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Attorneys For Plaintiff MICHAEL ANGELO MORALES

IN THE UNITED STATES DISTRICT COURT

FOR THE NORTHERN DISTRICT OF CALIFORNIA

SAN JOSE DIVISION

MICHAEL ANGELO MORALES, Plaintiff, v. JAMES E. TILTON, Acting Secretary of the California Department of Corrections and Rehabilitation; ROBERT L. AYERS, JR., Acting Warden, San Quentin State Prison, San Quentin, CA; and DOES 1-50, Defendants.	Case No. C 06 219 (JF) C 06 926 (JF) **POST-TRIAL DECLARATION OF DR. MARK HEATH**

I, Mark Heath, M.D., under penalty of perjury, both depose and state as follows:

1. Counsel for Mr. Morales has asked me to address the issues raised by the Court's Request for Briefing, dated October 3, 2006. I have reviewed the Court's questions carefully and thought about the issues raised in them.

2. The Court's questions to the parties highlight important issues that need to be thoroughly considered by the CDCR and its experts. While I will attempt, so far as is consistent with my personal ethical beliefs, to provide information that I feel is relevant to the Court's questions, some of those questions touch on areas in which I am not aware of scientific or medical data on which to rely, and therefore further study would be warranted. In my opinion, having listened to the entirety of the hearing testimony and reviewing nearly all of the deposition testimony, determining how best to remedy the deficiencies in the CDCR's execution procedure is a task that demands in-depth consideration by multiple experts -- much as the AVMA Guidelines on Euthanasia are the result of the thorough efforts of a panel of veterinary experts.

I. The Execution Team

3. The Court has asked what improvements could be made in the CDCR's screening of potential execution team members, and what the experience of other states has been in this regard.[1] As I testified at trial, it appears that to this point, the CDCR has performed no meaningful screening of execution team members, and at least two former team leaders have medical conditions or problematic histories that lead me to question the wisdom of placing them on the execution team.

4. This issue -- the failure to screen execution personnel -- has been a problem in other states, and it has direct consequences on the safety of the execution process. The most salient example of this is probably the recent revelations (published in July in the St. Louis Post-Dispatch) in

[1] Although I will attempt to provide as much information as possible about other states' practices in this declaration, almost every case in which I am involved is subject to a protective order. These orders vary in scope, and I can disclose information learned in these cases only if I am completely certain that the protective order does not forbid it. The states in which protective orders govern and limit my ability to comment include Virginia, Missouri, North Carolina, Maryland, and Oklahoma.

Missouri regarding the surgeon who designed and oversaw Missouri's execution procedure. That doctor, designated in litigation as John Doe I, had lost privileges at two hospitals and had been disciplined for failing to disclose his extensive malpractice history in his application for credentialing. His problematic conduct during executions turned out to be similar to his conduct in his professional life: He substantially reduced the dose of thiopental used in executions (from 5 grams to 2.5 grams in some executions, and perhaps lower in others) without ever informing the Department of Corrections. When asked repeatedly why he had reduced the dose, the doctor gave different answers at different times, ranging from "concerns in other states" that the 5-gram dose might be too large, to difficulty getting the thiopental powder to dissolve, to dyslexia-related confusion about the dose. Thus, not only was John Doe I's conduct of executions inconsistent and unreliable, but he was unable or unwilling to provide the court with a straightforward account of what he had been doing. Judge Gaitan has now barred John Doe I from participating in executions in any manner.

5. In this case, Witness #6 had trouble mixing the thiopental, was confused about the mixing process, and apparently had been preparing less than the 5-gram dose. In both California and Missouri, it is troubling that the departments of corrections fostered such a slack environment that the people who made these errors were allowed to keep making the same errors, in execution after execution. Both institutions have been willing to place on their execution teams people who are willing to remain ignorant of how the procedure works, or who are willing to deviate from the protocol in fundamental ways. The experiences with Witness #6 and John Doe I demonstrate that another important component of screening execution team members is that people knowledgeable in how the procedure should be performed should continuously evaluate the team members' performance. The CDCR should be willing to remove people from the team for inadequate performance or execution-related misconduct.

6. In Maryland, press investigation has recently revealed that the person responsible for injecting the drugs during executions was fired from his police department for refusing to cooperate with an internal investigation, and that he was charged with poisoning and killing several

neighborhood dogs. (An article about this conduct is attached as Ex. 18.) This type of conduct should be considered extremely problematic in a candidate for the execution team: The sensitivity and importance of the execution process demands personnel who understand the importance of internal auditing and dialogue; and it should be self-evident that someone who poisons animals should not be chosen to participate in executions.

7. Another member of Maryland's execution team was suspended for spitting in prisoners' food prior to the food being delivered to their cells. It is very concerning that individuals given the responsibility of mixing and delivering the anesthetic drugs have histories such as these. In view of the apparent inability or unwillingness to reliably exclude problematic individuals from the execution process it is particularly important that the CDCR does not obscure the process by using pancuronium.

8. These experiences, as well as the problematic histories of Witnesses #1 and #5, indicate the importance of effective screening. In addition, the example of John Doe I demonstrates that medical professionals involved in executions should be subject to screening too, just as they would be in a hospital. In order to admit patients and practice in hospitals physicians must undergo scrutiny from a credentialing board and must renew their privileges on an annual basis. This process is set in place to minimize the probability that problematic physicians are able to participate in health care delivery. Before being hired by a hospital, all doctors are subject to rigorous background checks that evaluate the fitness of the person for the tasks for which they will be responsible, as well as their susceptibility to some of the common dangers of the job, such as drug abuse.

9. No comparable process has taken place at San Quentin; clearly, asking someone if they would be willing to serve on the execution team, without more, does not come close to constituting effective screening. It appears that the CDCR, unlike hospitals, has not carefully considered the responsibilities of execution team members and the potential types of misconduct in which team members could engage, and then designed a screening process in light of these issues. That failure has negatively impacted the safety of the execution procedure.

10. Ideally, screening should be performed by someone experienced in hiring health care professionals, because the type of screening necessary appears to be similar. Like health care professionals in many circumstances, the execution team has complete responsibility for the welfare of the inmate on the night of the execution, and their misconduct or errors could have disastrous consequences for the inmate. Like health care professionals, the team members have access to addictive drugs, must be able to keep detailed records of those drugs, and must be willing and able to learn the procedure.

11. The Court has also asked what training should be given to execution team members. I believe that my testimony covers the primary, most appalling inadequacies in the training and understanding of the current and former team members. Anyone who participates in executions should understand and be trained in all aspects of the procedure. I would suggest looking to veterinary standards to determine the minimum standard of training for non-medical personnel (such as shelter technicians) who perform euthanasia. Of course, if the CDCR continues to use pancuronium and potassium, it is necessary that an individual with extensive training in anesthesiology monitor anesthetic depth regardless of the training level of the rest of the team.

12. Certain tasks within the execution process require medical training. In particular, I testified at the hearing that the CDCR needs to institute a plan to obtain central venous access if the team is unable to insert a peripheral IV. The experiences of other states buttress my opinion, as in addition to the Stanley Williams execution, there are numerous examples of executions in which the team was unable to obtain reliable venous access. Examples of executions that were most likely inhumane as a result include the Ohio execution of Joseph Clark, and the Oklahoma execution of Loyd LaFevers. (The testimony of a witness to the Clark execution, given in the Evans hearing in Maryland, is attached as Ex. 1, and a newspaper article describing the execution is attached as Ex. 2. My affidavit in Oklahoma discussing the LaFevers execution is attached as Ex. 3.) Therefore, the CDCR needs to have a procedure for inserting a central line. Because only physicians or, in rare cases, highly trained non-physician professionals, have the training and ability to safely and reliably insert central lines, a doctor must be available and willing to insert central lines in executions if

necessary. My views on this subject are supported by Dr. Dershwitz, excerpts of whose October 10, 2006 testimony on this subject in the Evans case is attached as Ex. 4. Other states, including Georgia, Indiana, Missouri, Florida, Oklahoma, Arizona, Arkansas, and possibly others have resorted to central lines or cut-down procedures as a result of difficulty obtaining peripheral IV access, and have evidently identified physicians who are willing and able to undertake this task. I am confident that Dr. Singler would also be capable of establishing venous access by alternative means if other members of the execution team were unable to establish adequate peripheral IV access.

13. Finally, the issues of training and screening are interrelated. In reviewing the deposition testimony of the execution team members, one of the things I found most shocking was the attitude revealed by some team members, that nothing could go wrong, or that it was not necessary to know anything about the procedure because it was not part of their daily work. Additional training might mitigate this problem, but training alone cannot inculcate the belief that this procedure is important and dangerous, and must be performed carefully. I would be surprised if animal shelters would hire euthanasia technicians who exhibited a similar degree of glibness or disregard for the process of euthanizing animals, because training may not change a person's fundamental outlook on the procedure. Thus, it seems that a shift in the CDCR's culture surrounding executions is necessary, and one element of that shift would be to select execution personnel who are willing to treat the procedure, and their responsibilities within it, with the care that it demands. I do not know how one can reliably screen personnel to determine whether they actually harbor the humane intent and attitude that seems to be intrinsic to the psyche of veterinary caregivers.

II. Physical Aspects of the Execution Facility

14. The Court has asked the parties to discuss potential improvements to the physical aspects of the execution facility. On this point, counsel for Mr. Morales has asked me to address a few points regarding the execution facilities in other states.

15. As I testified at trial, there are numerous difficulties that are engendered by the CDCR's use of the gas chamber to perform executions by lethal injection. The unnecessarily cramped quarters make inserting reliable peripheral IVs much more difficult, and would render

inserting a central line nearly impossible.[2] Dr. Singler noted this problem when he first saw the chamber, and so did I. The physical shape of the chamber and the angle of the gurney impede observation of the inmate and the catheter site. Finally, the execution team's unthinking adherence to practices used for lethal gas -- such as sealing the chamber door -- and its inability to solve problems caused by the gas chamber -- such as the question of where to situate the IV bags, and how to observe the inmate -- further increase the dangers of the procedure. Of course, medical procedures can be performed under adverse circumstances when necessary, such as when a patient is being transported in a helicopter, but those occasions are dictated by necessity. There is no such necessity here, and the team members do not have the training and competence that would allow them to compensate effectively for the adverse circumstances.

16. From a medical perspective, it is imperative that the facility in which a procedure is performed be designed with the needs of the patient, procedure and medical professionals in mind. The CDCR is attempting to perform a medical procedure, the induction of general anesthesia, in a facility that is not remotely appropriate for that purpose. Nor has the CDCR even attempted to meaningfully reconfigure or rebuild its execution facility for lethal injection, and as a result, it has unthinkingly and needlessly compromised the safety of the procedure.

17. There are other states that, like California, once used gas as the sole method of execution and now either provide inmates with a choice of gas or injection, or use lethal injection as the sole method of execution. I have inspected the execution chambers of two of these states, Missouri and Maryland, and both of them have built new execution chambers specifically for lethal injection. Those facilities -- while far from ideal, since both employ remote injection -- do not suffer from the irrational, needless flaws that plague California's gas chamber facility.

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[2] The awkwardness in setting IVs in the gas chamber may explain why the execution team has had trouble setting the IVs in a relatively high proportion of the executions that have been performed in California (difficulties have been documented in the executions of Anderson, Massey, Beardslee, and Stanley Williams).

18. I inspected Missouri's death chamber in May 2006, in conjunction with the Taylor v. Crawford litigation. Photos of the Missouri execution chamber, taken from a video of the inspection that was entered into evidence in the Taylor trial, are attached as Exhibits 5 through 9. The chamber is rectangular in shape and contained perhaps four times the floor area of California's gas chamber. Importantly, the chamber is large enough to allow execution team members the freedom of movement that may be necessary to achieve IV access. There is sufficient space to place a central line. The gurney could be repositioned if desired (indeed, Judge Gaitan has ordered the DOC to consider doing so), and it would be possible to place the monitors associated with assessment of anesthetic depth, as well as the equipment necessary to treat complications from central lines, inside the execution chamber itself.

19. Missouri's equivalent of California's anteroom -- the "execution support room" -- is also far larger than the anteroom. While I do not know the exact dimensions of the room, it was capacious in comparison to California's anteroom. It had cabinets for keeping equipment and materials readily available. Ex. 7. It was separated from the execution chamber by an ordinary door with a window in it. The photo attached as Exhibit 6 shows the door leading from the execution support room into the execution chamber. Two windows in the support room were meant to allow observation of the inmate. In front of these windows, the members of the execution team (two people to inject the drugs, a nurse, and the surgeon in charge of the procedure, known as John Doe I) would stand.

20. There was no evidence in the case that any officials (aside from prison officials who had responsibilities to perform during the procedure) would stand in the support room during the execution. This may have been because Missouri had designed the facility to include three entirely separate witness rooms, one on each of three sides of the execution chamber. Each room was meant for a different category of witnesses (state officials and the press; the inmate's family; and the victim's family), so the state witnesses had a large, isolated area from which they could view the procedure. In addition, it was represented to me that only the execution team members occupied the space directly in front of the observation windows.

21. I inspected Maryland's execution facility in June 2006, as part of the Evans v. Saar litigation. Architectural schematic drawings used as exhibits in that case are attached as Exhibit 10. As those drawings show, the execution chamber used for lethal injection is situated right next to (and shares a wall with) the gas chamber. Again, Maryland, unlike the CDCR, has chosen to create a new space more suited to lethal injection. The execution chamber is 11 feet by almost 17 feet, substantially larger (again, perhaps three to four times the floor area) than the San Quentin gas chamber. Again, this space provides execution team members with greater maneuvering space to set the IVs, and it affords sufficient room to place a central line and situate the necessary equipment in the execution chamber itself for any additional monitoring. As in Missouri, Maryland's execution support room provides ample space for execution team members to perform their tasks. Nor was there any testimony that the room is crowded with officials during executions.

22. Mississippi is another state that uses lethal gas as well as lethal injection. Although I have not visited the Mississippi execution chamber, a photograph of the lethal injection chamber is available on the Internet at http://mshistory.k12.ms.us/features/feature57/electric.htm. That photo shows that Mississippi does not use its gas chamber for lethal injection, and the chamber appears to be more spacious than California's gas chamber. Similarly, publicly available photos of Arizona's lethal injection chamber and its gas chamber (http://www.azcorrections.gov/prisons/florenceHist.htm#Chamber) establish that Arizona uses separate facilities for its lethal injection and gas executions.

23. Another example of a state that has built a new lethal injection facility is Oklahoma, which used to use electrocution as its method of execution. The lethal injection facility in Oklahoma affords ample room and space for proper and safe establishment of intravenous access.

24. When I read the Plata report, I found it striking that the report discussed San Quentin's antiquated health care facilities, because my overriding impression of the gas chamber was exactly that -- that it was an antiquated, outmoded facility that should be replaced. I understand that the CDCR is building a new death row; based on news accounts, construction is underway or imminent.

This seems like a good opportunity to build a new execution facility to alleviate some of the needless problems that currently plague the procedure.

III. Recordkeeping and Drug Custody

25. The judge has asked what improvements can be made to the CDCR's recordkeeping in the context of an execution. The execution team's contemporaneous recordkeeping should be sufficient to allow the team and the CDCR and the public to discern, after the fact, whether the protocol was followed and the drugs were properly prepared, and whether any unexpected events occurred during the execution. I testified at trial about the recordkeeping and drug custody practices used at Columbia University Medical Center, and the importance of recording precisely how much of each drug is prepared, used, and disposed of. Precise and reliable recordkeeping is part of an environment and culture of adherence, carefulness, and accuracy, and as such is conducive to correct and reliable accomplishment of a complex procedure. Careful record keeping also permits after-the-fact analysis and troubleshooting, which is essential if the system is to improve itself and continually attempt to minimize the risk of inhumane executions. Further, detailed and accurate records would be helpful were there to be future disputes or litigation regarding the conduct of lethal injection procedures. It is my understanding that some states are using video recordings of suspect interrogations and confessions, and that these are helpful in weighing the validity of any statements that are made. Video recording of the execution process in California would be similarly useful in resolving disputes about the conduct of the procedure, and would also be likely to be a good source of pressure to ensure that the personnel to carry out the procedure with care.

