no basis to dispute that.
Q. And the Miller and Mazur white paper is not a clinical

study; correct?
A. That's correct.
Q. You have no idea what methodology the authors used to collect the data referenced in the paper; correct?
A. Well, I do know their methodology. They reviewed the work of others, primarily, and that's how they developed this white paper. So that's -- it's not a research study where actually they did the research themselves on subjects. They reviewed the work of others.
Q. Let me ask the question again, Doctor. You have no idea what methodology the authors used to collect the data referred to in the paper; correct?
A. Well, I just said methodology. They reviewed papers. That's my recollection of what they did here. So -- I mean, that's the method that they used. I'm not sure -- I mean, obviously, if you write a paper where you're looking at a white paper, you're looking at references, you have a method of looking at that. So it may not be a full research method where you're doing a research study, so -- I mean, it's not as if there's no methodology here at all.
MS. SHARPE: Court's indulgence.
(Brief pause in the proceedings.)
MS. SHARPE: Your Honor, may I approach?
THE COURT: You may.
A. And I apologize if this is not a good time to mention this,

but you asked the question about nitrogen. It is mentioned in the white paper. If I may correct my earlier statement.
Q. You can correct it on redirect if your counsel wants to ask you about it.
A. I'm sorry. Very good.
Q. Dr. Antognini, you gave testimony under oath in the case of Anthony Boyd on September 5th, 2025. Do you recall that?
A. Yes.
Q. And I apologize for the size of this print, but if I could direct you to the transcript of that testimony at page 162.
A. Yes. I'm there.
Q. And I am going to read from lines 24 to 25 of 162 down to line 1 of 163.
Question: Do you have any idea how they -- what methodology they were used to collect the data referred to in the report?
Answer: No, I don't.
Do you see that?
A. Yes.
Q. And were you being truthful and honest when you testified under oath in the Boyd hearing on September 5th, 2025?
A. Yes, I was.
Q. You don't know how reliable the work of Miller and Mazur was in their report; correct?
A. Well, again, I don't know what you -- that's sort of a squishy term to say reliable. Again, they reviewed the work of

others and references that they provide there. So it's not original research, but that's pretty common to review the work of others. So reliability is not an all-or-none phenomenon.

Q. Dr. Antognini, if I could refer you to, again, your testimony under oath in the Boyd hearing, page 163, lines two to four.

A. Uh-huh (positive response). Yes.

Q. Question: And you don't know how reliable their work was in that report?

Answer: Well, no, I don't. I didn't test it in that regard.

Were you being truthful and honest when you gave this testimony under oath in the Boyd hearing?

A. I was, but I'm sorry, if we could go back to the original question. There was a time difference between when I looked at that in the Boyd case and when you just asked me that question in terms of reviewing that paper. So I have a better understanding of what they did, at least at this time. So what I said then, I've looked at that paper again, so I have a more informed answer to your question as I sit here today.

Q. Are you more familiar as well with the qualifications of Miller and Mazur?

A. That I don't recall.

Q. I want to turn to the executions by nitrogen gas that the State of Alabama has conducted to date. And if you could pull

up Plaintiff's Exhibit 97.
A. Yes, I have it here.
Q. And this is a spreadsheet that contains the names of inmates executed by nitrogen hypoxia in Alabama?
A. Yes.
Q. This spreadsheet was sent to you with the names, and you put in the times that are reflected in here yourself; correct?
A. Yes, I think that's true. At the time of the deposition when we talked about this, and as I sit here today, I really don't recall if the spreadsheet was sent to me and I worked on it, or I developed the spreadsheet myself from what was sent to me. Those details I don't recall as I sit here.
Q. Regardless, to the best of your knowledge, the spreadsheet that is here is an accurate reflection of the times that are documented for the codes that are given in the nitrogen hypoxia executions?
A. Yes. To the best of my knowledge, yes.
Q. And the spreadsheet contains columns for the first code, and then there is a parenthetical for the start time; correct?
A. Yes.
Q. And your understanding is that the first code is when the direction is given for the nitrogen to start flowing?
A. Yes.
Q. And the second code is five minutes after the EKG has been flat?

A. Yes.
Q. And the second code is given for the nitrogen to stop; correct?
A. That's my understanding, yes.
Q. And then there's a column that says time between codes. Do you see that?
A. Yes.
Q. And the time between codes is the time between the first code being given for the nitrogen to start and the second code being for the nitrogen to stop; correct?
A. Yes.
Q. And you would agree with me that the time period of these executions, in particular the time period between these two codes, has varied in length; right?
A. Yes.
Q. The shortest time between the codes was 16 minutes for Alan Miller and Carey Grayson, and the longest was 32 minutes for Anthony Boyd; correct?
A. Yes.
Q. You cannot say with any reasonable degree of medical certainty that there is no variability in the time to loss of consciousness in executions by nitrogen hypoxia; correct?
A. Could you repeat that slowly?
Q. Certainly. You cannot say with any reasonable degree of medical certainty that there is no variability in the time to

loss of consciousness in executions by nitrogen hypoxia; correct?
A. That is correct. That is correct.
Q. Your opinion is that assuming no breath holding, it takes less than a minute after the nitrogen begins flowing for an inmate to lose consciousness?
A. Could you repeat that? Did you say if there's no breath holding?
Q. I can reask it.
A. Yes, please.
Q. Your opinion is that assuming no breath holding, it takes less than a minute after the nitrogen begins flowing for an inmate to lose consciousness?
A. That's not -- it's not less than a minute. It's about a minute, probably little bit more than a minute, based on my -- what I had written in my report where it's essentially around 30 to 35 seconds, filling the mask, and then another 35 to 40 seconds to the loss of consciousness. So that's a little bit more than a minute, but it's pretty close to it.
Q. You agree with me that the only execution to date for which you have opined that the inmate held his breath was that of Kenny Smith; correct?
A. That is the only one that I am aware of where that might have happened. Yes.
Q. You did not observe Mr. Smith's execution; correct?

A. I did not.
Q. You have no personal knowledge of whether Mr. Smith held his breath or not; correct?
A. That is correct.
Q. You have no personal knowledge of, if Mr. Smith did hold his breath, for how long he held it; correct?
A. That is correct.
Q. And you cannot tell the precise moment when any individual inmate became unconscious during execution by nitrogen hypoxia; correct?
A. That is correct.
Q. You can't say to a reasonable degree of medical certainty when any inmate's movements were no longer voluntary; correct?
A. That is correct.
Q. You can't say to a reasonable degree of medical certainty at what point any inmate's breathing became agonal?
A. That is correct.
Q. You can't tell us with a reasonable degree of medical certainty whether any individual inmate felt any pain during his execution?
A. That is correct.
Q. And there have been seven executions by nitrogen hypoxia to date in Alabama; correct?
A. That is correct. To my knowledge, that is correct.
Q. You have not attended any of them; correct?

A. I have not. That is correct.
Q. But you have attended an execution by lethal injection; correct?
A. That is correct.
Q. That was an execution in Oklahoma in 2022?
A. Yes.
Q. And you attended that execution as an expert witness on behalf of the State of Oklahoma?
A. Yes.
Q. And you relied on your firsthand observations of that execution in a subsequent lethal injection case; correct?
A. That is correct.
Q. You think that attending an execution by nitrogen hypoxia would be helpful to your opinions as to when an inmate loses consciousness; correct?
A. It would be helpful, yes, that is correct.
Q. And you believe that attending an execution by nitrogen hypoxia would be helpful to your opinions as to whether an inmate experiences any suffering during the execution; correct?
A. Yes, that's correct.
Q. Yet you will not attend an execution by nitrogen hypoxia; correct?
A. I will not attend any more executions of any kind, including nitrogen hypoxia.
Q. You do not know the actual flow rate of nitrogen that was

used during any of the executions that Alabama has conducted; correct?
A. That is correct.
Q. And you've never been present for any of these executions to see the flow meter from any of the executions; correct?
A. That is correct.
Q. You've never been given any information or readout from the flow meter showing what the flow rate was during any execution; correct?
A. That is correct.
Q. And you have no way of knowing now the flow rate of any nitrogen hypoxia execution that Alabama has conducted; correct?
A. Yes, that's correct.
Q. But you would agree with me that it's important to know the flow rate of nitrogen gas to understand whether an inmate would suffer during a nitrogen hypoxia execution; correct?
A. Yes.
Q. You've never seen any data from the pulse oximeters that Alabama uses during executions by nitrogen hypoxia; correct?
A. That is not correct. I have seen data. And if I can elaborate, or I'm not sure you want me to -- do you have a follow-up question? But I have seen data.
Q. Is this data that was produced within the past week or so by the defendants in this case?
A. Yes.

