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Attorneys For Plaintiff MICHAEL ANGELO MORALES

IN THE UNITED STATES DISTRICT COURT

FOR THE NORTHERN DISTRICT OF CALIFORNIA

MICHAEL ANGELO MORALES, Plaintiff, v. RODERICK Q. HICKMAN, Secretary of the California Department of Corrections; STEVEN ORNOSKI, Warden, San Quentin State Prison, San Quentin, CA; and DOES 1-50, Defendants.	Case No. **DECLARATION OF DR. MARK HEATH**

Dr. Mark Heath, under penalty of perjury, both deposes and states as follows:

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, teaching residents, fellows and medical students, and managing a neuroscience laboratory. As a result of my training and research I am familiar and proficient with 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.

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 Maryland, Georgia, Tennessee, Kentucky, Virginia, and Louisiana in the following actions: *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.), and before state district court judge Ramona Emanuel in Shreveport, Louisiana in February 2003. 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, Missouri, and by the United States Supreme Court.

3. During court proceedings, I have heard testimony from prison wardens who are responsible for conducting executions by lethal injection. 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 and the other neuromuscular blockers in Pennsylvania's lethal injection protocol. My research regarding lethal injection has involved both extensive conversations with recognized experts in the field of lethal injection, toxicology, and forensic pathology and the exchange of personal correspondence with the individuals responsible for introducing lethal injection as a method of execution in Oklahoma (the first state to formulate the procedure) and in the United States. I have also appeared as an expert before this Court, by way of declaration, in the case of Kevin Cooper, which was first heard in this Court approximately two years ago, and in the case of Donald J. Beardslee which was first heard approximately one year ago.

4. 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.

5. I have been asked by counsel for Michael Angelo Morales to review the procedures concerning lethal injection currently in place in California to determine the likelihood that those lethal injection procedures create medically unacceptable risks of inflicting excruciating pain and suffering on inmates while the lethal injection is administered. I hold all opinions expressed in this Declaration to a reasonable degree of medical certainty, except as specifically noted at the end of paragraph 35, where I make a speculative comment.

6. I have reviewed what the California Attorney General has identified as "a complete copy of the redacted version of San Quentin Operational Procedure No. 770," bearing a revised date of June 13, 2003 ("Procedure No. 770"), which is attached as Exhibit A to Mr. Morales's Motion for Temporary Restraining Order.

7. In addition, I have reviewed the execution logs for Donald Beardslee, Keith Daniel Williams, William Bonin, Jaturun Siripongs, and Manuel Babbit (attached hereto as Exhibit 2). I have also reviewed the Declaration of Margo Rocconi, Esq., who witnessed the execution at San Quentin of Stephen Anderson. That Declaration is attached hereto as Exhibit 3. I have reviewed the

exhibits contained in the case of *Kevin Cooper v. Woodford*, No. C 04 436 JF, including the February 3, 2004 Declaration of Dr. Mark Dershwitz, attached hereto as Exhibit 4. I have also reviewed the materials that were submitted in connection with *Beardslee v. Woodford*, No. 5:04-cv-5381 (JF). I have also reviewed 16 Cal. Code Regs. § 2039, which pertains to the training for those performing euthanasia on animals, as well as statutes pertaining to euthanasia of animals from the states of: Florida, Georgia, Maine, Maryland, Massachusetts, New Jersey, New York, Oklahoma, Tennessee, Texas, Connecticut, Delaware, Illinois, Kansas, Kentucky, Louisiana, Missouri, Rhode Island and South Carolina. I have also reviewed the 2000 Report of the Panel on Euthanasia of the American Veterinary Medical Association, attached hereto as Exhibit 5, the American Society of Anesthesiologist's Practice Advisory for Intraoperative Awareness and Brain Function Monitoring, attached hereto as Exhibit 6.

8. Based upon my review of this material and my knowledge of and experience in the field of anesthesiology, I have formed several conclusions with respect to the protocol of the California Department of Corrections ("CDC") for carrying out lethal injections. These conclusions arise both from the details disclosed in the materials I have reviewed and from medically relevant, logical inferences drawn from the omission of details in those materials (e.g., details regarding the training of the personnel involved; details of all of the medical equipment used; and details of the precise methods by which the personnel involved use the equipment to carry out an execution by lethal injection).