26. To minimize the risk that any particular execution will be inhumane, what is really needed are personnel who understand the underlying reasons for recordkeeping requirements and the importance of carefully, precisely and reliably handling the drugs themselves. The CDCR and execution team members must understand that both securing and recording the chain of custody of thiopental are important because thiopental is a scheduled drug that is vulnerable to drug diversion. Team members must understand why it is important to give the same amount of thiopental every time and record that amount every time. They must understand that the CDCR must be able to verify after

the fact that its executions have been performed consistently, according to the protocol, and in a manner that minimizes the dangers created by the use of potassium and pancuronium. They also must understand that if something goes wrong during an execution, the team and the CDCR must be able to reconstruct the events after the fact and analyze what happened in order to prevent reoccurrences. Notably, neither the team members nor the CDCR displayed this understanding after the Stanley Williams execution. More broadly, they must understand that the anesthesia phase of the execution is the most important phase with respect to ensuring that the procedure is humane, and it must be carefully and properly performed.

27. If the CDCR comprehends the importance of these issues and ensures that its execution personnel do as well, then careful recordkeeping will complement the consistent, careful performance of the execution procedure. Based on my conversations with veterinarians and review of veterinary literature, including the Humane Society's *Euthanasia Training Manual*, veterinarians believe that it is important to ensure that euthanasia personnel, whether in a hospital or a shelter, appreciate the issues described above and the complementary need for precise recordkeeping. Anesthesiologists observe these standards as well, in the context of clinical anesthesia practice, in order to maximize positive outcomes and understand adverse ones.

28. In addition, auditing and debriefing are important quality control measures in clinical practice. When unfavorable outcomes occur in a hospital, the professionals involved know to report the problems, which are then reviewed by a committee of other doctors and administrators. The committee makes recommendations for avoiding the problems in the future. This type of oversight would be an important safety measure in the execution context. The evidence in California and in other states, including Missouri and Maryland, shows that unexplained deviations from the protocol are a recurring problem. An auditing procedure should review such deviations as well as any problems that occur during executions.

29. I feel it is important to note here that careful recordkeeping will be particularly important if the protocol is modified in any substantial manner in the future. Any time that a complex procedure is substantially altered, the people performing it need to be especially attuned to

the importance of evaluating and analyzing the performance of the procedure after the fact, to determine whether there are unanticipated flaws or the procedure could be improved further.

IV. Using Longer-Acting Barbiturate in Place of Thiopental

30. The judge has asked what the advantages and disadvantages are to using a longer-acting barbiturate, such as pentobarbital, while continuing to use pancuronium and potassium. As I testified at trial, sodium pentobarbital is a barbiturate anesthetic that is longer-lasting, but potentially slower to take effect, than thiopental.

31. Although I have little experience using pentobarbital for purposes of anesthesia or animal euthanasia, I believe it is significant that veterinarians, who purposefully have attempted to develop as humane a method of euthanasia as possible, have chosen to use pentobarbital for euthanasia, rather than other barbiturates such as thiopental. The AVMA Report explains the qualities that have led the AVMA to conclude that pentobarbital is the best available option for animal euthanasia in more detail.

32. As I stated in my first declaration in this case, as well as in my declaration in the Beardslee case, thiopental is very sensitive to errors in administration and preparation because it is unstable and wears off quickly. One of the dangers created by the use of thiopental is that an inmate who does not receive the full dose of thiopental may reawaken during the execution because of the short duration of the drug's effect. The duration of action of pentobarbital is much longer than that of thiopental, and it therefore may be somewhat less sensitive to some errors than thiopental.

33. A theoretical advantage of thiopental is that it takes effect more quickly than many other barbiturates. The speed of onset is affected by the speed of injection, however, and the CDCR's execution team currently intends to administer the thiopental so slowly (by measuring the injection speed by the drip rate) that the thiopental would probably not have its usual expected rapid onset. In any event, administering a huge dose of a slower-acting barbiturate will result in rapid onset, possibly within seconds. The extreme rapidity of the onset of pentobarbital is familiar to people who have brought household pets for euthanasia by a veterinarian. Over the past several years I have spoken with several veterinarians and numerous pet owners who have performed or witnessed

euthanasia by lethal injection, and nobody has described occurrences in which the animal did not pass from consciousness to unconsciousness within a few seconds.

34. It is important to understand, however, that whatever advantages pentobarbital may possess over thiopental, the use of pentobarbital (or indeed any anesthetic, narcotic, or sedative agent in combination with a barbiturate or alone) cannot in itself obviate the need to assess anesthetic depth. So long as pancuronium and potassium are employed in the execution protocol, it is necessary to assess the inmate's anesthetic depth prior to and during the administration of pancuronium and potassium. Like thiopental, pentobarbital would have to be delivered into the inmate's circulation by means of an intravenous drug delivery system. As I testified at trial, the CDCR's drug delivery system is so convoluted and outmoded that it renders the execution process very vulnerable to drug delivery failures. Whatever the drug delivery system used, however, the inmate's anesthetic depth must be verified, because drug delivery failures can and do occur even under the best of circumstances. Leaking of the IV tubing could result in only a fraction of the pentobarbital dose reaching the inmate, and that has in fact occurred in a Maryland execution. A publication describing the effect of leaking tubing on the delivery of anesthetic in a clinical setting is attached as Exhibit 11. Of note, the leaking of the anesthetic was detected because assessment of anesthetic depth indicated that the patient was “light”, resulting in an investigation of possible causes and the recognition of the leaking IV tubing. Depending on the relative dosages, infiltration could result in the delivery of an inadequate dose of pentobarbital, but sufficient pancuronium and potassium to have their intended effects. Individual characteristics such as weight and tolerance to barbiturates, as well as preparation errors, deliberate diversion, and defective batches of the drug, can also prevent a dose of anesthetic from having its expected effect. The discovery process also brought to light several features of the execution process that are so irrational and unexpected that I could not have and did not foresee them. I am concerned that additional problematic elements of the procedure may exist that would only become apparent during the actual conduct of an execution. Only assessment of anesthetic depth by a competent, adequately trained individual can reasonably ensure that the anesthetic has its intended effect prior to and during the injection of pancuronium and potassium.

35. Finally, substituting pentobarbital for thiopental in the three-drug cocktail could raise a other dangers and concerns, some of which cannot even be anticipated, because no execution has ever been performed using pentobarbital. For instance, in recent cases in Missouri and Oklahoma, a pharmacokineticist testified that executioners were injecting the potassium before the thiopental had had time to take full effect. I do not know whether this concern would come into play in California if pentobarbital were used in the protocol instead of thiopental, but the slower-acting nature of pentobarbital should be taken into account. Any modification of the protocol to use pentobarbital, while keeping the other two drugs, would have to evaluate every aspect of the procedure -- speed and rate of injections, dosages, etc. -- in light of the characteristics and pharmacology of pentobarbital. The CDCR has failed to undertake this analysis with respect to thiopental. The protocol's failure to address the rate of administration of the drugs, which is troubling and may have affected the humaneness of previous executions, should not be carried over into a new procedure using pentobarbital.

36. This concern touches on a larger point, that as with any complex procedure, altering one element could have unintended or adverse consequences on other elements. This is why, in my opinion, it is important that any new protocol be created by a deliberative process undertaken by a panel of suitable experts. The panel would need to include individuals with expertise in euthanasia, and who are cognizant of the training and experience of the execution team members. This would permit the creation of a protocol that was suited to the capabilities of the CDCR. The AVMA euthanasia methods are the result of such a repeated, deliberative, thoughtful process, and the execution procedure should be treated with at least as much care as we provide to animals.

V. Assessing Anesthetic Depth when using Pancuronium and Potassium

37. The Court has asked what steps are necessary to monitor the inmate's anesthetic depth assuming the continued use of pancuronium and potassium. As I testified at trial, so long as potassium is used to cause death, it is absolutely necessary to have an adequately trained individual assess the inmate's anesthetic depth during the execution. I will endeavor to provide more specifics about what that assessment should entail here.

38. As an initial matter, any assessment of anesthetic depth in the execution context must possess several characteristics in order to reasonably ensure that the execution is humane. First, the assessment of anesthetic depth must be geared towards ensuring that the inmate has reached, and remains in, a surgical plane of anesthesia. Dr. Dershwitz (in Baze v. Kentucky) and I have both likened the pain caused by potassium to a surgical stimulus, and I have no doubt that the injection of potassium in a concentration sufficient to cause death is excruciatingly painful. In addition, the feeling of suffocation and paralysis caused by pancuronium would be agonizing to a conscious person. Only by ensuring a surgical plane of anesthesia can one be confident that the inmate is sufficiently anesthetized not to be aware of the potassium. Second, any assessment of anesthetic depth must continue for the duration of the execution procedure (ie until death is known to have occurred) because the inmate could regain consciousness before the potassium is injected. Third, the assessment of anesthetic depth subsequent to the injection of the pancuronium must take into account the fact that the inmate could not respond to stimuli or indicate distress even if he were fully conscious. Verifying the anesthetic depth of an individual paralyzed by pancuronium requires the assessment of extremely subtle indicators of consciousness that do not rely on the activity of facial muscles or any other motor responses. An individual with advanced training in anesthesiology would be capable of assessing anesthetic depth subsequent to the injection of pancuronium if they were at the bedside and could deploy and observe the necessary monitors. Fourth, as I testified at trial, assessment of depth is meaningless if no one is equipped to quickly react to a finding of insufficient depth by administering more anesthetic. Either the person monitoring depth or members of the execution team must be prepared to administer additional anesthetic. The team must have a procedure for administering more anesthetic, and they must be trained in it and able to interact effectively with the anesthesia professional.

39. The assessment of anesthetic depth is a bedside procedure that requires trained clinical evaluation of the patient. Dr. Singler, Dr. Rosko, and I agree that monitoring an inmate's anesthetic depth during an execution would require the responsible individual to be situated in the execution chamber, by the inmate's "bedside." Like driving or flying, assessing anesthetic depth is something

that can only be learned from experience and practice. Inducing general anesthesia, and verifying that a patient has reached a surgical plane of anesthesia, is a complex task that requires the integration of multiple modalities of information. As an anesthesiologist, I monitor anesthetic depth by integrating my physical examination of the patient (which involves evaluating various physical indicia) with information provided by monitors, such as heart rate and blood pressure. Synthesizing this information into an evaluation of anesthetic depth is the core of an anesthesiologist's profession, and this synthesis -- as much an art as it is a science -- can only be performed adequately by a trained professional with extensive clinical experience.

40. To perform this task reliably and properly, a person must have extensive training in the medical subspecialty of Anesthesiology. Learning how to assess anesthetic depth requires formal anesthesia training from individuals who are themselves proficient in the assessment of anesthetic depth. The training necessarily includes extensive clinical experience in which anesthetic depth is assessed over and over again on many patients until one develops the intuitive capacity for doing it accurately and properly. It is also necessary to have current and practical experience in monitoring patients' anesthetic depth (such as an anesthesiologist would gain during his or her training and residency) in order to be able to reliably discern when a patient has been insufficiently anesthetized.

41. There are many useful tests and techniques and monitors that anesthesiologists use in their assessment of anesthetic depth. However, one cannot just “do a test”; one has to know which tests to perform, how to perform them, how to interpret them, and how to integrate the results with other streams of real-time data to form an impression or conclusion about anesthetic depth. It is important to understand that the ability to effectively and accurately use these techniques can only be developed through extensive clinical training in the field of anesthesiology.

42. An anesthesiologist would be able to use his or her medical judgment to determine what techniques to use to monitor anesthetic depth in an execution setting, as Dr. Singler did back in February.[3] Conversely, using personnel who have no background in anesthesiology to monitor

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[3] Dr. Singler planned to rely on his trained physical assessment of Mr. Morales; a pulse oxymeter; a blood pressure cuff; a BIS monitor; and EKG data. I agree with Dr. Singler that these sources of

anesthetic depth, while specifying what techniques they might use to monitor depth, would not come close to reasonably ensuring that the assessment of depth is performed reliably and accurately. Missouri proposed such a method -- having an EMT or nurse assess the inmate's anesthetic depth by performing tests from a list of potential tests created by the Department of Corrections -- and the judge in the Taylor case rejected that idea -- rightfully, in my view -- as failing to come close to providing for meaningful assessment of anesthetic depth. Similarly, the CDCR's initial proposal that Warden Ornoski "monitor" anesthetic depth by touching Mr. Morales was very inadequate.

43. In other words, the Court's decision in February proposing that the CDCR retain an anesthesia professional who could then use his or her training and judgment to determine how to monitor the inmate's anesthetic depth made logical sense. A trained professional properly integrated into the execution situation, with knowledge of the protocol, an understanding of the drugs, and the ability to communicate closely with execution team members, would be able to reasonably ensure that the inmate was sufficiently anesthetized by monitoring anesthetic depth throughout the execution and, if necessary, causing more anesthetic to be administered. Similar protections have been ordered by the Missouri court in *Taylor v. Crawford*; that is why I mentioned Missouri as a state in which the judge's orders appear to address many of the concerns about the dangers of the procedure there. The court's orders in *Taylor* are attached as Exhibits 12, 13, and 14.

44. In terms of what type of professional could adequately assess anesthetic depth, obviously a board-certified anesthesiologist is the only specialist who is by dint of their certification necessarily capable of successfully and properly performing this essential function. The label of "board-certified anesthesiologist" gives one assurance that the individual necessarily has advanced training in anesthesiology, has extensive clinical training and experience in monitoring anesthetic depth, and has passed the rigorous oral and written exams necessary to obtain board certification. As

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information, synthesized using Dr. Singler's clinical judgment, would have provided an accurate assessment of anesthetic depth. I do not mean to suggest, however, that all of these particular monitoring techniques should be mandatory, or that additional or different monitors might not also be helpful. An anesthesiologist would be able to determine what techniques and monitors would be most helpful to him or her personally based on his or her day-to-day clinical practice.

I previously noted in declarations in this case, a Certified Registered Nurse Anesthetist (CRNA) would also have the requisite training in anesthesiology. In rare cases, a physician who is not an anesthesiologist may have training in anesthesiology such that that person is credentialed in a hospital to induce and monitor anesthetic depth in, for instance, critical care (intensive care) environments. In short, to find a professional who can monitor anesthetic depth in an execution, the CDCR would need to recruit from the population of professionals who are credentialed in a hospital to monitor anesthetic depth in paralyzed patients.

45. I feel that it is necessary to note here that whenever one hires a doctor or other medical professional, one must take precautions to make sure that the doctor, in addition to being trained and possessing board certification and the necessary licenses, is also competent and will perform his or her duties in good faith. For instance, if the CDCR were to hire an anesthesiologist who has been barred from practice, for example for incompetence or commission of a felony, or states that he believes inmates should be subject to excruciating pain, then I would be concerned that that doctor's participation in the execution procedure would create a significant risk that the inmate would suffer during the procedure. In sum, any medical professional who is retained to assess an inmate's anesthetic depth should be subject to at least the same degree of screening as execution team members, in order to ensure that the individual will be able and disposed to perform his or her function in good faith, and does not have issues in his or her background that render the individual a poor choice.

46. Any professional who is tasked with monitoring anesthetic depth should also understand the dangers of the procedure (such as the fact that potassium is extremely painful), and should be well-versed in the procedure itself and integrated into the execution team. The importance of these issues is demonstrated by the disturbing testimony of Witness #3, to the effect that Dr. Singler had instructed the team to reduce the dose of thiopental to approximately 1 gram. This is extremely troubling, not only because a 1-gram dose may be insufficient in an execution context, and certainly provides little safety margin, but also because Dr. Singler apparently based his instruction on his hypothesis that too much thiopental would cause circulatory collapse. That hypothesis may or

may not be correct, but there is no experimental evidence to support it and it would be wrong to simply experiment during an execution. In addition, Dr. Singler had not, at the time of the scheduled execution, reviewed any of the data pertaining to previous executions. Dr. Singler testified at the hearing that the execution team misconstrued his statements as an order. Regardless, this event -- whether it was a miscommunication or a decision to deviate from the most important aspect of the protocol -- demonstrates that whoever is chosen to monitor anesthetic depth should be bound to operate within constraints that prevent undisclosed deviations from the protocol, and should be able to interact effectively with the execution team. Any intentional deviations from the protocol should not be permitted unless and until the anesthesia professionals' concerns are addressed in a comprehensive manner and any new procedure is disclosed and reviewed.