Q. Prior to seeing that data, had you seen any data from pulse oximeters that Alabama uses during nitrogen hypoxia executions?
A. Just by the reports of witnesses as we heard yesterday. That's the only -- if you want to call that data, that's basically all I've seen.
Q. Just to confirm, before seeing the data that you saw within the past week or so, you've never seen any readouts or reports from the actual pulse oximeter devices that Alabama uses during nitrogen hypoxia executions; correct?
A. That is correct. Yes.
Q. Setting aside the data that you saw most recently, you would agree with me that data from pulse oximeters would be informative to you in forming your opinions as to these nitrogen hypoxia executions?
A. They would, yes.
Q. And it's fair to say, then, that setting aside this more recent production of pulse oximeter data, that you're missing several pieces of information -- firsthand observations, flow meter data, pulse oximeter data -- that would be informative to your opinions; correct?
A. Yes, that's correct.
Q. You agree that pulse oximeters become less reliable as you get into lower oxygen saturations?
A. Yes, that is correct.
Q. You agree that movement of the body where the pulse oximeter

is located degrades pulse oximeter performance?
(Brief pause in the proceedings.)
A. Repeat the question.
Q. You agree that the movement of the body where the pulse oximeter is located degrades pulse oximeter performance?
A. I agree.
Q. You agree that erroneously high or low readings or no readings at all are much more frequent when a person is moving?
A. Yes, I agree.
Q. You agree that if the pulse oximeter is placed on an inmate's ear, and he's struggling or moving his head during an execution, there's a higher probability the pulse oximeter will not read correctly?
A. Yes, I agree.
Q. And during nitrogen hypoxia executions in Alabama, the pulse oximeter is, in fact, placed on the inmate's ears; correct?
A. Yes, that's my understanding.
Q. You agree that pulse oximeters placed on the ear are generally less accurate than those placed on the finger; correct?
A. Generally speaking, yes, that's correct.
Q. And you agree that ear oximeters are less accurate than finger oximeters because ears typically have less pulsatility than fingers; correct?
A. Yes, that's correct.

Q. You agree that in clinical use, ear oximeters are used for very limited circumstances, as in critically ill patients with extensive burns on their extremities, patients who are being administered powerful vasoconstrictor medications that decrease blood flow to the fingers, or the presence of severe peripheral vascular disease; is that correct?
A. Yes, that's correct. Those are generally the medical conditions where you would want to use an earlobe as opposed to a finger. Yes.
Q. And you agree that dark skin pigmentation degrades the accuracy of ear oximeters; correct?
A. Yes, that's correct. Degrades is not the term that we normally would use, but, yeah, it does affect the performance and accuracy.
Q. Let me just ask the question again. You agree that dark skin pigmentation degrades the accuracy of ear oximeters; correct?
A. Yes, I agree with that.
Q. To your knowledge, all pulse oximeters will be affected by the pigmentation of the skin; correct?
A. To my knowledge, yes, that's correct.
Q. And you've been testifying as an expert on behalf of states and the federal government in method of execution cases for more than ten years now; correct?
A. Yes.

Q. You've been paid close to half a million dollars for your work?
A. That's about right over the -- over ten years that I've been doing this.
Q. And in every execution case in which you've served as an expert, you've served as an expert in support of the government's execution method; correct?
A. Yes, that's correct.
Q. You've offered expert testimony previously on execution by nitrogen hypoxia?
A. Yes, I have.
Q. You've offered expert testimony on execution by firing squad?
A. As part of my expert witness testimony in those cases, yes, I did provide some expert opinions about the firing squad.
Q. You've offered expert testimony on execution by lethal injection?
A. Yes.
Q. And you would agree with me that those are fundamentally different execution methods?
A. Yes, they are.
Q. You're board certified in anesthesiology, Dr. Antognini?
A. Yes.
Q. Anesthesiology is your only board certification; correct?
A. Yes, that's correct.

Q. You do not have a subspecialty certification in anesthesiology critical care medicine; correct?
A. That is correct.
Q. You last practiced anesthesiology in the fall of 2019?
A. Yes, that's about right, I think. It was right before the pandemic, as I recall.
Q. From 2012 through the time that you stopped practicing anesthesiology in 2019, you spent only 10 to 15 percent of your time with patients; correct?
A. Yes, that's correct.
Q. And the last time you taught was in 2022; correct?
A. Yes, that's correct.
Q. Your research is focused on anesthesia mechanisms?
A. Yes, that's correct.
Q. And this case does not involve administering anesthesia agents; right?
A. That is correct.
Q. Nitrogen is not an anesthetic gas at normal pressures; correct?
A. Yes, that's correct.
Q. Physicians do not use nitrogen to put someone under anesthesiology; correct?
A. That is correct.
Q. You're not a pulmonologist, Doctor?
A. I am not.

Q. You're not a pathologist?
A. No.
Q. You're not a forensic pathologist; correct?
A. No.
Q. That's correct?
A. Yes, that's correct.
Q. And you're not board certified in pulmonary disease; correct?
A. That is correct.
Q. You're not board certified in critical care medicine; correct?
A. That is correct.
Q. You're not board certified in pathology; correct?
A. Yes, that's correct.
Q. And you're not board certified in forensic pathology; correct?
A. That is correct.
Q. You've never published any peer-reviewed articles in pulmonary medicine; correct?
A. No, I have not.
Q. And you have not published any peer-reviewed articles in the area of pathology; correct?
A. That is correct.
Q. You've never performed an autopsy; correct?
A. I have not.

Q. And you've only been present at a handful of autopsies?
A. That is correct.
Q. Once when you were an intern, one or two as a medical student, and only one as a practicing anesthesiologist; correct?
A. That is correct, yes.
Q. It was not a regular part of your practice as an anesthesiologist to review autopsy reports; correct?
A. That is correct.
Q. And you're aware that four of the inmates executed in Alabama by nitrogen hypoxia have had autopsies performed; correct?
A. Yes, that's correct. That's my understanding, yes.
Q. You have reviewed all four autopsy reports?
A. Yes, I did.
Q. And you're aware that all four autopsy reports documented signs of pulmonary edema found in each of the inmates?
A. Yes, that's correct.
Q. And it's possible that a sudden severe rise in blood pressure can be explained by a sudden extreme level of physiological stress; correct?
A. Yes, that's correct.
Q. You're offering opinions in this case on firing squad as an alternative method of execution?
A. Yes, I am. To rebut Dr. Williams, but, yes, I am.
Q. You offer opinions on firing squad in your expert report as

well as your rebuttal report; correct?
A. I did in the -- I'm sorry. Are you asking if I did in both? Could you repeat that? I'm sorry.
Q. Yes, Dr. Antognini. You've offered opinions on firing squad as an alternative method of execution in your initial report as well as your rebuttal report; correct?
A. I'll take -- I don't recall. I know it was in the original report. If I could just quickly review my supplemental report. I don't remember doing that, but I very well could have, if you don't mind me looking very quickly at my supplemental report.
Yes, I do. I see that at the very end. Yes. So it was both reports.
Q. Thank you. You have never conducted any studies related to gunshot injuries; correct?
A. That is correct.
Q. You have no publications related to gunshot injuries; correct?
A. That is correct.
Q. You have no studies or publications on firearms; correct?
A. That is correct.
Q. You've never taught a firearms course; correct?
A. That is correct.
Q. And in fact, you don't consider yourself an expert on firearm usage; correct?
A. That is correct.