A. CDC's Lethal Injection Protocol

9. CDC's lethal injection protocol calls for the administration of 5 grams of sodium thiopental, 100 milligrams of pancuronium bromide and 100 milligrams of potassium chloride. Broadly speaking, the sodium thiopental is intended to serve as an anesthetic, rendering the inmate unconscious for the duration of the execution. Five grams of sodium thiopental is a massive, and potentially lethal, dose. The pancuronium bromide paralyzes the inmate's voluntary muscles,

including those of his chest and diaphragm. Pancuronium is not an anesthetic or sedative drug, and it does not affect consciousness. Potassium chloride is a salt solution that, when administered in high concentrations, induces cardiac arrest.

10. Although the successful delivery into the circulation of 5 grams of sodium thiopental and 100 milligrams of pancuronium into the circulation would be lethal, it is important to understand that the lethality of sodium thiopental and pancuronium is due to respiratory arrest, which takes several minutes to ensue and does not typically occur prior to the administration of potassium. In the execution sequence, before death is caused by respiratory arrest from sodium thiopental and pancuronium, death is caused by cardiac arrest caused by potassium. I base this opinion, that the potassium and not the pancuronium or sodium thiopental is responsible for the death of prisoners during lethal injection, on the following:

A) Review of records from EKGs from lethal injection procedures conducted in other states, including California. During lethal injection, cardiac activity consistent with generating perfusion persists through the administration of sodium thiopental and pancuronium and only stops after potassium has been administered. The relatively sudden cessation of organized EKG activity is not consistent with a cessation of circulation due to administration of sodium thiopental and/or pancuronium and is consistent with cessation of circulation after the administration of a large dose of potassium chloride.

B) Statements by Dr. Mark Dershwitz. Dr. Mark Dershwitz, who has often served as an expert for various States in lethal injection challenges, has in his affidavits made statements such as, "...during an execution by lethal injection, circulation is slowed immediately by the administration of sodium thiopental, and circulation is stopped completely by the administration of potassium chloride..." *See* Affidavit of Mark Dershwitz dated September 27, 2004, at p. 9, *Perkins v. Polk, et. al*, No. 5:04-CT-643-BO, attached hereto as Exhibit 7. While I agree with Dr. Dershwitz that the successful delivery into the circulation

of large doses of sodium thiopental will slow the circulation, slowing of the circulation is a common consequence of the induction of general anesthesia and does not cause death. I also agree with Dr. Dershwitz that EKG and execution log evidence from executions by lethal injection suggests that circulation is completely stopped by the administration of potassium. For circulation to be completely stopped by potassium, some circulation must be present prior to the administration of potassium. Therefore it is logical and necessary to infer that some or possibly all prisoners are alive until the potassium has been administered and has traveled via the circulation to the heart.

C) Properties of Sodium Thiopental and Pancuronium. Sodium thiopental and pancuronium exert their effects by interacting with molecular targets in the nervous system and on muscle cells in a manner that induces unconsciousness and stops breathing. Sodium thiopental and pancuronium, unlike other chemicals such as cyanide, do not kill cells or tissues, and are useful to clinicians precisely because they do not kill or harm cells or tissues. The reason that sodium thiopental and pancuronium can cause death is that they cause the prisoner to stop breathing. Failure to breathe will result in brain damage, brain death, and cardiac arrest as the level of oxygen in the blood declines over time. These processes take a varying amount of time, depending on many factors. Physicians generally use four minutes of not breathing as the approximate benchmark time after which irreversible brain damage from lack of oxygen occurs, and death typically occurs some number of minutes after the onset of brain damage. It is worth noting, however, that this general figure of four minutes is often used in the context of cardiac arrest, in which there is no circulation of blood through the brain. If some level of blood circulation persists, it is very likely that brain damage and brain death would take longer than four minutes.

In the context of lethal injection, sodium thiopental and pancuronium, if successfully delivered into the circulation in large doses, would indeed each be lethal, because they would stop the

inmate's breathing. However, as described above, in execution by lethal injection as practiced by California and other states the administration of potassium and death precede any cardiac arrest that would be caused by sodium thiopental and pancuronium.