VI. Use of a BIS Monitor to Assess Anesthetic Depth

47. The judge has also asked whether the reliability of the protocol would be improved by the use of a BIS or other EEG monitor. A BIS monitor can be a helpful addition to the clinical evaluation performed by anesthesiologists, when used in conjunction with other traditional means of monitoring anesthetic depth. Dr. Singler planned to use a BIS monitor for Mr. Morales's execution, and I believe that the BIS monitor would have been helpful to him because he uses it in his clinical practice in addition to other means of monitoring, and he possesses the training necessary to be able to integrate data from the BIS monitor into his overall assessment. For these reasons, I would not question the decision of Dr. Singler or any other anesthesiologist to incorporate a BIS monitor into their assessment of an inmate's anesthetic depth.

48. As I stated in my declaration in this case filed on February 14, 2006, however, allowing personnel untrained in anesthesiology to employ a BIS monitor as the sole measure of anesthetic depth is simply not consistent with a minimum standard of care. I believe that it would be dangerous to use a BIS monitor in this manner. Assessment of anesthetic depth is fundamentally a clinical evaluation, and anesthesiologists agree that the BIS monitor cannot be used, even by trained anesthesiologists, as the sole measure of anesthetic depth. The ASA's Practice Advisory on Intraoperative Monitoring, which was attached to my expert report, explains this conclusion. Using a

BIS monitor to substitute for assessment by a trained individual could give the execution team a false sense of security if they believe that the monitor is failsafe and that no other assessment is needed.

49. Importantly, the anesthesiology profession's insistence that the BIS monitor may only be used by trained professionals as one element of the clinical evaluation is based in part on evidence of the BIS monitor's fallibility. Here it may be helpful to briefly explain how the BIS monitor works. The monitor must attached to the patient's forehead by means of an electrode strip, thereby permitting measurement of the electrical activity. The amplitude of the electrical activity of the brain, when recorded from the forehead, is very small compared with the amplitude of electrical activity from the muscles of the forehead (which permit frowning and movement of the eyebrows). Therefore the BIS monitor attempts to discern and distinguish the brain-derived electrical activity from other electrical activity, including muscles and the heart. The monitor displays a number between 0 and 100, with 0 indicating EEG flatline and 100 indicating consciousness, that is intended to correlate with a level of consciousness. The algorithm by which this number is calculated is confidential, proprietary information that is not released by the manufacturer. We do know, however, that the BIS monitor was developed by testing it on individuals in varying levels of anesthesia, and recording the numbers displayed; this data was then used to assign BIS values that correlate to different levels of anesthetic depth.

50. A recent peer-reviewed study has demonstrated that the number displayed by a BIS monitor can vary at any given time even within the same patient, and therefore concludes that "[a]nesthesia providers should not rely exclusively on the BIS reading when assessing depth of anesthesia." Niedhart et al., Intrapatient Reproducibility of the BISxp Monitor, Anesthesiology, Vol. 4, No. 2 (Feb. 2006) (attached as Exhibit 15). The study hypothesized that "when two BISxp electrode strips are placed concurrently on opposite sides of the forehead on the same patient, they reproducibly produce the same single number throughout the anesthetic period." (Page 242.) The study disproved this hypothesis, and instead found that the two BIS values for the same patient often varied, and sometimes concurrently indicated differing levels of anesthesia. Thus: “The results of this study suggest that the BISxp does not consistently display intrapatient reproducibility. . . . The

results of this study reinforce the sentiment expressed on the Aspect Medical Web site: 'Clinical judgment should always be used when interpreting the BIS in conjunction with other available clinical signs. Reliance on the BIS alone for intraoperative anesthetic management is not recommended.'" (Page 248.)

51. In addition, the BIS monitor's readout is subject to artifactual interference that can lead to an inaccurate indication of anesthetic depth. For instance, a peer-reviewed study shows that the injection of neuromuscular blockers in a conscious patient causes the BIS monitor to produce readouts consistent with a deep level of unconsciousness -- even though the subjects remained fully conscious throughout the experiment. Messner et al., The Bispectral Index Declines During Neuromuscular Block in Fully Awake Persons, *Anesth. Analg.*, 2003; 97-488 (attached as Exhibit 16). Not only does this study indicate that the BIS monitor should not be used as the sole monitor of anesthetic depth after pancuronium has been administered, but more generally, it demonstrates that the reliability of the BIS readout can be compromised by factors that affect a patient's muscles but not their consciousness.

52. Dr. Singler suggested in his deposition that while it would not be appropriate to use a BIS monitor as the sole measure of anesthetic depth in the surgical context, where the goal is to carefully calibrate the level of anesthesia, a BIS monitor could be used, standing alone, in an execution context because an overdose of anesthetic is used and there is no need to calibrate depth of anesthesia based on the BIS reading. I disagree with his opinion. For one thing, it assumes that the anesthetic is successfully administered. The instances of BIS unreliability described above can occur regardless of the dose of anesthetic that is intended to be administered, and in any event, the BIS alone would be rendered effectively inoperative once the pancuronium was administered. Only a trained professional would be able to use their experience and judgment to integrate the BIS monitor, with an understanding of its potential unreliability, into an effective assessment of an inmate's anesthetic depth throughout the execution procedure.

53. In sum, it is my strongly held opinion that the BIS monitor cannot be used to substitute for assessment of anesthetic depth by an individual with adequate training in anesthesia.

This opinion is shared by the American Society of Anesthesiologists, as noted above. It is also shared by Dr. Scott Kelley, the Medical Director of Aspect Medical Systems, which manufactures the BIS monitor. Dr. Kelley's affidavit in the Brown case in North Carolina is attached as Exhibit 17. In the Brown case, Dr. Dershwitz asserted that the BIS monitor could be used as a stand-alone monitor of anesthetic depth, but he was the sole proponent of that position.

VII. Removing Pancuronium from the Protocol

54. The Court has also asked about the advantages and disadvantages of removing pancuronium from the execution protocol. I cannot think of any disadvantages, from the perspective of ensuring that executions are performed humanely. As I testified at trial, if an inmate receives insufficient thiopental, or it is administered improperly, and the inmate is awake during the potassium injection, in the absence of pancuronium the execution team (assuming proper training) will at least be able to detect that mistake and attempt to correct it by immediately injecting more thiopental into the other arm (although this would be difficult given the current setup). Of course, monitoring of anesthetic depth is still necessary as long as potassium is being used to prevent such a scenario from occurring in the first place.

55. Another advantage of removing pancuronium is that the use of pancuronium renders ineffective several widely-used means of testing anesthetic depth. Without pancuronium in the protocol, an individual charged with monitoring anesthetic depth will have more options to employ throughout the procedure.

56. Based on the comments of Dr. Singler and Dr. Dershwitz, I imagine that a perceived disadvantage of removing pancuronium from the protocol will be the possibility that inmates will exhibit movements that could be mistaken for evidence of suffering. Any misconceptions on the part of witnesses could be avoided by explaining to them the nature of the expected movements, just as is done in end-of-life situations and in veterinary euthanasia.

VIII. Use of a Single-Drug Protocol

57. The Court has asked the parties to address the possibility of using a single drug, such as pentobarbital, to cause death. My opinions on this possibility have not changed since I responded

to the Court's inquiry about using thiopental alone to cause death in my declaration filed on February 14, 2006, so I would respectfully refer the Court to that declaration. Removing pancuronium and potassium from the execution process would eliminate much of the unnecessary risk that now is inherent in the procedure. I would add only that the AVMA has determined that pentobarbital is the best barbiturate to use in animal euthanasia, because of the qualities described above and in the AVMA Report.

58. My personal ethics do not allow me to discuss dosages, methods of administration, and other specifics of a hypothetical execution protocol using only a single drug. Based on my knowledge of the development of other states' protocols, however, I believe that many medical professionals, including anesthesiologists, would be willing to provide relevant advice to the CDCR. I have corresponded with Dr. Jay Chapman, the medical examiner who designed the first lethal injection protocol in Oklahoma; he felt that doing so was consistent with his ethical obligations. John Doe I in Missouri designed the state's execution protocol, though obviously his participation was problematic for other reasons. And it appears that Dr. Singler was willing to give the CDCR information about alternatives to the current protocol.

59. Even if the CDCR decides to use a single-drug protocol, it is my opinion that there should be a physician or other highly trained medical professional supervising the execution and standing ready to intervene (or direct the team to intervene) if something goes wrong. As I stated at the hearing and in February, a single-drug protocol is not devoid of risks; for instance, if the inmate does not receive the full dose, he might not completely stop breathing, and might wake up brain damaged. A doctor would be able to detect any failure of the drug to have its expected effect, ensure that any drug delivery problems that arise are corrected, and generally minimize the risk of a botched execution. In addition, a barbiturate has never been used as the sole instrument of execution, and although what we know about barbiturates tells us that death will occur in a relatively short time given a sufficient dose, there is no clinical data to give us a more concrete idea of what might occur, and what problems might arise, during such an execution. Therefore, if the CDCR wants to ensure that any unanticipated contingencies that arise can be dealt with effectively and safely, and if the

CDCR wants to avoid placing the execution team, who have little or no relevant medical training, in the position of performing an untested execution procedure, then it should retain a doctor to oversee the procedure.

IX. Conclusion

60. The process of designing or revising the execution procedure deserves expert consideration of the many medical and scientific issues involved, as well as careful analysis of the priorities in an execution and the best ways of protecting the inmate and supporting the personnel. It appears that no such process has ever taken place in California. The court has raised important questions. I have done my best to address them within the constraints detailed above, and hope that the Court finds this discussion informative.

November 9, 2006

By: 

Dr. Mark Heath

IN THE UNITED STATES DISTRICT COURT

FOR THE DISTRICT OF MARYLAND/NORTHERN DIVISION

VERNON EVANS,

Plaintiff

CIVIL NO. 06-149

Vs.

Mary Anne Saar, et al,

September 22, 2006

Defendants

_____/

DAY FIVE

TRANSCRIPT OF BENCH TRIAL

BEFORE THE HONORABLE BENSON E. LEGG,

UNITED STATES DISTRICT CHIEF JUDGE

APPEARANCES:

On behalf of the Plaintiff:

Stephen Hut, Jr, Esquire

Todd Zubler, Esquire

Kalea Clark, Esquire

Anne Harden Tindall, Esquire

Stephanie Katherine Wood, Esquire

On behalf of the Defendant:

Laura Mullally, Esquire

Philip Pickus, Esquire

REPORTED BY:

Jacqueline Sovich, RPR, RMR, FOCRR

Official Court Reporter

(PROCEEDINGS)

THE COURT: Good morning. Please be seated. Mr. Hut, whenever you're ready, sir.

MS. GERAGHTY: Your Honor, we'd call Dorian Hall.

THE COURT: Good morning, if you'll come forward, please. Mr. Thompson the clerk will administer the oath.

(The Witness is sworn.)

THE CLERK: Please be seated. Ma'am. What I need to you do is adjust that microphone, state your name and spell your name for the record.

THE WITNESS: Dorian, D O R I A N, and last name is H A L L.

DIRECT EXAMINATION

BY MS. GERAGHTY:

Q. Good morning, Miss Hall. My name is Anne Geraghty. I'm one of the counsel for the plaintiff.

What is your occupation?

A. I supervise the litigation specialists and criminal investigators at the office of the Ohio Public Defender.

Q. And can you tell us a little about what you do in that position?

A. As a supervisor, I assign cases and supervise the criminal investigations and mitigation investigations on the cases that are handled by our office.

And I also do work in the field so I still continue

to conduct mitigation investigations on cases.

Q. And how long have you been with the Office of The Public Defender?

A. It was 18 years this August.

Q. And where did you work before that?

A. I worked, I was hired by the Franklin County Sheriff's Department out of Columbus, Ohio to work in their correction center, the main jail. I was a social worker and a mental health liaison working with the mentally ill at the facility.

Q. Where did you go to college?

A. I have an undergraduate degree from Miami University and Master's degree from Ohio State University.

THE COURT: I'm sorry, I missed the college.

THE WITNESS: Miami University.

THE COURT: In Ohio?

THE WITNESS: In Ohio, yes.

THE COURT: Thank you.

BY MS.GERAGHTY:

Q. And your master'S degree is in what?

A. Sociology.

Q. Are you a licensed social worker?

A. Yes, I am, since 1992.

Q. What are your views on the death penalty?

A. Personally, I'm opposed to the death penalty.

Q. Do your views affect your ability at all to give truthful

testimony today?

A. Not at all.

Q. During your career, have you had an opportunity to witness an execution?

A. Yes, I have. Once.

Q. One time?

And what state did this execution take place?

A. Ohio.

MS. MULLALLY: Objection. Relevance, Your Honor.

THE COURT: I will overrule the objection, but the objection's noted. Thank you.

Q. Do you remember the date on which the execution took place?

A. It was in May of 2006, it was early May, I believe, something like that.

Q. Approximately what time the during the day?

A. It was in the morning. In Ohio, our executions are scheduled to occur around 10:00 in the morning.

Q. And what was the name of the person who was executed?

A. Joseph Lewis Clark.

Q. And had you ever met Joe Clark prior to the execution?

A. Yes. And like in '89 or '90, I worked on his post conviction case, our office handled the appeal. And I conducted the mitigation investigation at that time.

Q. And have you had an opportunity to work with him since

that time?

A. Yes. I mean we had sporadic contact throughout the years, and his case went outside our office for federal habeas, but when it came to clemency time, his federal attorney contacted our office and requested assistance.

This was his first case that went to clemency and potential execution, so I was involved in the group of people who are helping him. And, given my history with Joe and his family, I was assigned the task to contact the family, and to meet with Joe and also to kind of help the attorney with the practical considerations.

Q. Did you have any information about Joe's history in drug abuse?

A. Yes. At the post conviction phase, we learned that he was a long-time IV drug user.

Q. And did you have personal knowledge of that?

A. Yes. When we -- talked to him at post conviction level, we had checked, and he had some scarring and track marks on his arms from the IV use, and we did a pretty detailed history at that point on his drug use. And it was clear, he's not -- he was not an animated person, and he became very animated and agitated when talking about substances he used.

Q. After the post conviction proceedings, did you have any personal knowledge about his drug abuse?

A. Not at all.

Q. How did you come to witness Mr. Clark's execution?

A. Well, Joe didn't want -- his mother was older. He didn't want his family to witness the execution or be down at Lucasville, and so I had told Joe I would do whatever he wanted or needed me to do. He requested that I be down there.

So I had gone -- because the execution occurs at 10 in the morning, the day before's a contact visit. So I had gone down Monday and had a contact visit with him, and then ended up trying to try to see him had the next morning, and he requested that I be one of the witnesses.

Q. Let's walk through what happened the day of Joe Clark's execution. What time approximately did you arrive at the facility?

A. The attorney and I arrived around 7:30, maybe 8, I'm just not clear. There's an opportunity to have a visit, a self front visit with the inmate the morning of the execution. And we arrived to do that. We learned that he was kind of in a zone and didn't want to see anybody at that time. So we sat at the prison facility until the execution time.

Q. And at the execution time, where did you go then?

A. The inmate's witnesses are the last to be taken into the witness area, so we probably arrived there around a little after 10, a minute or two after.

Q. And were you in a special witness area?

A. Yeah. We were in the execution chamber or the witness area for the execution, yes.

Q. And is that separated by a piece of glass from where the inmate is executed?

A. Yes, it's a big glass window.

Q. Where was Mr. Clark when you first walked into that witness room?

A. He was in the anteroom, the room right next to the execution chamber.

Q. Were you able to see him?

A. Yes. They have a live via -- video coverage of the prison staff inserting the catheter in the inmate's arm.

Q. So you were able to watch the process by which the catheters were inserted; is that right?

A. Yes, I was.

Q. And you mentioned they were prison staff. Do you know what the qualifications were of the people who were doing this?

A. In Ohio we don't use medical doctors or anything. They were emergency trained technicians or paramedics.

Q. You said that they were working on getting IV catheters in. Can you describe what you saw during that time?

A. There were two individuals who were working on Joe. It took approximately, I'd say 20 to 30 minutes, trying to find a location in his arms to insert the catheter.