Q. And you aren't an expert in ballistics; correct?
A. That is correct.
Q. You testified on direct that you have treated people who have been injured by gunshot wounds many times; is that correct?
A. Yes, that's correct.
Q. And that was in your capacity as an anesthesiologist; correct?
A. Yes, that's correct.
Q. You've never treated somebody who has been shot in the first minute of time after they have been shot; correct?
A. That is correct.
Q. You've never talked to somebody who was shot in the chest about the pain they felt or didn't feel in the first minute after they were shot; correct?
A. That is correct.
Q. You've never attended an execution by firing squad; correct?
A. That is correct.
Q. You've never been shot yourself; correct?
A. I have not.
Q. You're relying in part for your opinions on the execution by firing squad of Mikal Mahdi?
A. Yes, that's correct.
Q. You were not present for that execution; correct?
A. That is correct.
Q. And that execution was done by the State of South Carolina;

correct?
A. That is correct.
Q. You have not viewed a video of that execution; correct?
A. I have not.
Q. And you would agree with me that the experience that Mr. Mahdi had with respect to his execution is not typical of firing squad executions; correct?
A. That is correct. Based on what I've reviewed, that is correct, yes.
Q. Mr. Mahdi appeared to be alive for a lot longer than what you have read about with respect to other firing squad executions; correct?
A. Yes, that's correct.
Q. You don't have any opinions about the nitrogen hypoxia protocol used by Utah; correct?
A. I'm sorry? The nitrogen hypoxia used by Utah?
Q. Yes.
MS. SIMPSON: Objection, Your Honor. Utah does not have a nitrogen hypoxia protocol.
MS. SHARPE: I'm sorry.
THE COURT: Restate your question.
Q. You're not offering any opinions about the firing squad protocol used by the State of Utah; correct?
A. That is correct.
Q. And you don't rely on that protocol in your reports;

correct?
A. That is correct.
Q. Now, you do offer the opinion that during an execution by firing squad, there will be eight to ten seconds of consciousness after bullet entry; correct?
A. Yes, that's correct.
Q. You do not cite anything in your reports to support this opinion; correct?
A. That is correct.
Q. And I asked you for a citation at deposition, and you said you cited articles for this proposition before but didn't cite one in this case; correct?
A. That is correct.
Q. And you couldn't give me the names of any studies or authors on which you were relying for that opinion of eight to ten seconds to loss of consciousness; correct?
A. That is correct.
MS. SHARPE: Your Honor, I move to exclude the opinion of Dr. Antognini that during an execution by firing squad, there will be eight to ten seconds of consciousness based on his lack of support for that opinion.
MS. SIMPSON: Your Honor, we would simply posit that Dr. Antognini is a physician, has been for decades, has had training in the human body, in the effect of mechanical trauma upon the human body, has certainly dealt with patients who have

suffered trauma. That would be -- we believe he has sufficient training and experience to opine on what is likely to happen after a human body experiences significant trauma to the chest.

MS. SHARPE: Your Honor, Dr. Antognini testified that he was relying on studies and literature for that opinion. He did not provide citations to those studies or medical literature. And for the same reason that Your Honor excluded Dr. Schwartzstein's reliance on the Huang study, which was not cited in his reliance materials, we submit that the Court should exclude Dr. Antognini's opinions for which he does not have support.

MS. SIMPSON: Your Honor, we would say it goes to the weight and not the admissibility.

THE COURT: I agree. The motion is granted.

Q. (Ms. Sharpe, continuing:) Dr. Antognini, you also offer the opinion that the emotions that an inmate would experience when being executed by nitrogen hypoxia are the same emotions an inmate would experience when being executed by firing squad; correct?

A. Yes, that's correct.

Q. And in your opinion, it's the same emotions that the inmate would experience when being executed by any method of execution?

A. Yes. That's what I believe. That's my opinion, yes.

Q. And you did not provide any citations in your reports in support of this opinion; correct?

A. I did not.
Q. And I asked you about this at deposition, and you said you were relying on published literature, but you couldn't identify the studies or authors; correct?
A. I don't recall that, but I have no reason to dispute that, so I think that's correct.
MS. SHARPE: Your Honor, based on the fact that Dr. Antognini said he was relying in his report on studies in medical literature but did not provide those citations to studies in medical literature, we move to exclude his opinion that the emotions an inmate would experience when being executed by nitrogen hypoxia are the same that an inmate would experience when being executed by firing squad or any method of execution.
MS. SIMPSON: Your Honor, we would say it simply goes to a commonsense proposition. It's documented as far back as the 1938 article that is in evidence about the firing squad that an inmate experiencing any method of execution is likely to experience anxiety, terror, dread. These are all things that their expert says are likely to be experienced with dyspnea as well. We think it's a commonsense proposition that Dr. Antognini has asserted.
THE COURT: Well, if it's common sense, then you don't need an expert to testify; is that correct?
MS. SIMPSON: I mean, an expert can testify in this case that it's a commonsense proposition.

THE COURT: Well, if he has said he's based his opinion on materials that he has not provided, wouldn't you agree with me that the testimony is due to be stricken?

MS. SIMPSON: We would respectfully disagree, Your Honor, on this point.

THE COURT: You would disagree that he has not provided the materials?

MS. SIMPSON: No, Your Honor. We would agree that he has not specifically cited materials as to this point.

THE COURT: All right. The motion is granted.

Q. (Ms. Sharpe, continuing:) Dr. Antognini, you offer the opinion that obese people generally become hypoxic more quickly than nonobese people when subjected to nonphysiological conditions; correct?

A. Yes.

Q. And you do not provide any citation in support of this opinion in your reports; correct?

A. That is correct.

Q. And I asked you about this at your deposition, and you could not provide a citation to any sources; correct?

A. I did not provide any citations. That is correct.

MS. SHARPE: Your Honor, we move to strike Dr. Antognini's opinion that obese people generally become hypoxic more quickly as opposed to nonobese people when subjected to nonphysiological conditions for the reason that he

did not provide support in the medical literature studies, either in his report or in deposition.

MS. SIMPSON: Your Honor, the witness is a trained anesthesiologist. His training covers a range of people, including obese people. We would argue about by the very nature of his training and experience, he has experience with hypoxic people and the conditions under which people become hypoxic.

He doesn't necessarily have to cite a source for every opinion he offers as a trained anesthesiologist. He testified that he is familiar with hypoxia, with dealing with patients who are undergoing hypoxia during surgery and postsurgery, and we would argue that the witness has sufficient experience because of his medical training and experience to opine as to this point.

THE COURT: Isn't this within his purview as an anesthesiologist?

MS. SHARPE: Your Honor, he said he relied on materials in the literature, and he never provided a citation to those materials.

MS. SIMPSON: Your Honor, we would still argue that this goes to just his basic training and experience as an anesthesiologist. He's a board certified anesthesiologist, and he testified as to his -- a part of his training yesterday, last night, that he's trained in hypoxia, he's trained to deal with hypoxic patients, he has dealt with patients for decades.

THE COURT: All right. With the understanding that he is -- his opinion as to the physiology of what happens with obese patients versus nonobese patients in a hypoxic environment, I will permit the testimony to the extent that it is based on his experience. I will strike it to the extent that it's based on materials he has not provided. You will need to parse out for me at which point he testified that his opinion was solely based on materials and, if so, I would strike it to that extent.

MS. SHARPE: Thank you, Your Honor. Could I request that we take a very brief recess? Five or ten minutes? I understand we have a hard stop at 1:30.

THE COURT: Yes. All right. We'll take a ten-minute recess.

(Recess was taken at 12:59 p.m. until 1:09 p.m., at which time the proceedings reconvened, as follows:)

MS. SHARPE: Your Honor, I don't have any further questions.

THE COURT: All right. Any redirect?

MS. SIMPSON: Your Honor, just -- if we're going to move the -- moving the witness's opinions, permission to briefly voir dire him.

THE COURT: Yes. Go ahead.

VOIR DIRE EXAMINATION

BY MS. SIMPSON:

Q. Dr. Antognini, prior to your -- well, at the time of your deposition, were you asked to bring documents you relied upon to that deposition?
A. Yes, I was asked to do that. Yes.
Q. And did you do that?
A. I did supply a lot of documents, yes.
Q. By a lot, do you remember about 150 documents perhaps?
A. I thought it was closer to 200, but maybe 150, 170. I don't remember off the top of my head, but around that, yes.
Q. And were those given to counsel for Mr. Lee?
A. Yes.
Q. Did those documents form the basis of your opinion?
A. Yes.
Q. Among those documents, is there an article by a Scott Weingart and Richard Levitan called Preoxygenation and Prevention of Desaturation During Emergency Airway Management?
A. Yes.
Q. Does that article have anything mentioning obese patients?
A. As I recall, it does, yes.
Q. And did you rely on that article in forming your expert opinion in this case?
A. Yes, I did.
MS. SIMPSON: Your Honor, I have a brief redirect. May I?
THE COURT: All right. Go ahead.

REDIRECT EXAMINATION

BY MS. SIMPSON:

Q. Doctor, you said on cross-examination that dyspnea can be distressing. Do you recall that?

A. Yes.

Q. Is it always distressing?

A. No, it -- again, it depends on the amount. Obviously, if someone is really dyspneic, that can be stressful, but just mild dyspnea is not necessarily stressful.

Q. In your medical opinion, does the nitrogen hypoxia protocol used in Alabama inevitably cause air hunger?

A. No, it does not inevitably do that, no, in my opinion.

Q. Is it likely to cause air hunger?

A. Maybe to a small extent it could, but it's not like 100 or 90, 80 percent going to do it and make it severe. But, it -- you know, it's not likely to be severe, at least in my opinion, but it could certainly make somebody have a little bit of air hunger.