11. Intravenous injection of concentrated potassium chloride solution causes excruciating pain. The vessel walls of veins are richly supplied with sensory nerve fibers that are highly sensitive to potassium ions. The intravenous administration of concentrated potassium in doses intended to cause death therefore would be extraordinarily painful. Defendants' selection of potassium chloride to cause cardiac arrest needlessly increases the risk that a prisoner will experience excruciating pain prior to execution. There exist, however, alternative chemicals that do not activate the nerves in the vessel walls of the veins in the way that potassium chloride does. Despite the fact that the statute authorizing lethal injection in California does not specify or require the use of potassium, *see* Cal. Penal Code §3604(a), defendants have failed to choose a chemical that would cause death in a painless manner.

12. Thus, the CDC has exercised its statutory discretion to select the means of causing death by choosing a medication (potassium chloride) that causes extreme pain upon administration, instead of selecting available, equally effective yet essentially painless medications for stopping the heart. In so doing, the CDC has taken on 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.

13. The provision of anesthesia has become a mandatory standard of care whenever a patient is to be subjected to a painful procedure. Throughout the civilized world, the United States, and California, whenever a patient is required to undergo a painful procedure, it is the standard of care to provide some form of anesthesia. Circumstances arise in which prisoners in California require surgery, and in many instances the surgery requires the provision of general anesthesia. In these circumstances general anesthesia is provided, and it is provided by an individual with specific

training and qualifications in the field of anesthesiology. It is critical to understand that the great majority of physicians and nurses and other health care professionals do not possess the requisite training, skills, experience, and credentials to provide general anesthesia. It would be unconscionable to forcibly subject any person, including a prisoner in California, to a planned and anticipated highly painful procedure without first providing an appropriate anesthetic, 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.

14. As a living person who is about to be subjected to the excruciating pain of potassium injection, it is imperative that all prisoners undergoing lethal injection be provided with adequate anesthesia. This imperative is of the same order as the imperative to provide adequate anesthesia for any California prisoner requiring general anesthesia (or any type of anesthesia) before 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.

B. Failure to Adhere to a Medical Standard of Care in Administering Anesthesia

15. It is my opinion to a reasonable degree of medical certainty that the lethal injection procedures selected for use in California and used elsewhere subject the prisoner to an increased and unnecessary risk of experiencing excruciating pain in the course of execution. Because of the potential for an excruciating death created by the use of potassium chloride, it is necessary to induce and maintain an appropriate and deep plane of anesthesia. The circumstances and environment under which anesthesia is to be induced and maintained according to Procedure No. 770 create, needlessly,

a significant risk that inmates will suffer the pain that accompanies the injection of potassium chloride.

16. Presumably because of the excruciating pain evoked by potassium, lethal injection protocols like Procedure No. 770 plan for the provision of general anesthesia by the inclusion of sodium thiopental. When successfully delivered into the circulation in sufficient quantities, sodium 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 sodium thiopental would result in a failure to achieve adequate anesthetic depth and thus failure to block the excruciating pain of potassium administration.

16. Defendants' procedures do not comply with the medical standard of care for inducing and maintaining anesthesia prior to and during a painful procedure. Likewise, Defendants' procedures are not compliant with the guidelines set forth by the American Veterinary Medical Association for the euthanasia of animals. Further, Defendants have made insufficient preparation for the real possibility, encountered in many other jurisdictions, and planned for in those jurisdictions, that peripheral IV access cannot be successfully established.

1. The Dangers of Using Sodium Thiopental as an Anesthetic

17. A major concern I have based on what I know about CDC's lethal injection protocol relates to the use of sodium thiopental. Sodium thiopental is an ultrashort-acting barbiturate with a relatively short shelf life in liquid form. Sodium thiopental is distributed in powder form to increase its shelf life; it must be mixed into a liquid solution by trained personnel before it can be injected.

18. When anesthesiologists use sodium 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 sodium 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.