They were able to insert one into his left arm, but the right arm they were having a great deal of difficulty with, they even checked his leg, and his feet, and other areas to try and find a spot for him. And the individual who was working on the left arm went over to and tried to assist the person who was working on his right arm.

Q. Did they eventually find another IV site?

A. No.

Q. It your understanding Ohio's protocol calls for the insertion of two IV catheters?

A. Yes, they do.

Q. Did they go ahead with just one?

A. Yes, they did.

Q. And you saw all of this on the video; is that correct?

A. Yes.

Q. Did they attempt to stick an IV into any of the sites, any other places in the body that you mentioned?

A. They tried to stick in the arm. I did not see them stick anything in the legs or the feet.

Q. Once they found one IV site, what happened after that?

A. We saw Joe getting up off the table, and walking and then that's when the curtain was -- was open, and he working, he had walked to the next room in the execution chamber and had leaned down, and then the prison staff there attached the IV lines to him.

Q. So the catheter was in, and then they hooked it to the IV tubing?

A. Yes. Because the IV comes through the other room. It comes through a window, so no one sees who starts the IV lines.

Q. So once he was hooked up and laying down, what happened after that?

A. He's strapped down, and then excuse me, one of the prison staff pulled the microphone off of the wall and turned it on and gave it to Joe, or held it in front of Joe, actually, so that he could make his last statement, which lasted approximately 10 minutes or so. It was pretty lengthy.

Q. And the microphone was on?

A. The microphone was on for that, yes.

Q. And then once his last statement was finished?

A. They turned off the microphone, attached it to the wall, and he laid back down and waited for the drugs to start.

Q. And was the execution completed at this point?

A. No, it was not. He laid back down for a couple minutes, and, you know, I mean I could tell he was breathing, and his legs were moving, his arms were strapped down, so he raised his upper shoulders and his head and turned, or looked up at the prison personnel and said "it's not working, it's not working."

He laid back down and for another minute or tow,

and he raised up again, and he looked at us in the witness area, just said "it's not working, it's not working."

And when he laid back down at that point, there's two prison staff in the execution chamber with him, one of them pulled the curtain.

Q. Okay. At that point you mentioned that they had turned the microphone off?

A. Yes, they did.

Q. Once they closed the curtain, were you able to see anything --

A. Nothing at all.

Q. -- on the other side of the room?

Now, even thought the microphone was off, were you able to hear anything?

A. Yes, I was.

Q. Can you tell me what you heard at that point?

A. Initially, we heard these really loud intense guttural moans and groans. You know, as if someone was in agony. I equate it with child birth, one of the most painful experiences I had. And that lasted for about five or ten minutes. It was really pretty intense.

And we're all just kind of real quiet. And, you know, we were kind of shocked and horrified of what was going on.

Q. And how long, you said there was five to ten minutes of

intense agony?

A. Yes.

Q. After the ten minutes, did everything just stop?

A. No, it didn't. It tapered down. It kept continuing to taper down until you couldn't hear anything, and then we could hear -- actually, I heard a noise, and I wasn't sure where it was coming from. And I tried to listen intently and finally figured out it was Joe snoring. And that whole process from which they closed the curtain till when they opened the curtain probably lasted a half hour or so.

Q. You said everyone in the room was quiet. Can you describe a little bit more about what the witness's reactions were in the room where you were ?

MS. MULLALLY: Objection.

THE COURT: Overruled. You may answer.

A. Okay. Thank you. Yeah, we were very -- I mean quiet and shocked. We weren't sure what was going on.

Joe's attorney had his hand, his head in his hands, and that was kind of our reaction. We just were really unsure of what was going on.

Q. Did you at any point try to do anything to stop things?

A. I talked to his attorney, and this was his attorney's first clemency and execution, and he was not a member of our office. I tried to talk to him. I suggested that we see if we could stop the execution at this point. That you know, we

could call someone in our office to see if they have any recommendations, since they're more experienced at this kind of thing, that, you know, they could call a judge, maybe get a stay of execution, if possible. And the attorney said in he wasn't sure what Joe would want.

And I suggested that we, you know, demand to see Joe, and find out what he would want us to do at that point.

The attorney ended up not doing anything. He seemed to be struggling with the decision.

Q. You mentioned the snoring was difficult for you to hear once his sounds died down?

A. Yes.

Q. Was it difficult for you to hear the moaning at the beginning when they first closed the curtain?

A. No, that was clearly loud. That was -- I thought it was in the same room.

Q. Once he began snoring, and he quieted down a bit, what happened?

A. Then they opened the curtain, and he was asleep. We could see he was asleep strapped to the gurney, and they had the one IV in.

Q. And was it your understanding that at that point they began the injection again?

A. Yes. They started everything from the beginning, the whole process was resumed.

And yet, you know, that may have taken five, maybe ten minutes at that point.

The drugs were flowing and he was -- he was clearly asleep. During that process, he would kind of reflexively lift his upper shoulders and his head was lifting up. He did that probably like 9 to 13 times while we were watching.

Q. And was it your understanding, were you given a description before this all happened about the types of drugs used in Ohio?

A. Yes. They told us about the drugs that were being used, and that was pretty much it.

Q. Did they mention that one of the drugs was a paralyzing agent?

A. Yes, they did.

Q. And was it your understanding that his movements made during the execution were at all normal or abnormal?

MS. MULLALLY: Objection.

THE COURT: Overruled.

A. They did not tell us anything about what movements to expect from Joe. It did learn that typically they might do that once or twice, but not the number of times that Joe did. That was unusual.

Q. Would you have appreciated it if someone had explained to you what to expect when you were witnessing the execution in terms of those movements?

A. Definitely. I would have been able to prepare myself and know what was normal and expected and have been able to ask questions about some of the explanations as well.

Q. And did anyone prepare you for witnessing the placement of the IV sites prior to the execution?

A. No. I was not aware we would see that video.

Q. Would that have made a difference to you?

A. Yes. That would have been helpful to have known that that was going to be coming as well.

Q. Did you just leave the execution facility once the execution had been carried out?

A. No. We were taken back to a room in the prison where we would be sitting and waiting for the execution.

They were prison staff who sit with the victim's families, as well as the inmate's witnesses, so we were taken back there with that personnel and sat around discussing the situation.

The attorney and I had asked if we could leave, and they told us that we were not allowed to leave, that we had to wait for Reverend Simms who is in charge of the prison ministries. He's there for all executions. And we'd had contact with him before. He's indicated that he wanted to talk to us before he left.

Q. And when he -- when he came, what did he say?

A. Well, we prayed, and excuse me. He asked how we were

doing, and if we wanted to discuss anything. He asked -- the prison has what they call a critical incident stress debriefing program, where the people involved in the execution gather around and do kind of peer counseling with each other and discuss the events, and sharing experiences so you know you're not the only one. This is typically used in trauma situations.

Q. And is it normal for the people who were there from the inmate side to be invited to this event?

A. No, it's not. No, it's not.

Q. And in your understanding, is this the first time that's happened in Ohio?

A. Yes.

Q. Did you accept that counseling?

A. I did not. I basically wanted to just get out of there and get back to my office, though I could, you know, talk to other co-workers who also witnesses to other executions and who would kind of understand my perspective.

I was not interested in being involved with the prison staff. I figured we would be coming from a different perspective.

Q. And as a witness, how has your experience of witnessing Mr. Clark's execution affected you?

A. Well, you know, obviously, I think about it a lot. I was extremely sad and horrified that Joe had to experience that.

And, you know, I'm concerned about other clients of mine personally having to experience that, as well as anybody else going through that process. It just looked to be painful.

MS. GERAGHTY: Thank you, Your Honor. I have no further questions.

THE COURT: Thank you.

Miss Mullally, your witness.

CROSS-EXAMINATION

BY MS. MULLALLY:

Q. Now, you just testified, I believe, that you don't want anyone else to experience that sort of pain that you witnessed and experienced?

A. I would hope no one would.

Q. Now, the pain that you witnessed, that you actually witnessed, that is when the people were inserting the IVs and you could see it on the video?

A. That I witnessed through my eyes, yes.

Q. Okay. Do you have anything, any records, or anything that says that Mr. Clark was not deeply anesthetized at the time that he died?

A. I don't have any records on that.

Q. And how does the Ohio protocol compare to Maryland's protocol?

A. I'm not real familiar with Maryland's protocol, so I don't know.

Q. Do you know -- so you don't know anything about Maryland at all?

A. No, I don't.

Q. Now, you state that these people who were inserting the IVs were paramedics?

A. Paramedics or emergency technical people, yes. We don't use doctors.

Q. Were they prison employees?

A. I believe so.

Q. Were they prison correctional officers?

A. They do not have uniforms on.

Q. What were they wearing?

A. They were wearing, you know, like dress khaki pants, and it looked like dress shirts, it was like one had a red shirt on, and I think one had a white shirt.

Q. Do you have any evidence that at the time the curtains were closed and you could hear the sounds that prison officials were doing anything other than starting an IV on him?

A. And I couldn't see. I could just hear his groaning and moaning.

Q. But do you have any evidence that they say were torturing or hurting him?

A. No, I did not. I did not see anything.

Q. And, eventually, where was the IV located?

A. It was in the arm.

Q. Was this the one in the left arm?

A. Yes.

Q. Okay. So the execution was delayed because of problems with the IV in the left arm, but the execution actually was completed with that same IV in that location?

A. Yes. It had blown out during the first attempt, and they had to re --

Q. How do you know that?

A. We were told by the prison staff.

Q. Okay. So they got it back into the vein, and they completed the execution?

A. Yes.

Q. And you have -- do you have any reason to believe that he experienced excruciating pain by being awake during the administration of a drug like potassium chloride?

A. I have no idea. No.

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

THE COURT: Thank you.

MS. GERAGHTY: We have no further questions, Your Honor.

THE COURT: Thank you very much for coming. You are excused. Oh, I did, I did write down a couple of questions, if I could.

The reason for the having witnesses in an execution is what, if you know?

THE WITNESS: I don't know. I assume to make sure that, I don't know, that the event occurred, I don't know.

THE COURT: And part of it is -- did you watch the pertinent parts of the execution on a VCR hook up, or did you look through a window?

THE WITNESS: And I actually sat through the feed, the witness' statement, or his last statement, and administration of the drug, I saw through the window.

THE COURT: And after the catheter had been inserted, did he stand up and then move from one place to another and lie down on the execution gurney?

THE WITNESS: Yes, he did.

THE COURT: Was he uncooperative at any time that you saw?

THE WITNESS: Not at all.

THE COURT: Good. Thank you. Thank you very much for coming.

Mr. Hut?

MR. HUT: Thank you, Your Honor. We now would like to move into evidence some additional exhibits, in addition to those that were used without objection over the course of the past couple days.

There are a dozen or so, I would estimate, many

DECLARATION UNDER PENALTY OF PERJURY

STATE OF NEW YORK §

COUNTY OF NEW YORK §

The undersigned, Mark J. S. Heath, M.D., makes the following statement under penalty of perjury:

I. Qualifications

1. I am an Assistant Professor of Clinical Anesthesiology at Columbia University in New York City. I received my Medical Doctorate degree from the University of North Carolina at Chapel Hill in 1986 and completed residency and fellowship training in Anesthesiology in 1992 at Columbia University Medical Center. I am Board Certified in Anesthesiology, and am licensed to practice Medicine in New York State. My work consists of approximately equal parts of performing clinical anesthesiology (specializing in cardiothoracic anesthesiology), teaching residents, fellows, and medical students, and managing a neuroscience laboratory. As a result of my training and research I am familiar with and proficient in the use and pharmacology of the chemicals used to perform lethal injection. I am qualified to do animal research at Columbia University and am familiar with the American Veterinary Medical Association's guidelines for animal research and animal euthanasia.

2. Over the past several years, as a result of concerns about the mechanics of lethal injection as practiced in the United States, I have performed many hundreds of hours of research into the techniques that are used during this procedure. I have testified as an expert medical witness in courts in Missouri, Maryland, Tennessee, Georgia, Kentucky, Virginia, and Louisiana in the following actions: *Taylor v. Crawford*, No. 05-4173-CV-C-FJG (W.D. Mo.); *Evans v. Saar*, 06-cv-00149-BEL (D. Md.); *Baker v. Saar*, No. WDQ-05-3207 (D. Md.); *Reid v. Johnson*, No. 3:03cv1039 (E.D. Va.); *Abdur'Rahman v. Bredesen*, No. 02-2236-III (Davidson County Chancery Ct., Tenn.); *State v. Michael Wayne Nance*, 95-B-2461-4 (Ga. Superior Ct.); *Ralph Baze & Thomas Bowling v. Rees*, 04-CI-01094 (Franklin County Circuit Ct., Ky.), *Commonwealth v. Lamb*, CR05032887-00 (Rockingham County Cir. Court, Va.), *State v. Nathaniel Code*, No. 138860 (1st Judicial District Court of La. for Caddo Parish). I have filed affidavits that have been reviewed by courts in the above states and also in California, Pennsylvania, New York, Alabama, North Carolina, South Carolina, Ohio, Oklahoma, Texas, Maryland, Missouri, Connecticut, Virginia, Arkansas, Delaware, Nevada, and Montana, and by the United States Supreme Court.

3. I have reviewed the execution protocols and autopsy data (when available) from each of the above referenced states and the federal government. Additionally, I

have reviewed execution protocol and/or autopsy data from Florida, Idaho, and Oregon.

4. As a result of the discovery process in litigation I have participated in inspection of the execution facilities in Maryland, Missouri, and California.

5. During court proceedings, I have heard testimony from prison wardens who are responsible for conducting executions by lethal injection.

6. I have testified before the Nebraska Senate Judiciary Committee regarding proposed legislation to adopt lethal injection. I have testified before the Pennsylvania Senate Judiciary Committee regarding proposed legislation to prohibit the use of pancuronium bromide or other neuromuscular blockers in Pennsylvania's lethal injection protocol.

7. My research regarding lethal injection has involved extensive conversations with recognized experts in the fields of anesthesiology, toxicology and forensic pathology, and communicated extensively with Drs. Jay Chapman and Stanley Deutsch, the physicians responsible for introducing lethal injection as a method of execution in Oklahoma.

8. My qualifications are further detailed in my curriculum vitae, a copy of which is attached hereto as Exhibit 1 and incorporated by reference as if fully rewritten herein.

9. I have been asked by counsel for Eric Patton to review the procedures concerning lethal injection currently in place in Oklahoma to determine whether those procedures create medically unacceptable risks of inflicting unnecessary pain and suffering while the lethal injection is administered. I hold all opinions expressed in this declaration to a reasonable degree of medical certainty unless otherwise specifically noted. I understand that discovery in this case has not yet begun; I, therefore, reserve the right to supplement or modify this declaration based on new or additional information as and when such information is provided to me.

10. In preparing this declaration, I have referred to and relied on:

    a. My training and experience as a practicing anesthesiologist;

    b. My research into lethal injection and materials reviewed in litigation;

    c. The autopsy reports and execution logs provided by the Office of the Chief Medical Examiner of Oklahoma labeled ME 1-2684;

    d. The affidavit of Warden Mike Mullin, dated January 12, 2004, and the statements made by the State of Oklahoma regarding the accuracy of Warden Mullin's January 12, 2004, affidavit made at the hearing in *Boltz v. Jones et al*. (W.D. Okla. June 1, 2006); and

e. The Ehlers declaration, and the affidavits of Burton, Burden, and Chesley.