Q. By a little bit, can you estimate how long that might last?

A. On the order of probably 10 to 20 seconds perhaps.

Q. Doctor, you were asked some questions about OSHA reports and your reliance upon them. Do you remember that?

A. Yes.

Q. Why did you look at OSHA reports in this case?

A. Because, again, the information that we have about what

happens to people who inhale inert gases comes, to a large extent, from these tragic accidents that occur in the workplace setting, and that's going to be described in these OSHA reports. So I think that was a very important body of information or data that I needed to look at.

Q. As a physician, do you tend to look for the best data sources?

A. I do. Sometimes, you know, it's not just published manuscripts, it's data generated by other individuals.

Q. In the Ogden articles that we looked at, did you see any evidence of attempted self-rescue?

A. I did not.

Q. If you, Doctor, were to put on a respirator and began experiencing breathlessness and a sense of doom, what would you do?

A. I would remove it.

MS. SHARPE: Objection, Your Honor. Speculative testimony.

THE COURT: Overruled. He can answer.

Q. Doctor, let me turn here to Miller and Mazur, Defendants' 20, again. You were asked some questions about this; correct?

A. Yes.

Q. If you would go with me, please, to page 3.

A. Yes.

Q. There is a paragraph that begins, "At Fermilab."

A. Yes.
Q. Would you please read the first two sentences.
A. "At Fermilab large quantities of liquefied gases are employed in high-energy physics research. Those most commonly used are liquid nitrogen, liquid helium, and liquid argon."
Q. So is it fair to say that this white paper does potentially concern the risks of using nitrogen in the workplace?
A. Yes, it does. And, in fact, even though they say liquid nitrogen, you use the acronym LN2. And you can see that LN2 is mentioned elsewhere. So they do mention it multiple times, or several times at least.
Q. You were asked how reliable you believe the author's methods were. Do you recall that?
A. Yes.
Q. Do you know with certainty how reliable any study is if you're not actually part of it?
A. Well, you don't know for sure. I mean, obviously, there can be fraudulent papers and so forth, and sometimes you may not -- you may have a problem with the way the study is conducted or whatever, so you can't say with 100 percent certainty that any paper is reliable, I guess. But you just have to judge the paper on what you see, I guess. I don't know.
Q. As a scientist, looking at this white paper, do you see any indicia of nonreliability?
A. No, I do not.

Q. Let me go with you briefly to Plaintiff's 97, the spreadsheet here. Just wanted to clarify. What does the second code signify, Doctor?
A. My understanding is that is the time at which the EKG has been flatlined for at least five minutes; or if it's at 15 minutes after the nitrogen started -- as you can see, none of those times -- I'm sorry -- all of those times between the first code and the second code are greater than 15 minutes, which means that the time indicates when the ECG became flatlined plus five minutes.
Q. Looking at the first four entries there for Mr. Smith, Mr. Miller, Mr. Grayson, and Mr. Frazier, the time between the codes in all those cases was less than 20 minutes; correct?
A. Yes, that's correct.
Q. So would it be fair to say that the EKG flatlined in less than 15 minutes?
A. Yes, that's correct.
Q. Doctor, you've read the Alabama execution protocol?
A. Yes, I have.
Q. Are you aware of the flow rate that is listed in the protocol?
A. Yes.
Q. Do you have any reason to believe that that flow rate was not used in any of the prior executions?
A. I have no reason to believe that. Yes, that's correct.

Q. You were asked about some pulse oximeter data; correct?
A. Yes.
Q. Is it fair to say as a scientist or a clinician that there is always more information or data that could inform your opinion?
A. Absolutely. Yes, that's true.
Q. In your opinion, what is more useful, the real-time observation of data or spot checked data taken every 30 seconds?
A. It would be the real-time observation of data.
Q. Did you consider in your report the observations of the team captains, Wardens McKenzie and Frazier?
A. Yes, I did.
Q. You were asked about whether you have attended executions. Yes?
A. Yes, that's correct.
Q. Do you know if Dr. Schwartzstein or Dr. Bastarache has attended a hypoxia execution?
A. I'm not aware if they have. I don't -- I don't know, but I don't think so.
Q. Go briefly back to Defendants' 47, the Arden report. Doctor, if you would look, please, in the middle under synopsis of pertinent facts.
A. Yes.
Q. Do you see the AP's reporting of the description of the

execution, the italicized portion?
A. Yes, I see it there.
Q. Okay. In the first two paragraphs, looking at that as a clinician, do any of the things described there suggest pain to you?
MS. SHARPE: Objection, Your Honor. This is outside -- well, objection, Your Honor.
THE COURT: What's the basis?
MS. SHARPE: This is outside the scope of my cross-examination.
MS. SIMPSON: The witness was asked about his reliance upon this report, Your Honor, and to inform his opinion as to firing squad and whether it was painful.
MS. SHARPE: I did not ask any questions about the Arden report. I did not --
MS. SIMPSON: It also goes to his opinion that there were eight to ten seconds of pain. Witness reports, lay witness reports from the hypoxia executions were certainly used as a basis for Mr. Lee's experts' reports. I'm simply asking him about one portion of an AP report about a firing squad execution.
MS. SHARPE: Your Honor, they're now attempting to bolster an opinion that has been stricken based on the fact that the expert did not previously disclose citations for that. I think that's improper.

THE COURT: Which exhibit are you talking about?

MS. SIMPSON: 47, Your Honor, Defendants' 47. That's the Arden report.

MS. SHARPE: And, Your Honor, I would just note that Exhibit 47, which is the Arden report of the South Carolina execution, has been admitted for only a limited purpose and not for the truth of the matters asserted within the report. And I think that counsel's also trying to elicit testimony that would suggest that the facts are, in fact, true.

MS. SIMPSON: Your Honor, we're just saying that the witness relied on this report; that they helped inform his decision. We would ask Your Honor to reconsider your ruling as to Exhibit 47, and also to reconsider your adverse rulings, considering those relevant portions of Dr. Antognini's testimony a few minutes ago.

THE COURT: I'm going to sustain the objection. Go ahead.

MS. SIMPSON: One moment, Your Honor.

(Brief pause in the proceedings)

MS. SIMPSON: Your Honor, just for the record, we would ask you to reconsider your ruling about the eight- to ten-seconds firing squad pain finding. You know, we were not given opportunity to voir dire the witness before Your Honor ruled on this. He does have the data before him. He testified that he relied upon the Arden report. It's listed among his

materials. The Arden report gives an eye witness account as to what happened there. And if we're going to give credence to eye witness accounts like Ms. Clifton and everyone else that Mr. Lee has relied upon, there's nothing here showing that this particular report is any more or less reliable than any of theirs.

MS. SHARPE: Your Honor, I just cross-examined Dr. Antognini about his eight- to ten-second opinion, and he did not point to the Arden report in support of an eight- to ten-second loss of consciousness. He has at multiple points had an opportunity to provide the basis for that opinion, and he has not done so. We ask that Your Honor stand by the ruling previously and that the testimony remain stricken.

THE COURT: I'm going to give the defense an opportunity to rehabilitate him by asking voir dire questions. Go ahead.

VOIR DIRE EXAMINATION

BY MS. SIMPSON:

Q. Dr. Antognini, what is the basis for your conclusion that a person executed by firing squad will experience eight to ten seconds of pain? What did you rely upon?

A. There are several studies that have been published that looked at the heart stopping in a variety of different ways, including people who have had ventricular fibrillation occur during a procedure where they're awake, and then the heart goes

into ventricular fibrillation and they lose consciousness, which is around -- in the range of ten seconds or so.

There are reports, both in the popular press but also in medical reports, of people who suffer what is called commotio cordis, which is a condition where you get struck in the chest with, like, a baseball or something like that. And those individuals can maintain consciousness for about eight to ten seconds.

There was a very famous -- you might remember this, several years ago of a football -- I think in the NFL, a football player who was hit in the chest, and he -- at the end of the play, he stood up, and he sort of wobbled a bit and then collapsed, and he had this commotio cordis. That's been documented in animal studies.

So those are some of the studies that I relied upon that inform me about how long does it take for someone to lose consciousness when the heart stops.

Q. Were any of those studies included among the documents you provided to plaintiff's counsel prior to your deposition?

A. I really don't remember. I'm sorry. I don't know.

Q. Is information about -- well, strike that.

MS. SIMPSON: Nothing further, Your Honor.

THE COURT: All right.

MS. SHARPE: Your Honor, I think Dr. Antognini's testimony only reconfirms our position. He just said that he's

relying on multiple studies, reports in the popular press, animal studies. None of these have been disclosed in his opinions or identified, even sitting here today, so, again, we would move to strike his testimony and opinions with regard to the eight to ten seconds loss of consciousness.

THE COURT: Have any of those studies been provided?

THE WITNESS: I would have to -- pardon me. May I say?

MS. SIMPSON: Unless the witness has specific knowledge of that, I do not.

THE WITNESS: Of the 150 papers I submitted, I don't recall if that's one of them or not. I'm sorry. I just don't recall.

THE COURT: All right. My ruling will stand.

MS. SIMPSON: Thank you, Your Honor. Nothing further.

THE COURT: All right. Any recross?

MS. SHARPE: No, Your Honor.

THE COURT: All right. You can step down, Dr. Antognini. Thank you.

Does the defense have any more witnesses?

MS. SIMPSON: No, Your Honor. The defense rests.

THE COURT: Do I have any motions?

MS. SIMPSON: I'm sorry. We did have the one question, though. Exhibits 46 and 47 -- 46 is the Mahdi report. 47 is the Arden report. We would move Your Honor to admit those into evidence.

THE COURT: Any objection? Oh, 46 is the Mahdi autopsy, and the Arden report is 47?

MS. SIMPSON: Yes, Your Honor.

MS. SHARPE: Your Honor, we have no objection for the limited purpose to which the Court previously allowed them to be admitted and not for the truth of the matter asserted.

THE COURT: For which exhibit? Both?

MS. SHARPE: For both exhibits.

THE COURT: All right. They are admitted for the limited purpose.

MS. SIMPSON: Thank you, Your Honor.

MS. SHARPE: Your Honor, I think there also -- and I apologize. I'm looking for the exhibit numbers. There were two other exhibits that the Court conditionally admitted. It was the Nitschke tweet and the Nitschke deposition exhibit. We will get you those exhibit numbers.

MS. SIMPSON: 58 and 59.

MS. SHARPE: 58 and 59. Thank you, counselor.

Those were admitted for the limited purpose, I believe, of bolstering Dr. Antognini's testimony and opinions. No testimony was actually offered on either exhibit, so we ask that the Court reconsider its decision on those exhibits and exclude them.

MS. SIMPSON: Your Honor, again, those go to support the Daubert challenge that Your Honor has not yet ruled upon.

We think Dr. Antognini today certainly did testify that he is familiar with Dr. Nitschke. He's familiar with his work. We are simply trying to show that Dr. Antognini is not, in fact, an island of one, as plaintiff's counsel would have, but rather that he has an opinion that is supported by other clinicians.

MS. SHARPE: Your Honor, counsel had an opportunity to ask Dr. Antognini about his reliance on either documents or how they supported him, and they did not do so. I believe that they --

THE COURT: Well, they're not being offered to -- they're being offered for the purpose of responding to the argument that there is no one who supports his opinion, and I have admitted them for that limited purpose.

MS. SHARPE: Understood, Your Honor. But there's no testimony or evidence that's been offered on how they support his opinions or what opinions precisely that they do support. I think that they needed to elicit that testimony in order to bring them within that realm.

THE COURT: All right. I'm not revisiting that ruling. It will stand.

MS. SIMPSON: Thank you, Your Honor.

THE COURT: All right. Do I have any motions?

MS. SHARPE: Your Honor, I would ask if we could address that point after the lunch break.

THE COURT: After the lunch break? Sure. Yes.

Let me ask this. Do you anticipate any rebuttal witnesses?

MS. SHARPE: No, Your Honor, not on behalf of the plaintiff.

MS. SIMPSON: No, Your Honor.

THE COURT: All right. Very good. We will take up any motions and housekeeping matters after your lunch break.

Again, I have a sentencing that begins at 2:00. I expect it to last less than hour, so let's plan to reconvene at 3:00.

MS. SHARPE: Your Honor, one additional question. When we were before Your Honor for the pretrial conference, we agreed that formal final closings would come after any additional evidence on the pulse oximeters, but you contemplated interim shorter closings. Will you still entertain those this afternoon?

THE COURT: Yes. Yes. I would certainly be happy to hear from you on closing arguments based on what we have heard. I will leave the evidence portion of the trial open for us to determine what we need to come back on, if anything, on the pulse oximeter issue.

MS. SIMPSON: Your Honor, may Dr. Antognini be excused to go catch a flight?

THE COURT: I assume there's no objection to that?

MS. SHARPE: No objection.

THE COURT: Yes. That's fine. Thank you, Dr. Antognini.

All right. Anything further? All right. I will see you after lunch. Thank you.

(Recess from 1:29 p.m. until 3:02 p.m., at which time the proceedings reconvened, as follows:)

THE COURT: I wanted to -- before you get started with your closings, I wanted to clarify. Before the break we discussed Exhibits 46 and 47, and Lee's counsel represented that they had been admitted for the limited purpose of supporting Dr. Antognini's opinions. I agree with that on Exhibit 47. My recollection is that we have not -- Exhibit Number 46, which is the Mahdi autopsy report, has not been offered or admitted, and that I had ruled that it would not come into evidence. So I wanted to clarify that with you-all.

You had represented they both came in for a limited purpose -- you-all being -- I'm pointing at Lee's attorneys, for the record. Is that true? Am I missing where that was offered and admitted?

MS. KENNY: We discussed them, those particular exhibits --

THE COURT: We have.

MS. SHARPE: Yes, Your Honor. And I apologize if we are mistaken on that. We would defer to the Court and agree with your interpretation.

MS. SIMPSON: Obviously, we would like it in for a limited purpose, but whatever the Court decides. We just need to remove it from the thumb drive we just gave your deputy.

THE COURT: All right. My recollection is that the report, which is Exhibit 47, was admitted for the limited purpose because it was a report upon which Dr. Antognini relied for his opinions. I do not see in my records that 46 was admitted.

MS. SIMPSON: I believe that's correct, Your Honor.

THE COURT: Okay.

MS. SHARPE: Thank you, Your Honor.

THE COURT: And if it is on the thumb drive, we'll just make a note.

MS. SIMPSON: We don't mind moving it now if that's your preference.

THE COURT: Why don't we go ahead and do it while we're thinking about it.

MS. KENNY: I've got to re-sign the -- okay.

THE COURT: How long do you-all need for your closings?

MS. SHARPE: I believe mine is going to be 12 or 13 minutes.

MS. KENNY: I can do that length, Your Honor.

THE COURT: All right. I'll say 15 minutes for both sides. We'll time you, but if you need additional, we don't have a jury here and we've got some time, so if you need a

little additional time. I just want both of you to have an equal amount of time available to you.

MS. SIMPSON: Thank you, Your Honor.

THE COURT: You don't have to use it all, but it's available to you.

MS. SHARPE: And before turning to that, we do have a motion.

THE COURT: All right.

MS. SHARPE: Plaintiff moves for judgment under Federal Rule of Civil Procedure 52(c). The undisputed evidence shows that Alabama's nitrogen hypoxia method of execution violates the Eighth Amendment. Dr. Antognini just testified that he cannot say to a reasonable degree of medical certainty that inmates executed by nitrogen hypoxia do not experience pain. On the other side, three experts for the plaintiff have testified to a reasonable degree of medical certainty that inmates being executed by nitrogen hypoxia will experience severe air hunger.

Dr. Antognini also conceded that an inmate could suffer air hunger for 10 to 20 seconds. All of the experts agree that air hunger is suffering.

The other part of the test, is there a reasonable, feasible alternative that is less painful? The evidence establishes that there is. Commissioner Hamm and Deputy Commissioner Williams both testified that firing squad is feasible. The evidence shows that Utah's firing squad protocol

causes no pain whatsoever. That's unrebutted by the State's expert. I submit that plaintiff has proven his case, and we ask for judgment.

THE COURT: All right. What's your response?

MS. SIMPSON: Your Honor, defendants would submit that the plaintiff has not satisfied *Bucklew* in any sense. That, in fact, we do have disputed testimony over the painfulness and the efficacy of both firing squad and nitrogen hypoxia. It is defendants' position that even if there is any pain associated with nitrogen hypoxia, that it is not -- there's no evidence showing that it is superadded to anything naturally occurring in the method. As for firing squad, we have testimony from DOC employees that it is not feasible, readily available, and significantly safer. And we would encourage the Court to deny the motion.

THE COURT: Anything further?

MS. SHARPE: Nothing further from plaintiff. Yes, Your Honor.

THE COURT: All right. In light also of the fact that we are leaving the evidence open, I'm denying the motion without prejudice for leave to refile at a future date once the evidence is closed. On this record so far, I think there's enough for us to move forward, so the motion is denied.