II. Summary of Facts on Which This Opinion Is Based

11. From the foregoing materials, the Oklahoma Department of Corrections's ("ODOC") has represented the facts pertaining to execution by lethal injection to be the following:

a. The intended initial dosage of thiopental is 1.2 grams (1200 milligrams) delivered from a 60 cc syringe.

b. The lethal injection drugs are intended to be administered through two intravenous lines, one placed in each arm. Thiopental is administered into the left arm, followed by a flush of saline solution. Vecuronium bromide is administered next in the right arm, followed by a flush of saline solution. Potassium chloride is administered next in the left arm, followed by a flush of saline solution. Potassium chloride is administered again, this time into the right arm, followed by a flush of saline solution. Thiopental is administered again, in the left arm, followed by a flush of saline solution. Finally, vecuronium bromide is administered again, in the right arm, followed by a flush of saline solution.

c. Contrary to Oklahoma's statutory requirement for a continuous administration of an ultrashort-acting barbiturate,[1] the drugs and saline flushes used in executions in Oklahoma are given in bolus[2] doses, rather than as continuous infusions.

d. The drugs, and intervening flushes of saline solution, are intended to be delivered serially, one after another.

e. The intravenous catheters are inserted by phlebotomists.

f. The ODOC does not monitor the condemned inmate to ensure that he or she has been successfully anesthetized.

[1] I understand Oklahoma's statute to require the following: "continuous, intravenous administration of a lethal quantity of an ultrashort-acting barbiturate in combination with a chemical paralytic agent until death is pronounced by a licensed physician according to accepted standards of medical practice." Okla. Stat. tit. 22 § 1014 (A).

[2] A bolus dose is a single dose of drug injected into a blood vessel rapidly, over a short period of time. Bolus drug delivery should be contrasted with a continuous infusion of drugs which involves the slow introduction of a fluid or drugs into a vein or artery over a period of time.

IV. Summary of Opinions

12. Based upon my review of the foregoing material and my knowledge of and experience in the field of anesthesiology, I have formed several conclusions with respect ODOC's protocol for carrying out lethal injections. These conclusions arise both from the details disclosed in the materials I have reviewed and available at this time and from medically relevant, logical inferences drawn from the details in those materials. My principal conclusions are as follows:

a. The ODOC's failure to have an appropriately qualified and trained persons monitor the condemned inmate after the administration of thiopental to ensure that the inmate has reached an appropriate plane of anesthesia prior to the administration of drugs which would cause suffering is contrary to all standards of practice for the administration of anesthetic drugs and creates a severe and unnecessary risk that the condemned will not be adequately anesthetized before experiencing asphyxiation and/or the pain of potassium chloride injection.

b. The ODOC's practice of delivering thiopental and vecuronium bromide from two separate intravenous lines, one in the right arm and one in the left arm, is medically inappropriate, unnecessary, and, even if all drugs are effectively delivered to the condemned inmate, creates a severe and unnecessary risk that the ODOC cannot control the relative rate and timing of drug onset.

c. The ODOC's practice of delivering thiopental and vecuronium from two separate intravenous lines, one in the right arm and one in the left arm, creates a severe and unnecessary risk that, if there is a problem in the thiopental delivery (such as an infiltration), a condemned inmate will not be adequately anesthetized and will feel the agonizing effects of vecuronium bromide and potassium chloride while still conscious.

d. The ODOC's second dose of thiopental has been preceded by two doses of potassium chloride. Two doses of potassium chloride, if properly delivered, will reliably and rapidly cause death. It is nonsensical to administer any drug, and especially an anesthetic drug, to a dead person. The ODOC cannot possibly understand the function of the drugs if it believes this order of drug administration is appropriate.

e. The ODOC's first dose of 1.2 grams (1200 milligrams) of thiopental, unadjusted for weight or body mass, is the lowest dose of thiopental in the nation of which I am aware and it is insufficient to reliably ensure prolonged and deep anesthesia for all condemned prisoners.

f. It is my opinion that published reports, declarations and affidavits from witnesses who have attended executions by lethal injection which recount

prolonged body movements (which lay persons describe as convulsing or seizuring) indicate the protocol devised by the ODOC is not working as intended.

g. Vecuronium bromide (or any other similar neuromuscular blocking agent) serves no legitimate medical purpose during execution by lethal injection and inclusion of such agents adds a severe and unnecessary risk of masking body movements that could signal condemned inmate distress during execution.

V. Discussion

13. It useful to divide the procedure of lethal injection into four stages. The first stage is achieving intravenous access. The second stage is the administration of general anesthesia. The third stage is the administration of neuromuscular blocking agent that has a paralyzing effect to ensure the execution appears serene and peaceful. The fourth stage is the execution through the administration of potassium chloride which kills the prisoner by stopping his heart. For purposes of discussion, it is helpful to consider the execution process in reverse order.

A. Potassium Chloride Causes Extreme Pain

14. I have reviewed execution logs from Oklahoma, and execution logs and electrocardiogram ("EKG") strips from executions around the country. These data show clearly that the administration of potassium chloride disrupts the electrical signals in the heart, paralyzes the cardiac muscle, and causes death by cardiac arrest.

15. The ODOC currently injects 100 milliequivalents (meq) of potassium chloride in a 50 cc syringe to cause death; this is a highly concentrated dose.

16. There is no medical dispute that intravenous injection of concentrated potassium chloride solution, such as that administered by the ODOC, causes excruciating pain. The vessel walls of veins are richly supplied with sensory nerve fibers that are highly sensitive to potassium ions. There exist other chemicals which can be used to stop the heart and which do not cause pain upon administration.

17. Even though the statute authorizing lethal injection in Oklahoma does not require the use of potassium, the ODOC has nevertheless selected potassium chloride to cause cardiac arrest. Thus, the ODOC has exercised its discretion and chosen a means of causing death that causes extreme pain upon administration, instead of selecting available, equally effective yet essentially painless medications for stopping the heart. In so doing, the ODOC has assumed the responsibility of ensuring, through all reasonable and feasible steps, that the prisoner is sufficiently anesthetized and cannot experience the pain of potassium chloride injection.

18. A living person who is to be intentionally subjected to the excruciating pain of potassium injection must be provided with adequate anesthesia. This imperative is of the same order as the imperative to provide adequate anesthesia for any person or any prisoner undergoing painful surgery. Given that the injection of potassium is a scheduled and premeditated event that is known without any doubt to be extraordinarily painful, it would be unconscionable and barbaric for potassium injection to take place without the provision of sufficient general anesthesia to ensure that the prisoner is rendered and maintained unconscious throughout the procedure, and it would be unconscionable to allow personnel who are not properly trained in the field of anesthesiology to attempt to provide or supervise this anesthetic care.

19. Indeed, the need for proper medical anesthetic care before death by potassium chloride is so well understood that standards for animal euthanasia require that euthanization by potassium chloride be performed only by one qualified to assess anesthetic depth:

> It is of utmost importance that personnel performing this technique [euthanasia by potassium chloride injection] are trained and knowledgeable in anesthetic techniques, and ***are competent in assessing anesthetic depth*** appropriate for administration of potassium chloride intravenously. ***Administration of potassium chloride intravenously requires animals to be in a surgical plane of anesthesia characterized by loss of consciousness, loss of reflex muscle response, and loss of response to noxious stimuli.***

2000 Report of the American Veterinary Medical Association Panel on Euthanasia, 218 (5) J. AM. VET. MED. ASS'N 669, 681 (2001) (emphasis added), attached hereto as Exhibit 2. As result of the ODOC's failure to assess anesthetic depth and its failure to provide personnel who are competent in assessing anesthetic depth, the ODOC protocol for executing humans is unacceptable for the euthanasia of animals.

B. Administration of Neuromuscular Blocking Agents Is Medically Unnecessary and Causes an Extreme Risk of Suffering

20. The ODOC's protocol calls for the administration of 20 milligrams of vecuronium bromide.[3] Vecuronium bromide is one of a class of drugs called neuromuscular blocking agents. Such agents paralyze all voluntary muscles, but do not affect sensation, consciousness, cognition, or the ability to feel pain and suffocation. The effect of the vecuronium bromide is to render the muscles (including the

[3] Oklahoma has, over time, used a variety of neuromuscular blocking agents to paralyze prisoners during executions. Most states use pancuronium to produce paralysis; for purposes of this discussion pancuronium and vecuronium are interchangeable because their paralytic properties are essentially identical.

diaphragm which moves to permit respiration) unable to contract. It does not affect the brain or the nerves.

21. Clinically, the drug is used to ensure a patient is securely paralyzed so that surgical procedures can be performed without muscle contraction. Anesthetic drugs are administered before neuromuscular blocking agents so that the patient does not consciously experience the process of becoming paralyzed and losing the ability to breathe. Thus, in any clinical setting where a neuromuscular blocker is to be used, a patient is anesthetized and monitored to ensure anesthetic depth throughout the duration of neuromuscular blocker use. To assess anesthesia, a trained medical professional, either a physician anesthesiologist or a nurse anesthetist, provides close and vigilant monitoring of the patient, their vital signs, using various diagnostic indicators of anesthetic depth. The appropriate procedures for monitoring a patient undergoing anesthesia and who is about to be administered a drug which masks the ability to convey distress are detailed in the American Society of Anesthesiology's recently published *Practice Advisory for Intraoperative Awareness and Brain Function Monitoring*, 104 Anesthesiology 847, 850-51 (Apr. 2006) (describing preoperative and intraoperative measures for gauging anesthetic depth, including close monitoring of sites of IV access), attached hereto as Exhibit 3. *See also ASA Standards for Basic Anesthetic Monitoring* (Oct. 25, 2005), attached hereto as Exhibit 4. ODOC's procedure, to the extent disclosed, indicates that, contrary to all medical practice, no one, let alone a properly trained individual, assesses anesthesia prior to the administration of vecuronium bromide.

22. It is important to understand that vecuronium bromide does not cause unconsciousness in the way that an anesthetic drug does; rather, if administered alone, a lethal dose of vecuronium bromide would cause a condemned inmate to lose consciousness only after he or she had endured the excruciating experience of suffocation. It would totally immobilize the inmate by paralyzing all voluntary muscles and the diaphragm, causing the inmate to suffocate to death while experiencing an intense, conscious desire to inhale. Ultimately, consciousness would be lost, but it would not be lost as an immediate and direct result of the vecuronium bromide. Rather, the loss of consciousness would be due to suffocation, which would be preceded by the torment and agony caused by suffocation. This period of torturous suffocation would be expected to last at least several minutes and would only be relieved by the onset of suffocation-induced unconsciousness.

23. Based on the information presently available, I believe it is likely that this has occurred in Oklahoma. But before commenting on a specific execution, I think it is important to explain how assessing the degree of consciousness that may have been felt in an execution differs from assessing consciousness in a clinical context. In the clinical context, anesthesiologists closely monitor patients for signs of awareness, and conduct post-operative interviews to assess to what extent a

patient may have consciously experienced any part of his or her surgical procedure. The American Society of Anesthesiologists has recently commented that "[i]ntraoperative awareness cannot be measured during the intraoperative phase of general anesthesia, because the recall component of awareness can only be determined postoperatively by obtaining information directly from the patient." *See Practice Advisory for Intraoperative Awareness and Brain Function Monitoring*, 104 Anesthesiology 847, 850 (Apr. 2006), attached hereto as Exhibit 3.

24. Neither monitoring nor post-process interviews take place with an execution; we can therefore never know with absolute certainty the degree of consciousness felt in an execution. But, to the extent we can know, after the fact, we look for signs of intravenous access problems, physical reaction to the process, and postmortem blood concentrations of anesthetic drugs. Based on the information presently available, this information suggests a terrible problem in the ODOC's execution of Loyd LaFevers in 2001. During Mr. LaFevers's execution witnesses observed an infiltration (a problem with intravenous access) in the intravenous (IV) line delivering the anesthetic thiopental. This problem was confirmed by the Medical Examiner's office notes attached to Mr. LaFevers's autopsy file. Witnesses to Mr. LaFevers's execution observed movements that they described as convulsions or seizures lasting for many minutes. *See* Declaration of Pat Ehlers, attached hereto as Exhibit 5; Affidavit of Catherine Burton, attached hereto as Exhibit 6. These witness reports were confirmed by newspaper reports of the LaFevers execution. The levels of thiopental in Mr. LaFevers's blood after death were very low, suggesting that little thiopental entered his body. Based on this presently available evidence, it is my opinion that Mr. LaFevers's execution was botched and it is more likely than not that he experienced conscious or partly conscious asphyxiation. Such a conscious or partly conscious asphyxiation would have occurred as a result of inadequate anesthesia. Inadequate anesthesia results from the completely avoidable problem of the ODOC's very poorly designed protocol for the delivery of anesthetic drugs, which I will discuss in full below.

25. When thiopental is not properly administered in a dose sufficient to cause loss of consciousness for the duration of the execution procedure, it is my opinion held to a reasonable degree of medical certainty, that the use paralytic drugs such as pancuronium or vecuronium bromide will cause conscious paralysis, suffocation, and the excruciating pain of the intravenous injection of concentrated potassium chloride, such as Mr. LaFevers likely experienced.

26. There is no legitimate reason for including vecuronium bromide in the execution process and assuming the foregoing risks. Because potassium chloride causes death in executions by lethal injection, there is no rational place in the protocol for vecuronium bromide; the drug simply serves no function in the execution process. Its inclusion, therefore, only adds risk, with no medical benefit.

27. Because of the concerns enumerated above, medical practitioners eschew the use of neuromuscular blocking agents in circumstances similar to that of executions, end of life care:

> NMBAs [neuromuscular blocking agents] possess no sedative or analgesic activity and can provide no comfort to the patient when they are administered at the time of withdrawal of life support. Clinicians cannot plausibly maintain that their intention in administering these agents in these circumstances is to benefit the patient. Indeed, unless the patient is also treated with adequate sedation and analgesia, the NMBAs may ***mask the signs of acute air hunger*** associated with ventilator withdrawal, ***leaving the patient to endure the agony of suffocation in silence and isolation***. Although it is true that families may be distressed while observing a dying family member, the best way to relieve their suffering is by reassuring them of the patient's comfort through the use of adequate sedation and analgesia.
>
> * * *
>
> As a general rule, therefore, ***pharmacologic paralysis should be avoided at the end of life***.

Robert D. Truog et al., *Recommendations for end-of-life care in the intensive care unit: The Ethics Committee of the Society of Critical Care Medicine*, 29(12) CRIT. CARE MED. 2332, 2345 (2001) (emphasis added), attached hereto as Exhibit 7.

28. I have heard some prison officials comment that neuromuscular blocking agents are included in the execution process to paralyze the condemned so that witnesses will not see muscle contractions associated with potassium chloride administration that could look painful, but because of the presence of anesthesia, are not, in fact, indicative of pain. Because vecuronium bromide takes time to act on the body, and executions in Oklahoma generally proceed at a very rapid rate, it is extremely unlikely that the vecuronium has time to provide an effective neuromuscular blockade; it therefore cannot fulfill this purported function. It is particularly ironic that the ODOC has added a drug to the process that cannot (because of the manner of administration) achieve its intended purpose and instead greatly increases the risk of an inhumane execution.

C. The ODOC's Administration of General Anesthesia Fails to Adhere to a Medical Standard of Care

29. Because of the potential for an excruciating death created by the use of potassium chloride and the risk of conscious asphyxiation created by the use of the vecuronium bromide, it is necessary to induce and maintain a deep plane of anesthesia. The circumstances and environment under which anesthesia is to be induced and maintained, according to Warden Mullin's affidavit and other

available documents, create, needlessly, a significant risk that inmates will suffer. It is my opinion, stated to a reasonable degree of medical certainty, that the lethal injection procedures selected by the ODOC subject condemned inmates to an increased and unnecessary risk of experiencing excruciating pain in the course of execution.

30. Presumably, because of the ODOC's awareness of the potential for excruciating pain evoked by potassium, the protocol plans for the provision of general anesthesia by the inclusion of thiopental. When successfully delivered into the circulation in sufficient quantities, thiopental causes sufficient depression of the nervous system to permit excruciatingly painful procedures to be performed without causing discomfort or distress. Failure to successfully deliver into the circulation a sufficient dose of thiopental would result in a failure to achieve adequate anesthetic depth and thus failure to block the excruciating pain.

31. The ODOC's procedures do not comply with the medical standard of care for inducing and maintaining anesthesia prior to and during a painful procedure. Likewise, the ODOC's procedures are not compliant with the guidelines set forth by the American Veterinary Medical Association for the euthanasia of animals.

The Dangers of Using Thiopental as an Anesthetic

32. Thiopental is an ultrashort-acting barbiturate that is intended to be delivered intravenously to induce anesthesia. In typical clinical doses, the drug has both a quick onset and short duration, although its duration of action as an anesthetic is dose dependant.