MS. SHARPE: Thank you, Your Honor.

MR. THOMPSON: Your Honor, we would also move under

Rule 52, based -- and understanding the context of your most recent ruling, that on the issue of whether there is a feasible and readily available alternative, that given the revelation during cross-examination of Dr. Williams' testimony, we ask that you either find him not credible or exclude his testimony on some other ground. And then on that basis find that under *Bucklew*, Mr. Lee cannot meet his burden by a preponderance of the evidence.

And if Your Honor is not willing to do so at this time, the State would ask to be heard with written submissions in fuller detail on the effect of Dr. Williams' relationship with Mr. Mahdi's family and their attorney.

THE COURT: Tell me again, what is the basis for the motion to exclude Dr. Williams?

MR. THOMPSON: The basis for the motion to exclude would be twofold. Either the undisclosed -- you know, the undisclosed bias in the State's inability to properly prepare to cross-examine. And then under Daubert, the fact that Dr. Williams' relationship with the Mahdi family and his anticipated role in any action against the State has resulted in -- has so infected the methodology of his opinion in this case as to make it wholly unreliable under Daubert. And that you exclude his testimony on that basis, which would fatally undermine Mr. Lee's ability to prove a viable and readily available alternative to nitrogen hypoxia, which would result in

dismissal of his claim.

THE COURT: What's your response?

MS. SHARPE: Your Honor, with respect to Dr. Williams, he had no obligation to disclose his involvement in a litigation that has not yet been filed, in which he has not yet offered a report, in which he has not yet testified, in which there may never be an actual lawsuit. There is just no basis whatsoever for that statement.

In addition, the defendants had an opportunity to take the deposition of Dr. Williams. They declined to do so. The deadline for filing Daubert motions has come and long gone. They had a full opportunity to cross-examine Dr. Williams during the trial itself. He was not limited in what he could respond to. He answered all of their questions. There's no basis for them to now seek to exclude him, and Your Honor has already ruled on that issue.

And for all of the reasons that I just stated in our argument for motion under Federal Rule 52, we otherwise oppose their Rule 52 motion.

THE COURT: Anything further?

MR. THOMPSON: Your Honor, the basis for -- Your Honor, I think that Dr. Williams testified on cross-examination that he had been advised by Mr. King, the Mahdi family attorney, that he needs to keep his public comments circumspect. And that, I think, illustrates exactly the -- I guess sort of methodological

flaws with his analysis; that his report in this case is being colored by his anticipated testimony or potential involvement in future litigation involving the Mahdi family. And that, you know, if he's being circumspect in his public statements, that that hesitation would naturally infect and affect any conclusions that he has reached in this case, not only this case, but also in the Boyd case, in which he also testified.

THE COURT: Well, Mr. Williams was subject to cross-examination. You are certainly free to argue what weight the Court should give his testimony based on his revelation during the trial.

I don't particularly fault the State for not deposing him on that issue because it was unknown to them at the time they made the decision whether to depose Dr. Williams, but you had an opportunity to cross-examine him. And if you want to in post-hearing submissions make any argument, you're certainly free to do so, but I'm not going to strike his testimony. So that motion is denied.

Likewise, your Rule 52 motion is denied as well. This case needs to proceed.

MR. THOMPSON: Thank you, Your Honor.

THE COURT: Are you all ready for closings?

MS. SHARPE: Yes, Your Honor.

THE COURT: All right. Go ahead.

MS. SHARPE: May I proceed?

THE COURT: Go right ahead.

MS. SHARPE: As the plaintiff, we have two burdens: To show a substantial risk of superadded pain, and to show that there is a feasible alternative that can be readily implemented.

So let's start with that first question and what's been shown in this case. The evidence has shown there is a substantial risk of superadded pain. We presented three experts who testified consistently that the evidence shows that inmates suffer during nitrogen hypoxia executions. On the other side, Your Honor, you just heard Dr. Antognini testify that he cannot say to a reasonable degree of medical certainty that these inmates do not experience pain.

And consider that for a moment. The whole premise of Dr. Antognini's opinion is that nitrogen hypoxia executions do not cause pain. But when I asked him directly, are you saying to a reasonable degree of medical certainty that these inmates have actually not experienced pain, he answered no. He couldn't say that.

So let's talk about the type of suffering that's on the line here. It's called air hunger. Now, air hunger may not be traditional physical pain, but it is suffering; suffering that affects the entire body. It causes profound distress and physical sensations, and these are sensations that are worse than severe pain. Air hunger evokes the primal urge to breathe.

And Dr. Antognini's concessions today not only

undermine defendants' case, they support ours. He agrees that absolutely dyspnea ranks among the most distressing experiences that human beings can suffer. He agrees that for a dyspneic person, dyspnea can be far worse than pain. He agrees that nitrogen hypoxia falls under the definition of suffocation.

In *Baze v. Rees*, the Supreme Court described conscious suffocation as, quote, a constitutionally unacceptable risk. That's 553 U.S. 35 at 53.

So air hunger, the worst form of dyspnea, is profound, unconstitutional suffering.

The remaining question for the first part of the test is whether inmates who are executed by nitrogen gas are likely to experience air hunger. Again, the undisputed evidence is that they are.

Now, Dr. Antognini said on direct that air hunger won't appear without hypercapnia. That's elevated levels of carbon dioxide. But then he testified on cross-examination that hypoxia, that low levels of oxygen, can cause dyspnea even in the absence of hypercapnia. And he agreed that inmates can suffer air hunger for 10 to 20 seconds.

Now, we submit that our evidence has shown that the period of suffering is longer, but, again, either way, think about that for a moment. The defendants' expert has conceded that inmates can experience profound suffering for 10 to 20 seconds during a nitrogen hypoxia execution. Eye witness

observations not only corroborate that suffering but also show that it happens for much longer than 10 to 20 seconds.

And then we had the testimony of Dr. Julie Bastarache, a pulmonologist who on a daily basis treats patients who suffer from dyspnea and who reviewed these eye witness accounts and the underlying physiology. She concludes that in each of the nitrogen hypoxia executions that have taken place, inmates consciously suffered air hunger for several minutes, not seconds. Minutes that, again, the experts here agree would be the worst suffering that humans can endure; that is far worse than pain.

And Dr. Schwartzstein testified that even after loss of consciousness, the suffering continues. The European Respiratory Society, in their consensus statement, agrees. That consensus statement is in evidence at Plaintiff's Exhibit 55.

So I submit, Your Honor, that the evidence supports plaintiff's case with respect to the first part of the test without dispute.

The second part of the test is a requirement under *Baze* and *Glossip* that a plaintiff identify an alternative method of execution. An alternative method that, quote, Would significantly reduce a substantial risk of severe pain and that the State has refused to adopt without a legitimate penological reason. That's *Bucklew*, 587 U.S., 119 at 134.

Let me first dispense with any feasibility argument.

Firing squad is clearly feasible. Both Commissioner Hamm and Deputy Commissioner Williams have testified, ADOC can modify the structures at Holman Correctional Facility to create a firing squad area. ADOC can purchase the necessary equipment. ADOC can train the shooters. ADOC will be able to get volunteers to perform the executions.

Nor is the lack of an authorizing statute relevant. The Supreme Court has said, quote, A prisoner may point to a well established protocol in another state as a potentially viable method of execution. That, again, is *Bucklew*, 587 U.S., 119 at 140.

Firing squad is an approved method of execution in five states.

So what about the risk of suffering with firing squad? Well, on the one hand we have nitrogen hypoxia, where there is a risk of the worst suffering imaginable, regardless of how an inmate experiences it, and then with firing squad we have a method of execution where there is evidence that there would be no pain or suffering.

Dr. Williams, the only firearms expert in this case, testified that the inmate will very likely feel no suffering whatsoever when executed by firing squad. He testified that because of the way that your brain processes noxious stimuli, and because of the neural stunning that occurs when four or five bullets penetrate the heart point blank, it will take several

seconds, if not minutes, for the inmate's brain to even realize that there's been a traumatic event. By that time, the inmate is deeply unconscious and dead soon thereafter.

The record is clear, Your Honor. Execution by firing squad is feasible and readily available, and it causes dramatically less suffering than execution by nitrogen hypoxia.

I want to spend a moment now discussing the legal standard that applies here. As the plaintiff, we recognize that we bear the burden of proof, and we recognize as well that we are bringing a facial challenge to a method of execution. So I want to talk a little bit about the particular framework that applies to a facial challenge.