33. When anesthesiologists use thiopental, we do so for the purposes of temporarily anesthetizing patients for sufficient time to intubate the trachea and institute mechanical support of ventilation and respiration. Once this has been achieved, additional drugs are administered to maintain a "surgical depth" or "surgical plane" of anesthesia (i.e., a level of anesthesia deep enough to ensure that a surgical patient feels no pain and is unconscious). The medical utility of thiopental derives from its ultrashort-acting properties: if unanticipated obstacles hinder or prevent successful intubation, patients will likely quickly regain consciousness and resume ventilation and respiration on their own.

34. The benefits of thiopental in the operating room engender serious risks in the execution chamber. The duration of narcosis provided by thiopental is dose dependent. Generally, the larger the dose, the longer the narcosis. Oklahoma administers a 1.2 gram (or 1200 milligram) dose of thiopental in a single injection from a single syringe. ***This initial dose of thiopental is the smallest dose of thiopental of which I am aware given by any state conducting executions by lethal injection.*** If successfully delivered into the circulation, such a dose is larger than the typical clinical dose, and would likely produce a deep anesthesia in most people. However, this dose is concerning because, if an inmate does not receive

the full dose of thiopental because of any error or problems in drug preparation or administration, there is absolutely no safety margin in the dose. This is unacceptable given the context in which the drug is being administered and it is appalling that the ODOC has for years been performing executions with this initial dose of thiopental. Additionally, given the range of time it has taken to complete some Oklahoma executions and the range of inmate weights, this dose of thiopental is small enough that, unadjusted for weight or body mass, some inmates could be at risk of reawakening.

35. Many foreseeable situations exist in which human or technical errors could result in the failure to successfully administer the intended dose. The ODOC's procedure both fosters these potential problems and fails to provide adequate mechanism for recognizing these problems, and it does these things needlessly and without legitimate reason.

Drug Administration Problems

36. Examples of problems that could occur (and which have occurred in executions) that could prevent the proper administration of thiopental include, but are not limited to, the following:

a. **Errors in Drug Preparation.** Thiopental is delivered in powdered form and must be mixed into an aqueous solution prior to administration. This preparation requires the correct application of pharmaceutical knowledge and familiarity with terminology and abbreviations. Calculations are also required, particularly if the protocol requires the use of a concentration of drug that differs from that which is normally used. Recently drug preparation problems were revealed in the State of Missouri, which was using a board-certified physician to prepare drugs. *See* Excerpts of Transcript of June 12, 2006 Bench Trial, at 30-39, *Taylor v. Crawford*, No. 05-4173-CV-C-FJG (W.D. Mo.), attached hereto as Exhibit 8.

b. **Error in Labeling of Syringes.** It is of paramount importance that the drugs in an execution be given in the correct order. If the drugs are mislabeled, it greatly increases the chances the drugs will not administered in the correct order.

c. **Error in Selecting the Correct Syringe.** As presently configured, the ODOC protocol uses the serial injection of fluid from eleven syringes. With that number of syringes it would be easy to make a mistake in selecting the correct syringe, especially in the reportedly low light conditions described as occurring in the Oklahoma drug room during executions. *See* Affidavit of Janet Chesley, ¶11, attached hereto as Exhibit 9.

d. **Error in Correctly Injecting the Drug into the Intravenous Line**. If the syringe holding the drug is turned in the wrong direction, a retrograde injection of the drug into the IV fluid bag rather than into the inmate will result. Even experienced anesthesiologists sometimes make this error, and the probability of this error occurring is greatly increased in the hands of inexperienced personnel.

e. **The IV Tubing May Leak.** An "IV setup" consists of multiple components that are assembled by hand prior to use. If, as indicated by publicly available pictures of Oklahoma's execution chamber, the drugs are not at the bedside but are instead in a different room then it will be impossible to maintain visual surveillance of the full extent of IV tubing so that such leaks may be detected. The configuration of the death chamber and the relative positions of the executioners and the inmate may hinder or preclude such surveillance, thereby causing a failure to detect a leak. Leaking IV lines were noted in Maryland. *See* Maryland Department of Corrections Execution Log, attached hereto as Exhibit 10.

f. **Incorrect Insertion of the Catheter.** If the catheter is not properly placed in a vein, the thiopental will enter the tissue surrounding the vein but will not be delivered to the central nervous system and will not render the inmate unconscious. This condition, known as infiltration, occurs with regularity in the clinical setting. Recognition of infiltration requires continued surveillance of the IV site during the injection, and that surveillance should be performed so as to permit correlation between visual observation and tactile feedback from the plunger of the syringe. One cannot reliably monitor for the presence of infiltration through a window from another room. There has been at least one occasion in Oklahoma in which an infiltration in the catheter delivering the anesthetic thiopental has been noted. *See* Medical Examiner Records on the Execution of Loyd LaFevers, at ME 1695, attached hereto as Exhibit 11; Declaration of Pat Ehlers, attached hereto as Exhibit 5

g. **Migration of the Catheter.** Even if properly inserted, the catheter tip may move or migrate, so that at the time of injection it is not within the vein. This would result in infiltration, and therefore a failure to deliver the drug to the inmate's circulation and failure to render the inmate unconscious.

h. **Perforation or Rupture or Leakage of the Vein.** During the insertion of the catheter, the wall of the vein can be perforated or weakened, so that during the injection some or all of the drug leaves the vein and enters the surrounding tissue. The likelihood of rupture occurring is increased if too much pressure is applied to the plunger of the syringe during injection, because a high pressure injection results in a high velocity jet of drug in the vein that can penetrate or tear the vessel wall. This is a particularly grave risk in Oklahoma where the drugs are injected as fast as possible.

See Oklahoma Drug Administration Times, attached hereto as Exhibit 12. Recently, during the Clark execution in Ohio, the Department of Corrections failed to recognize that the condemned's veins had collapsed, causing the inmate to reawaken during the execution process and the condemned inmate to plead "Can't you just give me something by mouth to end this." *See* Jim Provance, *Problematic execution draws questions: Correction official to appear before panel*, TOLEDO BLADE (May 17, 2006), attached hereto as Exhibit 13.

i. **Excessive Pressure on the Syringe Plunger.** Even without damage or perforation of the vein during insertion of the catheter, excessive pressure on the syringe plunger during injection can result in tearing, rupture, and leakage of the vein due to the high velocity jet that exits the tip of the catheter. Should this occur, the drug would not enter the circulation and would therefore fail to render the inmate unconscious. This is a particularly grave risk in Oklahoma where the drugs are injected as fast as possible. *See* Oklahoma Drug Administration Logs, attached hereto as Exhibit 12.

j. **Securing the Catheter.** After insertion, catheters must be properly secured by the use of tape, adhesive material, or suture. Movement by the inmate, even if restrained by straps, or traction on the IV tubing may result in the dislodging of the catheter. If this were to occur under a sheet, it would not be detected, and the drug would not enter the inmate's circulation and would not render the inmate unconscious.

k. **Failure to Properly Loosen or Remove the Tourniquet.** A tourniquet is used to assist in insertion of an IV catheter. Failure to remove such tourniquets from the arm or leg after placement of the IV catheter will delay or inhibit the delivery of the drugs by the circulation to the central nervous system. This may cause a failure of the thiopental to render and maintain the inmate in a state of unconsciousness.

l. **Impaired Delivery Due to Restraining Straps.** Restraining straps may act as tourniquets and thereby impede or inhibit the delivery of drugs by the circulation to the central nervous system. This may cause a failure of the thiopental to render and maintain the inmate in a state of unconsciousness. Even if the IV is checked for "free flow" of the intravenous fluid prior to commencing injection, a small movement within the restraints on the part of the inmate could compress the vein and result in impaired delivery of the drug. It has been noted in at least one execution by lethal injection that the straps hindered the flow of drugs. *See* Editorial, *Witnesses to a Botched Execution*, ST. LOUIS POST-DISPATCH, at 6B (May 8, 1995).

37. These types of drug administration problems are not uncommon in the practice of medicine. A number of medical publications detail exactly these types of administration issues. For example, the National Academy of Sciences Institute on Medicine has just published the report of the Committee on Identifying and Preventing Medication Errors, which details the rates of drug preparation and administration errors in hospital setting and concludes "[e]rrors in the administration of IV medications appear to be particularly prevalent." PREVENTING MEDICATION ERRORS: QUALITY CHASM SERIES 325-60 (Philip Aspden, Julie Wolcott, J. Lyle Bootman, Linda R. Cronenwett, Eds. 2006), excerpt attached hereto as Exhibit 14. *Id*. at 351. Likewise a recent study shows that "drug-related errors occur in one out of five doses given to patients in hospitals." *See* Bowdle, T. A., *Drug Administration Errors from the ASA [Am. Soc. Anesthesiologists] Closed Claims Project*, 67(6) ASA NEWSLETTER, 11-13 (2003), attached hereto as Exhibit 15. This study recognizes that neuromuscular blockers have been administered to awake patients and to those who have had inadequate doses of general anesthetic. *Id*.

38. In the practice of medicine, preventing pain and/or death as a result of these common drug administration problems is achieved by having persons in attendance who have the training and skill to recognize problems when they occur and the training and skill to avert the negative consequences of the problems when they arise.

The Need for Adequate Training in Administering Anesthesia

39. Because of these foreseeable problems in administering anesthesia, in Oklahoma and elsewhere in the United States, the provision of anesthetic care is performed only by personnel with advanced training in the medical subspecialty of Anesthesiology. The establishment of a surgical plane of anesthesia is a complex task which can only reliably be performed by individuals who have completed the extensive requisite training to permit them to provide anesthesia services. *See Practice Advisory for Intraoperative Awareness and Brain Function Monitoring*, 104 Anesthesiology 847, 859 Appendix 1 (Apr. 2006) (recommending the use of "multiple modalities to monitor depth of anesthesia"), attached hereto as Exhibit 3. If the individual providing anesthesia care is inadequately trained or experienced, the risk of these complications is enormously increased. The President of the American Society of Anesthesiologists recently agreed that "the only way to assure [a surgical plane of anesthesia] would be to have an anesthesiologist prepare and administer the drugs, carefully observe the inmate and all pertinent monitors, and finally to integrate all this information." Orin F. Guidry, M.D., *Message from the President: Observations Regarding Lethal Injection* (June 30, 2006), attached hereto as Exhibit 16.

40. In Oklahoma, and elsewhere in the United States, general anesthesia is administered by physicians who have completed residency training in the

specialty of Anesthesiology, and by nurses who have undergone the requisite training to become Certified Registered Nurse Anesthetists (CRNAs). Physicians and nurses who have not completed the requisite training to become anesthesiologists or CRNAs are not permitted to provide general anesthesia.

41. In my opinion, individuals providing general anesthesia in the Oklahoma State Penitentiary ("OSP") should not be held to a different or lower standard than is set forth for individuals providing general anesthesia in any other setting in Oklahoma. Specifically, the individuals providing general anesthesia within OSP should possess the experience and proficiency of anesthesiologists and/or CRNAs. Conversely, a physician who is not an anesthesiologist or a nurse who is not a CRNA should not be permitted to provide general anesthesia within OSP prison (or anywhere else in Oklahoma).

42. There is no evidence, at this time, that any person on the ODOC's injection team has any training in administering anesthesia, or, if personnel are given training, what that training might be. The absence of any details as to the training, certification, or qualifications of injection personnel raises critical questions about the degree to which condemned inmates risk suffering excruciating pain during the lethal injection procedure. The great majority of nurses are not trained in the use of ultrashort-acting barbiturates; indeed, this class of drugs is essentially only used by a very select group of nurses who have obtained significant experience in intensive care units and as nurse anesthetists. Very few paramedics are trained or experienced in the use of ultrashort-acting barbiturates. Based on my medical training and experience, and based upon my research of lethal injection procedures and practices, inadequacies in these areas elevate the risk that the lethal injection procedure will cause the condemned to suffer excruciating pain during the execution process. Failure to require that the injection team have training equivalent to that of an anesthesiologist or a CRNA compounds the risk that inmates will suffer excruciating pain during their executions.

43. In addition to apparently lacking the training necessary to perform a lethal injection, the ODOC's protocol imposes conditions that exacerbate the foreseeable risks of improper anesthesia administration described above, and fails to provide any procedures for dealing with these risks. Perhaps most disturbingly, the protocol prevents effective monitoring of the inmate's condition or whether he is anesthetized and unconscious. After IV lines are inserted and the execution begins, it appears that only the Warden (who is standing next to the condemned) has a clear view of the intravenous catheter sites. Accepted medical practice, however, would dictate that trained personnel monitor the IV lines and the flow of anesthesia into the veins through visual and tactile observation and examination. The lack of any qualified personnel present in the chamber during the execution thwarts the execution personnel from taking the standard and necessary measures to reasonably ensure that the thiopental is properly flowing into the inmate and

that he is properly anesthetized prior to the administration of the vecuronium bromide and potassium.

44. In my opinion, having a properly trained and credentialed individual examine the inmate after the administration of the thiopental (but prior to the administration of vecuronium) to verify that the inmate is completely unconscious would substantially mitigate the danger that the inmate will suffer excruciating pain during his execution. This is the standard of care, and in many states the law, set forth for dogs and cats and other household pets when they subjected to euthanasia by potassium injection. Yet the ODOC protocol does not apparently provide for such verification.

45. The ODOC's protocol calls for the drugs to be administered through two intravenous lines. Thiopental is administered through the left arm and vecuronium is administered through the right arm. I know of no other state that administers drugs for lethal injection in this manner. In clinical practice, an anesthesiologist would never plan to induce anesthesia through two separate IV sites. Even if the drugs are intended to be given serially, one after another, the use of two lines creates a grave risk that serial drug administration will not actually occur. The ODOC is injecting different volumes of drug through two IV lines at a high rate of speed. The rapid rate of injection of different volumes means that, sent through two different IV lines, the ODOC has lost its ability to control precisely when the drugs get to the condemned inmate. Seconds matter in an execution that is taking place in under three (or even under two) minutes. The loss of control over the drug delivery (even if everything else is working according to plan) creates a serious and completely avoidable risk regarding timing the drug onset.

46. Even more concerning, if a condemned inmate has a drug delivery problem in the thiopental arm (as we know to have occurred in the execution of Loyd LaFevers), thiopental will be ineffectively delivered, and as a result of the ODOC's uniquely dangerous use of two IV lines, the full doses of vecuronium and potassium will then be injected via the other arm. The inmate will then experience the full effect of those drugs, with the pain of that experience unameliorated by anesthetic. The ODOC's method of using two IV catheters for the injection of drugs is blatantly reckless and inadequate and raises serious concerns about the qualifications and experience of those who designed this protocol.

47. The rate of drug administration in Oklahoma executions presents a serious risk of suffering. Thiopental, like any anesthetic – even an ultra-short acting anesthetic – takes time to act. When all injections are completed with two minutes, as would appear to be the case in Oklahoma, the ODOC is recklessly pushing the boundary of ensuring that the condemned inmate has been adequately anesthetized even if there are no IV access or drug related issues. The ODOC has simply not allowed enough time for the thiopental to work to its fullest.

48. The ODOC protocol calls for the administration of thiopental ***after*** the administration of two doses of potassium chloride. As soon as the potassium chloride perfuses the inmate's heart, his heart will stop beating and his circulation will stop. He will be dead. It is senseless to administer anesthetic to a dead person. That the ODOC does not understand that its second dose of anesthetic can serve no purpose in ameliorating pain suggests, once again, that the ODOC does not understand the lethal injection process.

D. Unqualified Persons Creating Intravenous Access

49. The first step in the lethal injection process is creating effective intravenous access for drug delivery. The subsequent administration of the anesthetic drugs can only be successful if IV access is properly achieved. But the ODOC has put in place a protocol that exacerbates the risk that IV access will not be adequately achieved. Oklahoma states it uses phlebotomists to insert IV catheters. In my experience as an anesthesiologist (which has been confirmed by the affidavit of Mary Burden) phlebotomists are not qualified by virtue of their phlebotomy training to insert catheters for the administration of intravenous anesthetics. *See* Affidavit of Mary Burden, attached hereto as Exhibit 17. I have identified at least one occurrence where the ODOC was unable to effectively achieve IV access and failed to recognize and rectify that problem. *See* Medical Examiner Records of Loyd LaFevers, attached hereto as Exhibit 11. The failure to recognize and avert the negative consequences of a significant problem like an infiltration is the direct consequence of having unqualified persons engaged in complicated medical tasks in conjunction with an absence of monitoring or oversight.