The Supreme Court's most recent description of the facial challenge standard comes from the *Rahimi* case, which this Court knows and cited to in its decision in Boyd. The *Rahimi* case stated, among other things, that a plaintiff bringing a facial challenge must show, quote, No set of circumstances under which the act would be valid. That's 602 U.S., 680 at 693.

Now, *Rahimi* didn't articulate some new standard. Instead, that language was a reiteration of the no set of circumstances language that the Court articulated in *United States versus Salerno*, a 1987 case at 481 U.S. 739.

And I want to spend a moment deconstructing that language. Because read literally, the language could mean that whenever a party can come up with a situation where the statute

or rule or process is constitutional, the entire thing is held valid; that is, if 99 times out of a hundred there will be an unconstitutional result, and one time there will not be, then the rule survives full stop, even when you know that 99 times out of a hundred, there will be an unconstitutional result.

That makes no logical sense; indeed, several courts explaining the language of *Salerno*, including the Eleventh Circuit, have rejected a literal interpretation of the no set of circumstances language.

The controlling case in this circuit is *Club Madonna v. City of Miami Beach*, 42 F.4th 1231, an Eleventh Circuit case from 2022. That case involved a federal challenge to a state law on the basis of federal preemption. The Eleventh Circuit carefully analyzed the *Salerno* language and declined to read it literally. It said the no set of circumstances language, quote, Would reject a conflict preemption claim in a facial challenge whenever a defendant can conjure up just one hypothetical scenario in which implementation of the state law would not directly interfere with federal law. That's 42 F.4th at 1256.

That can't be the law, the Eleventh Circuit said. Instead, the Court, reviewing how the Supreme Court and how other circuits actually evaluate facial challenges, said the relevant question is, quote, Whether the statute fails the relevant constitutional test. 42 F.4th at 1256.

So, then, what about this no set of circumstances

language from both *Salerno* and *Rahimi*? It is, as the Eleventh Circuit explained, quote, A description of the outcome of a facial challenge in which a statute fails to satisfy the appropriate constitutional framework. That's 42 F.4th at 1256.

So the question is, actually, rather straightforward. We go back to the constitutional test, which here is whether there is a substantial likelihood of superadded pain and whether there is a feasible alternative method of execution. Not what conceivably might happen in a hypothetical world. Not even what could happen once in a while. It's what's substantially likely to happen.

That, I respectfully submit, Your Honor, is how to think about the facial challenge standard in accordance with how the appellate courts actually apply the legal framework. And I submit that under this framework, we have proven that there is a substantial risk of superadded pain with execution by nitrogen hypoxia that can be alleviated by execution by firing squad, which will result in no pain.

I look forward to representing a more comprehensive closing argument when the record in this case is closed.

THE COURT: All right. Thank you.

MS. SIMPSON: May it please the Court.

Jeffery Lee faces an exceedingly high burden as to his Eighth Amendment method of execution challenge. He must prove by a preponderance of the evidence that he is very likely to

experience severe pain over and above death itself if he is executed via ADOC's nitrogen hypoxia protocol.

Which, by the way, is the method he chose, sight unseen, knowing nothing about it other than nitrogen hypoxia.

This standard is so high that no inmate has ever met it before the Supreme Court. Not one. No state's method of execution has ever been held unconstitutional by the high court. The Supreme Court has considered nitrogen hypoxia in preliminary injunction or stay of execution postures on multiple occasions now, both from Alabama and Louisiana, and has not stayed a single execution.

As the Supreme Court discussed in *Bucklew*, at the time of the framing, cruel and unusual punishments were those in which terror, pain, or disgrace were superadded to the penalty of death. That's 587 U.S. 130.

The most common method of execution at the time of the Eighth Amendment's adoption was hanging, which, as the Supreme Court wrote, was no guarantee of a quick and painless death. While hanging could result in prolonged suffocation, mechanical suffocation, even, it was not intended to be painful.

In the wake of *Baze*, *Glossip*, and *Bucklew*, to prevail in a method of execution challenge, the inmate must show, quoting here, That the State's chosen method of execution cruelly superadds pain to the death sentence. And he must show a feasible and readily implemented alternative method of

execution that would significantly reduce a substantial risk of severe pain that the State has refused it adopt without a legitimate penological reason. That's *Bucklew* at 134.

Now, the Court has recognized in *Baze* and *Glossip* that the Eighth Amendment does not demand the avoidance of all risk of pain in carrying out executions, and nor does the Eighth Amendment come into play unless the risk of pain associated with the State's method is substantial when compared to a known and available alternative.

As to this proposed alternative, the inmate must show it is feasible and readily implemented, and he must offer a substantially detailed protocol so as to allow the State to carry it out relatively easily and reasonably quickly. And then he must show that it significantly reduces a substantial risk of severe pain. As the *Bucklew* court said, a minor reduction of risk is insufficient. The difference must be clear and considerable. And also the State may have legitimate penological reasons for declining to switch methods of execution, such as preserving the dignity of the proceedings.

Mr. Lee has not and cannot make the necessary showing. First, there is a risk of pain inherent in every method of execution. The distinction is that ADOC is not trying to superadd pain. ADOC's nitrogen hypoxia protocol results in rapid loss of consciousness. The videos of ADOC's system and Louisiana's system, which are Defendants' 55 and 56, show that

less than 20 seconds after nitrogen reaches the mask, the concentration of oxygen within the mask is lethally low. Not zero percent, but below 6 percent where life-threatening danger is imminent.

Dr. Antognini opined that within approximately 30 to 45 seconds, that is, around a minute after nitrogen first hits that mask, assuming the inmate is not holding his breath, he will be unconscious and he will be dead in a matter of minutes thereafter.

We know from OSHA and from the U.S. Chemical Safety and Hazard Investigation Board -- that's Defendants' 43 through 45 -- how insidious inert gases can be in the workplace. For instance, looking at page 2 of Defendants' 43, or also on page 6 of Defendants' 45, we see a case study of a contractor who accidentally plugged his respirator line into the nitrogen instead of into the breathing air, and he asphyxiated. If he had been in pain, if he had been suffering from dyspnea, if he had noticed something was wrong, surely this man would have ripped his mask off his head. He didn't. He succumbed. He died before he realized there was a problem.

OSHA reports citing Hudnall, et al., found that unconsciousness can occur in about 12 seconds in a zero percent oxygen environment, with death occurring in minutes.

And we know from the Ogden studies, Defendants' 23 and 24, that individuals who commit suicide with inert gases, which

include helium, argon, nitrogen, rapidly lose consciousness in low oxygen environments and then exhibit reflex movements and agonal breathing for some time before they finally die. Again, if these people were in severe pain following the first breaths of inert gas, surely they would have stopped. Surely they would have done something. Surely there would have been some sign of pain or severe distress. Ogden and then Ogden, et al., report nothing like that.

And this is what we see in Alabama. Yes, we see movements. We see movement at the beginning of executions, such as Mr. Frazier when he rotated his wrists or Mr. Grayson when he flipped an obscene gesture. And we see movement later in the executions. We've seen arms twitch. We've seen legs lift. We've seen breathing, gasping type breathing. But these reflect what we see documented in the Ogden studies.

If inmates don't hold their breath, then they rapidly pass out. And in a matter of minutes they are dead, having never reawakened.

As for the contention that nitrogen causes panic or psychological terror, Mr. Lee has not shown that it does so above and beyond other methods of execution.

First, as to suffocation, there was mentions of suffocation. That's from *Baze v. Rees*, and that is a very different context. In the *Baze* context, the issue was a paralytic -- if the inmate was not properly given thiopental, he

could suffer suffocation when the paralytic paralyzed his diaphragm. That's not what we're dealing with here.

But turning back to hypoxia, we expect to see anxiety from any inmate facing imminent death. Look at the description of the EKG taken during the 1938 firing squad execution of John Deering. That's Defendants' 48. Mr. Deering seemed outwardly calm, according to the reports, but his heart rate jumped from 72 to something well above normal. Said 180 in the report. I believe Dr. Williams thought that may have been too high, but it was very high. And then it fluttered wildly before he gave his final statement.

Anxiety, even severe anxiety, panic, terror before an execution does not constitute cruel and unusual punishment. And Mr. Lee cannot show that he would have any greater fear from knowing that he is about to die via nitrogen hypoxia, just breathing nitrogen -- which, again, is colorless, odorless, and tasteless -- than from knowing that he, like Mr. Deering, is about to be shot in the chest with multiple high-velocity rounds in which he can only hope the marksmen hit the spot.

Assuming arguendo that inmates experience dyspnea in the few seconds before they lose consciousness, if dyspnea creates a sense of dread and doom, then so too must the knowledge that the inmate is about to die. He is facing his own mortality.

Now, Dr. Schwartzstein suggested that patients can

experience dyspnea or associated suffering even when they are unconscious. But while the brain may still be registering sensations and processing them, the patient is unconscious. He is not experiencing negative stimuli in the moment. Dr. Williams, in fact, testified there is no pain while someone is unconscious. So which is it? Is there pain? Is there not pain? Defendants would suggest there is no pain when an inmate is unconscious.

Dr. Schwartzstein also testified that inmates could suffer greater dyspnea because the restraints used to hold them to the gurney might impede their breathing. Well, putting aside the fact that ADOC has incredibly valid penological reasons to restrain inmates about to be executed, Dr. Schwartzstein has not been restrained himself. He cannot testify as to the actual effect.

But we had witnesses who could. James Houts and Wardens McKenzie and Clemons all testified that they had been restrained to the gurney under execution conditions in terms of tightness, and that their breathing was not impeded.

Dr. Bastarache testified that inmates move long before her theoretical two minute and 18 second point at which they should potentially lose consciousness, but she's never witnessed a nitrogen hypoxia execution. She based her testimony on the testimony of lay witnesses. And as this Court saw in her discussion of Gladys Bautista's article, Dr. Bastarache only

accepted the witness's interpretation of events if she agreed with it. Ms. Bautista testified that the inmate lost consciousness long before Dr. Bastarache thought he did.

Now, Dr. Antognini has served as an expert witness in four prior hypoxia challenges in this state and one in Louisiana. He is a board certified anesthesiologist, which means he is required to be knowledgeable in fields such as human anatomy and physiology, physics, the respiratory system, and the cardiovascular system. Indeed, he has taught on the subjects of anesthesiology and physiology, including respiratory physiology. And perhaps above and beyond some anesthesiologists, he was a question writer for the board exam. He has to be knowledgeable about the topic areas covered, including respiration. He is familiar with ventilators, intubation, oxygen transport, and, yes, hypoxia.

There is no reason that he should not be qualified as an expert now to opine on the effects of ADOC's nitrogen hypoxia protocol on the human body, and Dr. Antognini believes to a medical and scientific certainty that ADOC's protocol will cause unconsciousness within 35 to 40 seconds, maybe less, once the oxygen in the mask dips below 10 percent. He opines that death will occur within about 15 minutes on average. He further opines the mask does not cause significant leakage or cause carbon dioxide to build up within it for rebreathing. And he opines the protocol does not cause significant suffering or

pain.

Now, Mr. Lee has attempted to paint Dr. Antognini as an island of one, directing the Court to a cluster of articles written about nitrogen hypoxia in recent years. But beyond the fact that many of his exhibits are editorials, written by the same group of authors in different permutations, some of whom are, in fact, on the editorial boards of the journals in which their opinion pieces appear and some of whom are avowedly opposed to the death penalty, he overlooks the existence of Exit International and Dr. Philip Nitschke.

Dr. Nitschke is also a medical doctor and has a Ph.D. in laser physics. He is one of the authors of The Peaceful Pill Handbook, which for decades has provided information to individuals who wish to end their life by safe, hopefully painless, methods. And one method that he has espoused and continues to espouse in that handbook is inert gas suicide.

He feels so strongly about this that he testified for Kenneth Smith in 2024 here in the Middle District, and he developed the Sarco Pod, which is a device that when the person intending to commit suicide wishes to do so, they climb inside, push the button, and the capsule fills with nitrogen.

As he describes in The Peaceful Pill Handbook, he was a witness to the first and so far only use of a Sarco Pod, and the decedent died quickly. She was 64 years old, lost consciousness a little over a minute after nitrogen began filling the pod, had

some involuntary muscle contractions, and her death occurred after about seven minutes.

Now, admittedly, ADOC's executions tend to show more movement and a longer time to death, as the protocol calls for either 15 minutes of nitrogen or five after flatline, but there are notable differences. The Sarco user, again, was very ill, and most ADOC inmates are in better health.

Dr. Nitschke is avowedly opposed to the death penalty. His tweet, which is before the Court in a limited capacity, says as much. But he also makes clear that he firmly believes that nitrogen hypoxia, not as a method of execution but as a euthanasia measure, is not cruel or otherwise unusual.

So while Mr. Lee can point to medical professionals who oppose the use of nitrogen hypoxia, their opinion is not universal in the medical community.

Now, Mr. Lee has to name an alternative. Firing squad. That does not satisfy *Bucklew*. It is not feasible and readily available to ADOC.

Yes, Mr. Lee has pointed to the Utah and the Army protocols, but this is not as simple as simply taking Mr. Lee out behind the prison and shooting him with rifles. The Court heard testimony that the chamber is not currently suitable for a firing squad execution.

You know, the inmates did testify that perhaps the chamber could be retrofitted at some point. They don't know

what that would take. But the Court has seen the chamber. The Court has seen the dimensions of the chamber. The Court has seen the layout of the chamber. And if the chamber could be modified at all, it would take significant changes to prepare it to be a safe place to carry out a firing squad execution. The witnesses did testify, I remember Warden McKenzie especially, that it's too small.

Finally, ADOC would need to study available firing squad protocols, do its own research, decide on a protocol. And as the history of nitrogen hypoxia in Alabama shows well, as soon as ADOC announced a protocol, the inmates who elected it would come up with reasons why it was insufficient.

It took ADOC five and a half years to get the first hypoxia execution completed from the time that the method was made legal. There is no guarantee that firing squad would be any faster.

Firing squad is not significantly safer. Aside from the risk of anxiety, hypoxia is virtually painless if the inmate breathes normally. With firing squad, the inmate, yes, may die within seconds if the bullets hit accurately. The Mahdi execution in South Carolina upon which Dr. Antognini relied is proof that sometimes these things can go horribly wrong.

Mr. Lee wants the Court to believe that being shot in the chest by multiple rounds significantly reduces a severe risk of pain. This Court should find that Mr. Lee has failed to

prove his Eighth Amendment claim and grant judgment to defendants. Thank you.

THE COURT: All right. Thank you. All right.

I will take everything under advisement and get an opinion out after the evidence is closed, which brings me to the next question. Have you all conferred about how long you need, if at all, for the presentation of additional evidence?

MS. SHARPE: We have not yet conferred with opposing counsel in that regard. We have reached out to experts who are actively working on the issue. I would suggest, Your Honor, that we provide you with a status report, or we could have a telephone conference if that would be a preference early next week, and we can check in. And that would also give us an opportunity, I think, to speak further with counsel for defendants.

The one other suggestion which I wanted to make to the Court is we would be prepared and propose for plaintiff, at least, to revisit the posttrial briefing that we discussed at the pretrial conference. We would like to go ahead and submit proposed findings of fact and conclusions of law based on the record that's been developed to date and would be prepared to do so by Monday, if that would be agreeable with the Court.

MS. SIMPSON: It's currently scheduled for Friday, Your Honor. We certainly would not object to moving that to Monday if that's agreeable.

THE COURT: Yes. I actually had a very large note to myself to tell you just that.

MS. SHARPE: We have that same note, Your Honor.

THE COURT: So I did not forget. So, yes, I will bump the deadline for proposed findings of fact and conclusions of law to Monday.

As to follow-up about dates, would a telephone conference on Tuesday, the 5th, be enough time for you-all to at least have an update?

MS. SHARPE: Yes, Your Honor.

THE COURT: All right. Let's set a telephone conference for 1:30 on Tuesday, May 5th. Is that -- do you have a conflict?

MS. KENNY: Could we have a moment?

(Brief pause in the proceedings.)

MS. SIMPSON: Yes, Your Honor, that will work. I beg your pardon.

THE COURT: All right.

MS. SIMPSON: If I may put one more thing on the record, Your Honor.

THE COURT: All right.

MS. SIMPSON: So we did hear back late yesterday from the manufacturer of the pulse oximeters as to how they got the data down. That email has been given to counsel for Mr. Lee and counsel for the other hypoxia plaintiffs.

THE COURT: All right. Very good.

So proposed findings of fact and conclusions of law are now going to be due Monday, May 4th, and we will have a telephone conference on Tuesday, May 5th, at 1:30 to discuss when and how to reopen -- or keep evidence open for the pulse oximeter information. All right? Very good.

Thank you all very much. Have a safe trip to all of you. Good to see you.

(Proceedings concluded at 3:43 p.m.)

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COURT REPORTER'S CERTIFICATE

I certify that the foregoing is a correct transcript from the record of the proceedings in the above-entitled matter.

This 4th day of May, 2026.

/s/ Patricia G. Starkie
Registered Diplomate Reporter
Certified Realtime Reporter
Official Court Reporter