50. Autopsy reports of executed inmates show that the ODOC has experienced difficulty in establishing IV access. In the last execution conducted in Oklahoma, newspapers report that "Boltz's execution was delayed more than one hour because prison workers had trouble finding a vein to inject the lethal cocktail, said Jerry Massie, spokesman for the Oklahoma Department of Corrections." Tim Talley, *Oklahoma executes 74-year-old death row inmate,* AP Alert (June 2, 2006), attached hereto as Exhibit 18. Although it is not entirely clear, it appears that the ODOC was not able to achieve peripheral venous access to Mr. Boltz and instead used some other method, possibly a "cut-down" as mentioned in Warden Mullin's affidavit, to achieve intravenous access.

51. A "cut-down" is a complicated medical procedure requiring equipment and skill that are not accounted for Warden Mullin's affidavit. It has a very high probability of not proceeding properly in the absence of adequately trained and experienced personnel, and without the necessary equipment. If done improperly, the "cut-down" process can result in very serious complications including severe hemorrhage (bleeding), pneumothorax (collapse of a lung which may cause suffocation), and severe pain. It is well documented that lethal injection procedures in Oklahoma and other states have at times required the use of central intravenous lines. As is widely recognized in the medical community,

administration of intravenous medications and the management of intravenous systems are complex endeavors with significant risks and complications. The report of apparent blood from the execution of Mr. Boltz in the entrance to H-Unit is not inconsistent with complications occurring in a cut-down or central line placement. *See* Affidavit of Janet Chesley, ¶ 14, attached hereto as Exhibit 9.

52. It is my opinion that, to reasonably minimize the risk of severe and unnecessary suffering during the ODOC's execution by lethal injection, there must be: proper procedures that are clear and consistent; qualified personnel to ensure that anesthesia has been achieved prior to the administration of vecuronium bromide and potassium chloride; qualified personnel to select chemicals and dosages, set up and load the syringes, administer "pre-injections," insert the IV catheter, and perform the other tasks required by such procedures; and adequate inspection and testing of the equipment and apparatus by qualified personnel. The ODOC's procedures for implementing lethal injection, to the extent that they have been made available, provide for none of the above.

VI. Conclusions

53. Based on my research into methods of lethal injection used by various states and the federal government, and based on my training and experience as a medical doctor specializing in anesthesiology, it is my opinion stated to a reasonable degree of medical certainty that, given the apparent absence of a central role for a properly trained professional in ODOC's execution procedure, the characteristics of the drugs or chemicals used, the failure to understand how the drugs in question act in the body, the failure to properly account for foreseeable risks, the design of a drug delivery system that exacerbates rather than ameliorates the risks of error, the ODOC's lethal injection procedure creates medically unacceptable risks of inflicting excruciating pain and suffering on inmates during the lethal injection procedure. All of these problems could easily be addressed, and indeed have been addressed by the veterinary profession for the euthanasia of dogs and cats. It is difficult to understand why the ODOC has failed to address these problems and has failed to meet the minimum standards set forth for veterinary euthanasia.

54. In addition, in order to more fully and fairly assess the impact of ODOC's protocol failings, it is necessary to obtain all the records and logs used, and all official witness statements from prior executions, as well as the full rules and regulations devised by ODOC for lethal injection. This would include identifying the qualifications, experience and training of those persons who apply the IVs and who administer and monitor the injection.

I declare under penalty of perjury that the foregoing is true and correct.

EXECUTED ON THIS 27th DAY OF July, 2006.

Mark J. S. Heath

IN THE UNITED STATES DISTRICT COURT

FOR THE DISTRICT OF MARYLAND/NORTHERN DIVISION

VERNON EVANS,

Plaintiff

CIVIL NO. 06-149

Vs.

Mary Anne Saar, et al,

October 11, 2006

Defendants

_____/

DAY SIX

TRANSCRIPT OF BENCH TRIAL

BEFORE THE HONORABLE BENSON E. LEGG,

UNITED STATES DISTRICT CHIEF JUDGE

APPEARANCES:

On behalf of the Plaintiff:

Stephen Hut, Jr, Esquire

Todd Zubler, Esquire

Kalea Clark, Esquire

Anne Harden Tindall, Esquire

Stephanie Katherine Wood, Esquire

On behalf of the Defendant:

Laura Mullally, Esquire

Philip Pickus, Esquire

REPORTED BY:

Jacqueline Sovich, RPR, RMR, FOCRR

Official Court Reporter

October 11, 2006 Evans versus Saar.

(PROCEEDINGS)

THE COURT: Good morning. Please be seated.

Mr. Pickus, I see that you're standing so this is probably your witness.

MR. PICKUS: It is, good morning. I would call Dr. Mark Dershwitz.

THE COURT: And Dr. Dershwitz, good honoring, sir.

THE WITNESS: Good morning.

THE CLERK: Dr. Dershwitz, if you would raise your right hand.

(The Witness is sworn.)

THE CLERK: Please state your name for the record.

THE WITNESS: Mark Dershwitz.

THE CLERK: Thank you.

MR. PICKUS: Good morning.

THE CLERK: Dr. Dershwitz, would you spell your name for the record, please?

THE WITNESS: D, as in David, E R S H W I T Z.

THE CLERK: Thank you.

DIRECT EXAMINATION

BY MR. PICKUS:

Q. Good morning, Dr. Dershwitz. Can you see and hear me?

A. Just fine.

Q. Okay. If you have a problem either seeing or hearing us, let us know.

A. Yes.

Q. Do you see any faults with the medical aspects of the Maryland protocol?

A. Well, I'm here to limit my testimony primarily to the pharmacology and the delivery of the medications, and in that narrow area, I do not see faults that I would recommend changing.

Q. But earlier today, you were testifying about the plausibility of things going wrong in the execution protocol, weren't you?

A. Well, on a theoretical basis, lots of things could go wrong. But the important consideration is what is the intrinsic probability of a given problem happening?

Q. And so do you see any medical aspects of the protocol that should be improved?

A. The one thing that I have discussed is I believe that there needs to be an alternate plan for securing IV access if the nursing assistant is not able to put a peripheral IV in the arm. And I think that would be one addition that I would make would be to have a protocol by which a qualified person would then attempt to place an intravenous catheter elsewhere if the nursing assistant couldn't utilize her expertise to get the IV in the arm.

Q. And is there any other?

A. Off the top of my head, I can't think anything else in

the protocol that is within my personal area of expertise that I think is worth addressing.

Q. Now, going back to your issue of having an alternate, or idea of having an alternate plan, you're aware of jurisdictions in which a physician is available to insert a central line when needed, aren't you?

A. Yes.

Q. In fact, most states that you're familiar with have arranged for an experienced physician to place a central IV via jugular vein in the neck or femoral vein in the groin, correct?

A. Yes. I would just use a different term than central line, especially when it's placed by the femoral approach, it's not a central line. But it is an IV in a large blood vessel that is very reliable, but typically requires a higher level of expertise to insert than somebody from the IV team would generally have.

Q. And anyone inserting a central line, or if you don't want to call it, a femoral IV a central line, femoral peripheral IV, anyone injecting one of those, or I'm sorry, establishing one of those intravenous lines should be experienced and comfortable doing that procedure; is that correct?

A. Yes, absolutely. In most cases that would be a physician, although in some jurisdictions there may be, for example, paramedics in some jurisdictions are allowed to put

in neck lines or groin lines in the field in a patient in whom they can't establish IV access in an arm or leg.

Q. And the primary reason for having a plan B is frequency of inmates who, because of prior IV drug abuse, do not have good peripheral veins and therefore need some sort of central line in order to insert a reliable working IV, correct?

A. Well, in general, that's correct. I think that there are a multiplicity of etiologies that cause a person to have bad veins, and many of these pathological problems are found in higher levels in the incarcerated population.

So I would also submit chronic hepatitic failure is another failure that's common in the prison population also leads to difficulty with IV placement.

Q. So it's your understanding, isn't it, it's reasonably common for inmates to have bad veins?

A. I think it depends on your definition of common, but it's certainly a concern that is worth addressing.

Q. And in the context of drug administration, a contraindication is a condition that makes that particular treatment or procedure inadvisable, correct?

A. In a very, very broad generalization, that's true.

Q. And an absolute contraindication would be a situation or condition that makes a particular treatment absolutely inadvisable, correct?

A. Correct. And there's truly very, very few absolute

contraindications in medicine.

Q. Do you know what any absolute contraindications are for thiopental?

A. That's a good question, because are you talking about the specific effect of a judicial execution versus in the general population?

Because textbooks will tell you that a genetic disease called porifera is an absolute contraindication to the use of thiopental in clinical medicine, but I will submit based upon my extensive knowledge of why porifera is problematic, that it would not be a contraindication during a judicial execution.

Q. Well, let me refer you to plaintiff's exhibit 18. And Mr. Thompson, if we could?

This is a document, Dr. Dershwitz, which has previously been admitted into evidence. It is the package insert for pentothal, and I would refer you to page 2 of this document, where contraindications are listed.

And the first section is Absolute Contraindications. And you'll see that the absence of suitable veins for intravenous administration is the first one listed.

Do you see that?

A. Yes.

Q. Were you aware of that prior to this?

A. Thiopental should not be given by alternative injection routes. If it is going to be injected, it should be IV, not subcutaneously or intramuscularly.

Q. So, therefore, you need suitable veins for proper administration of thiopental, correct?

A. Or at least one good vein.

Q. And you would agree, wouldn't you, that during injection of thiopental into a peripheral vein, some of the thiopental could be extravasating while at the same time some is going into the vein?

A. That's possible.

Q. And that's certainly happened in clinical practice before, hasn't it?

A. It has.

Q. Now, you testified earlier today regarding the probability that an inmate receiving a three-gram dose of thiopental might be conscious when the other drugs were administered, correct?

A. Yes.

Q. All of those probabilities were predicated on the assumption that the drugs were given in the right dose in the right order into a working IV, correct?

A. Yes.

Q. Those probabilities didn't reflect any possibility that Maryland's lethal injection protocol might be implemented

-- would there be a cause for that?

Or would it be the case that, if the IV site looks good, nothing wrong mechanically, you're not going to have back pressure?

THE WITNESS: Well, one other possibility is probably not that common, but there could be a clot in the catheter even though it's in the blood vessel. So that could make it hard to inject the drug even though the IV catheter is in the right place.

And at that point, what the team should do is go to the alternative back up IV, and use that.

THE COURT: Would it be possible to remove the catheter and clear the clot?

THE WITNESS: It's certainly possible, but if one has a functioning IV on the other side, I think it would be far wiser to just use that.

THE COURT: Good. Thank you.

In your affidavit to Mr. Oakley, and first I assume is it fair to say that when you wrote the affidavit, you were on unaware that it would be produced in discovery?

THE WITNESS: Are you referring to my e-mails?

THE COURT: E-mail, yes, I meant e-mail.

THE WITNESS: Yes. I was unaware that the e-mail was discoverable, and had I known that, I would have written the same scientific terms, I probably would be a little --

have been a little less flip with some of my editorial comments.

THE COURT: So that the affidavit was prepared with a view that it would serve as a document that would be shown to the other side and the Court, but the e-mail was intended for Mr. Oakley and whatever lawyers were assisting him, correct?

THE WITNESS: Yes.

THE COURT: Now, you had mentioned the need to have a plan B in case there were problems, and I believe you testified, and you may even have said in the e-mail in some other states they do have a plan B.

Is that correct?

THE WITNESS: Yes.

THE COURT: And what is the plan B in these other states, if you remember?

THE WITNESS: Well, it depends on the venue, but the typical scenario is that they have a physician who is qualified to put in a large -- not a large IV, a large IV into a large vessel in the neck or the groin. And certainly not all physicians are experienced and qualified do this.

So just having a doctor is not enough. The person should be experienced in doing this, and that should be, in my opinion, available for the situation where an IV cannot be inserted into a peripheral vein in the arm.

THE COURT: Now, there was testimony the other day of an individual whose acronym is contractual team C, I believe, and this person is an EMT/paramedic, my understanding is that there are three levels of emergency para personnel, that he's the highest, which I think is a paramedic.

Does that sound right?

THE WITNESS: Yes, it also varies from state to state but usually paramedic implies higher levels of training than just EMT.

THE COURT: And he said that he has inserted IVs, and I believe he stated that he is certificated, or I could be wrong with, that to put in a line in the jugular vein in the neck.

If he has that experience, and if he has the -- if he's licensed by the State of Maryland to insert a neck line, is that or is it not an inadequate plan B?

THE WITNESS: I think it would be with one caveat. I'm not sure that the state goes all the way toward licensing someone for this particular procedure, but chances are his employer has a credentialing procedure whereby individual tasks are credentialed.

So, for example, if he is able to put in a neck line in the field in a patient who has poor peripheral access, and that's part of his day job, and he does it often

enough to be comfortable, then I think it's reasonable for him to serve as the state's implementer of their backup plan.

THE COURT: Now, I'm testing my recollection of his testimony, but I believe that he testified that he has not done a line in the groin. And I can't remember what the name of that vein is.

THE WITNESS: That would be the femoral vein.

THE COURT: The femoral. Let me ask miss Mullally could he do a groin line?

MS. MULLALLY: No. Honestly, Your Honor, I think you might be confused about two things. He can put an IV in the external jugular.

THE COURT: Right.

MS. MULLALLY: But he cannot put in a central line.

And also the groin line is what we call a central line.

THE COURT: Good. Thank you.

MR. ZUBLER: To clarify, Your Honor I think the internal jugular that would constitute a central line.

THE COURT: Let me write this down.

THE WITNESS: Your Honor, if I could be more specific?

THE COURT: If I could rephrase the question?

THE WITNESS: Okay.

THE COURT: We have an external jugular. We have counsel reminded me that his testimony was that he has put in IVs in the external jugular. He has not put in IVs in the internal jugular, and he has not put IVs in the femoral artery.

So if that's the case, is he then an adequate plan B?

THE WITNESS: Many people do have a good external jugular vein for cannulation. But just to be a purist with regard to the nomenclature, a central line does not depend upon the insertion site. It depends on how long the catheter is and where the tip of it is.

So if I put a line in through the neck, 15 or 20 centimeters gets me to a central location. If I put it in through the groin, for it to be central, it has to be much, much longer, because it needs to be near where the superior and inferior vena cava meet.

Lots of people misuse the term central line all the time. But I'm trying to be a purist here. And so putting a line in the neck, if it's only two inches long, which is a typical IV length, if it goes into the external jugular vein, that is not a central line.

THE COURT: Good. So would a central line be the internal jugular and or the femoral?

THE WITNESS: If they're long enough. You can put

a central line in through the external jugular, but it would have to be 15 to 20 centimeters in length to qualify as being a central line.

THE COURT: So where does the tip of the catheter have to end up in order to have a central line?

THE WITNESS: Near where the superior and inferior vein in a cava meet, which is near the right atrium.

(Pause.)

THE COURT: And when this is done, is the catheter actually thread into the vein itself?

THE WITNESS: It can be.

THE COURT: Well, let's then go back to the concept of adequate backup and adequate plan B. If the credentials of the person who is the backup, this person is a paramedic, he is capable, or he has in the past put an IV into the external jugular, but not the internal jugular and not the femoral artery, or is he an adequate plan B, in your view?

THE WITNESS: I think it's a reasonable plan B, because what you're asking him to do is similar to his daily practice. But also understand that there is no guarantee that he will necessarily get an IV in.

THE COURT: Right.

THE WITNESS: I mean it is possible for him to be able to unable to do so, too. But using the external jugular vein as your next step is logical and reasonable.

THE COURT: Because, as I understand it, plan B is a plan that takes into consideration the fact that you may not be able to access a peripheral vein in the arms or the hand.

So the next step would be to go to the perhaps the external jugular. There are other places one might go, but to be an adequate backup, or plan B, you wouldn't have to have medical personnel needed to do every potential site in the body, correct?

THE WITNESS: That's probably true.

THE COURT: Now, you had mentioned in your testimony that this is the subject of Mr. Evans' drug use or the fact that a person is an intravenous drug abuser, and if I'm remembering your testimony correctly, I believe that you said that if a person had in the past been an intravenous drug user, and then stopped while in prison, and could not get drugs while in prison, that over after the passage of time, that his veins would then be suitable, or you would expect them to be suitable for the administration of an IV, is that right, or wrong?

THE WITNESS: No. Actually, what I meant to describe was IV drug abusers typically have significant tolerance to the drugs that they abuse, and they need larger doses than normal people.

And what I believe I was being asked at the time

was would that affect the dose needed to render a person unconscious?

Now, the passage of time in a former drug abuser who's no longer abusing, that level of tolerance they had as an abuser will wane. And my understanding is the typical person is on death row for years and presumably does not have access to illicit drugs. I expect them to have no inherent tolerance due to the use of illicit drugs they had used years ago.

If somebody has mangled their veins due to years of IV drug abuse, that usually does not heal well. So I think that's a completely separate issue.

THE COURT: Good. So that you are not giving an opinion that the veins ravaged by drug use regenerate over time, you were talking about something completely different?

THE WITNESS: That is correct. My experience is that veins ravaged by heavy drug abuse typically do not heal.

THE COURT: Now, you were asked a question about whether the Maryland's lethal injection protocol could be improved. And I would assume that -- and I'm looking to see what you meant because of this factor.

I would assume that -- well, the gold standard is the clinical administration of anesthesia in a hospital administered by a board certified anesthesiologist who's sitting right next to the patient, and applying all of his

medical arts to keep the patient in that plane not too low, not too high, correct?

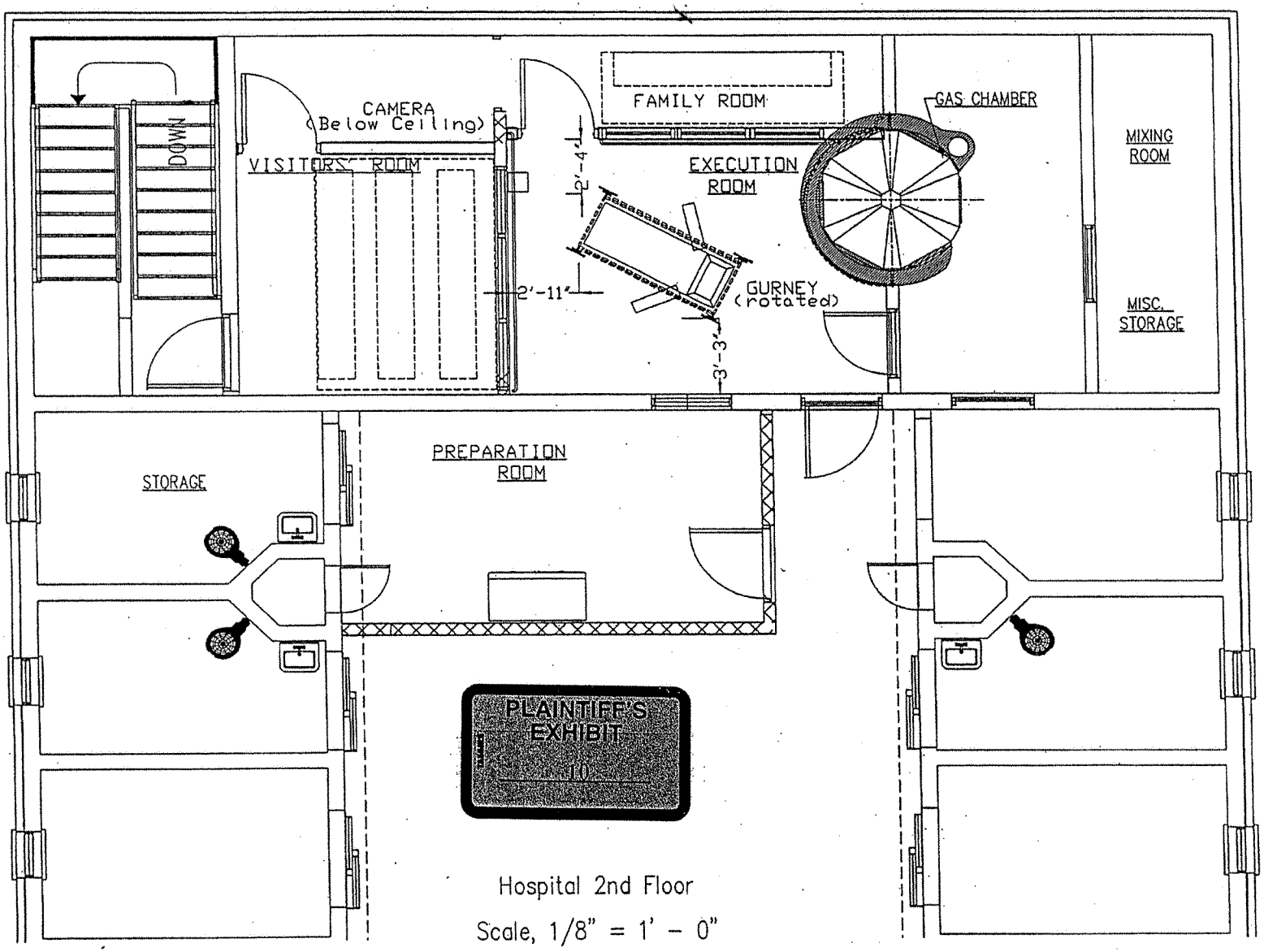
THE WITNESS: In general, that is true.

THE COURT: So the closer one moved a lethal injection protocol to the gold standard, the better it is, the less chance there is that something go awry, you would agree with that, wouldn't you?

THE WITNESS: But, in general, but I would not think that it would be a good idea to try to adjust the doses so that the person was just enough asleep. I think it's a good idea that the protocol mandates what is a huge overdose in essentially everybody.

THE COURT: Right. But there are other parts of the protocol that have been faulted, such as the anesthesiologist is not the person administering the anesthesia, is not an anesthesiologist, is not a nurse anesthetist, is not sitting eyeball to eyeball with the inmate, that there is sort of a long skein of tubing stretching from one room to another, lack of lighting and other points.

I did not take your testimony -- and please correct me if I'm wrong -- to mean that the protocol could not be improved. I took your to my testimony to mean that looking at the protocol that you believe that it was adequate to deliver the drugs; is that right?



Hospital 2nd Floor

Scale, 1/8" = 1' – 0"

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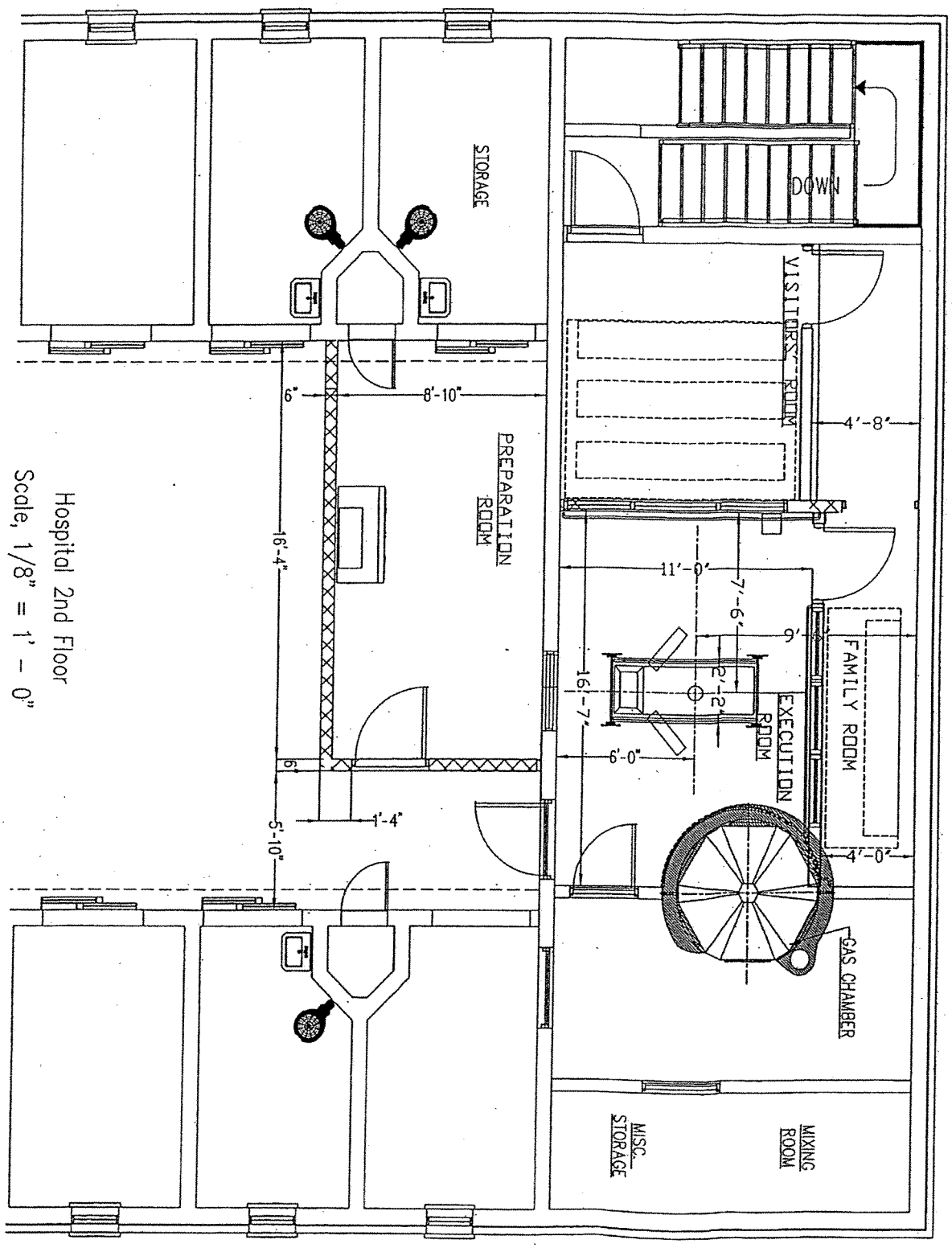

Hospital 2nd Floor
Scale, 1/8" = 1' - 0"

EXHIBIT F

IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF NORTH CAROLINA
WESTERN DIVISION

FILE NUMBER 5:06-CT-3018-H

WILLIE BROWN, JR. **Plaintiff,** **v.** **THEODIS BECK, Secretary, North Carolina Department of Correction, and MARVIN POLK, Warden, Central Prison, and UNKNOWN EXECUTIONERS,** **Defendants.**	**AFFIDAVIT OF SCOTT D. KELLEY, M.D.**

Affiant, being first duly cautioned and sworn, states as follows:

1. I am a physician licensed by the Commonwealth of Massachusetts and the State of California. I am certified by the American Board of Anesthesiology, with a Special Qualification in Pain Management. I practice anesthesiology at Brigham and Women's Hospital, a Harvard Medical School Affiliate.

2. In 1980 I received a Bachelor of Science degree (with Honors) and a Master of Science degree from Stanford University. I earned my Doctor of Medicine at University of California, San Francisco in 1984. I completed a residency in anesthesia at University of California, San Francisco.

3. Until moving to Massachusetts in 2000, I served as Associate Professor of Clinical Anesthesia and Director of Liver Transplant Anesthesia at University of California, San Francisco.

4. I am a member of American Society of Anesthesiologists, Society for Ambulatory Anesthesia, International Society of Anesthetic Pharmacology and International Anesthesia Research Society.

5. I am Vice President and Medical Director of Aspect Medical Systems, Inc. ("Aspect"), which is located in Newton, Massachusetts. As described in its Mission Statement, Aspect develops technology to:

> "help[] medical professionals deliver the best possible patient care through innovative brain monitoring technologies."

6. Aspect's products incorporate Bispectral Index ("BIS") technology, which provides doctors and nurses with reliable information about the effects that drugs have on the brain and affirm the clinical decisions made by those doctors and nurses in providing patient care.

7. I have extensive knowledge of BIS systems, and I have authored a clinical handbook for anesthesia professionals on BIS monitoring. I frequently lecture on BIS systems, and I have personally trained hundreds of healthcare professionals in the use of BIS monitoring. I also regularly use BIS systems in my own anesthesiology practice.

8. I have reviewed Defendants' Notice and Response to 7 April 2006 Order, Second Affidavit of Marvin L. Polk, and Third Affidavit of Mark Dershwitz, M.D., Ph.D. submitted in this action on April 12, 2006. From those documents I have learned that the Defendants have modified the execution protocol and propose to utilize a BIS monitor during the execution of the Plaintiff Willie Brown, Jr.

9. Earlier this week, representatives of the Defendants purchased that BIS monitor, an Aspect A-2000 EEG Monitor with BIS, by calling Aspect's 1-800 telephone sales number. In response to standard inquiries from Aspect's telephone sales team, those representatives of the

Defendants indicated that they were purchasing the Aspect BIS monitor for use in operating rooms, mobile operating rooms and intensive care units and never indicated in any way that they intended to use it in connection with the execution of the Plaintiff.

10. The Operating Manual for the Aspect A-2000 EEG Monitor with BIS, which was shipped to the Defendants with the product, clearly indicates that:

> "the BIS monitor is intended for use on . . . patients within a hospital or medical facility providing patient care. . . ."

11. While the Defendant Polk notes in his Second Affidavit, ¶ 3, that "the BIS monitor has been approved by the Food and Drug Administration ("FDA") for multiple purposes," he does not indicate that the intended uses submitted to the FDA by Aspect and the "cleared indications" by the FDA have always related solely to the provision of therapeutic care to patients by trained doctors and nurses.

12. The BIS monitors have never been tested or submitted for approval or approved by the FDA for the use intended by the Defendants.

13. Furthermore, as the Operating Manual notes, the BIS monitor:

> "is intended for use under the direct supervision of a licensed healthcare practitioner or by personnel trained in its proper use."

14. The Operating Manual warns of potential false readings which:

> "may be caused by poor skin contact . . . , muscle activity or rigidity, head and body motion, sustained eye movements, improper sensor placement and unusual or excessive electrical interference."

These or other factors may lead to "inappropriate BIS values."

15. For this reason, medical professionals must interpret the data provided by the BIS monitor:

> "Clinical judgment should always be used when interpreting the BIS in conjunction with other available clinical signs. Reliance on

> the BIS alone for intraoperative anesthesia management is not recommended."

16. The Defendants' Notice and Response indicates that:

> "Defendants currently employ a Cardiac Monitor Defibrillator . . . [which will be] located in the observation room adjacent to the execution chamber . . . [along with a] licensed registered nurse and . . . licensed physician. . . ."

17. The Defendants do not specify the precise location of the BIS monitor, indicating only that it "will be located such that it can be observed and its values read by both medical professionals."

18. Both Aspect and standard anesthesia treatises recommend that medical professionals integrate the BIS monitoring with their own direct observation of the patient (along with traditional monitoring – i.e., blood pressure, heart rate, respiratory rate, etc.).

19. The Defendants' Notice and Response and the supporting Affidavits indicate that the "licensed registered nurse" and the "licensed physician" will be at a remote location from the Plaintiff and may be relying excessively -- or even solely – on the BIS monitor readings rather than clinical observations.

20. The Defendants also do not indicate whether the licensed registered nurse and licensed physician have received appropriate training in the use of the BIS monitor.

21. Aspect has not taken any position on death penalty issues. Rather, Aspect's concern is that its product may be employed by the Defendants in a manner that is entirely contrary to its intended use, its cleared indications for use and its Operating Manual. Aspect is further concerned that the BIS monitor may be operated by persons lacking appropriate training.

22. Had I known the Defendants' true purpose in purchasing the Aspect A-2000 EEG Monitor with BIS, I would have interceded to prevent the sale.

23. Further, the Affiant sayeth not

This, the 14th day of April 2006.

Scott D. Kelley, M.D.

This the 14th day of April 2006, sworn to and subscribed before me.

Notary Public

My Commission Expires: 11-4-2012