19. The benefits of sodium thiopental in the operating room engender serious risks in the execution chamber. Based on the information I have available to me concerning CDC's execution protocol, the five gram dose of sodium thiopental is apparently administered in a single injection from a single syringe. Although the full five grams of sodium thiopental, if properly administered into the prisoner's bloodstream, would be more than sufficient to cause unconsciousness and, eventually, death, if no resuscitation efforts were made, my research into executions by lethal injection strongly indicates that executions have occurred where the full dose of sodium thiopental was not fully and properly administered. If an inmate does not receive the full dose of sodium thiopental because of errors or problems in administering the drug, the inmate might not be rendered unconscious and unable to feel pain, or alternatively might, because of the short-acting nature of sodium thiopental, regain consciousness during the execution.

20. Thus, the concerns raised in this affidavit apply regardless of the size of the dose of sodium thiopental that is prescribed under the protocol. The level of anesthesia, if any, achieved in each individual inmate depends on the amount that is successfully administered, although other factors such as the inmate's weight and sensitivity/resistance to barbiturates are also important. Many foreseeable situations exist in which human or technical errors could result in the failure to successfully administer the intended dose. Procedure No. 770 both fosters these potential problems and fails to provide adequate instruction for preventing or rectifying these situations, and it does these things needlessly and without legitimate reason. Examples of problems that could prevent proper administration of sodium thiopental include, but are not limited to, the following:

a) Errors in Preparation. Sodium 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.

b) Error in Labeling of Syringes. Procedure No. 770 requires that the syringes of chemicals be prepared in reverse order, so that the potassium chloride syringe are loaded first and are labeled "3." Then the pancuronium bromide syringes are created and labeled "2," and finally the sodium thiopental syringes are prepared and are labeled "1." Confusion in creating the syringes could lead to mislabeling, and because the syringes are labeled only with numbers, such a mistake could not be detected and corrected later in the process. Use of numbers or other codes instead of drug names is unacceptable medical practice, and the inclusion of such coding in CDC's lethal injection protocol bespeaks a lack of regard for basic tenets of medical practice and safety.

c) Error in Selecting the Correct Syringe during the sequence of administration.

d) Error in Correctly Injecting the Drug into the Intravenous Line. The "three-way stopcock" used in the California execution protocol as one of the two alternate methods for delivering the drugs may be turned in the wrong direction, resulting in a retrograde injection of the drug into the IV fluid bag rather than into the inmate. The design of three-way stopcocks is counterintuitive to many individuals, and the error of retrograde injection is widespread in clinical practice. Even seasoned professionals are known to make this error, and the probability of this error occurring is greatly increased in the hands of inexperienced practitioners.

e) The IV Tubing May Leak. An "IV setup" consists of multiple components that are assembled by hand prior to use. If, as dictated by Procedure No. 770, the personnel who are injecting the drugs are not at the bedside but are instead in a different room or part of the room, multiple IV extension sets need to be inserted between the inmate and the

administration site. Any of these connections may loosen and leak. In clinical practice, it is important 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.

f) Incorrect Insertion of the Catheter. If the catheter is not properly placed in a vein, the sodium 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 by the individual who is performing the injection so as to permit correlation between visual observation and tactile feedback from the plunger of the syringe.

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.

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.

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 Administer Flush Solutions Between Injections of Drugs. Solutions of paralytic agents such as pancuronium cause sodium thiopental to precipitate out of solution on contact, thereby interfering with the delivery of the drug to the inmate and to the central nervous system.

l) Failure to Properly Loosen or Remove the Tourniquet 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 sodium thiopental to render and maintain the inmate in a state of unconsciousness.

m) 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 sodium 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.

2. The Need for Adequate Training in Administering Anesthesia

21. Because of these foreseeable problems in administering anesthesia, in California 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. This is because the administration of anesthetic care is complex and risky, and can only be safely performed by individuals who have completed the extensive requisite training to permit them to provide anesthesia services. Failure to properly administer a general anesthetic not only creates a high risk of medical complications including death and brain damage, but also is recognized to engender the risk of inadequate anesthesia, resulting in the awakening of patients during surgery, a dreaded complication known as "intraoperative awareness." The risks of intraoperative awareness are so grave that, in October 2005, the American Society of Anesthesiologists published a new practice advisory on the subject of intraoperative awareness. If the individual providing anesthesia care is inadequately trained or experienced, the risk of these complications is enormously increased. In California 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.

22. In my opinion, individuals providing general anesthesia in the San Quentin State Prison should not be held to a different or lower standard than is set forth for individuals providing general anesthesia in any other setting in California. Specifically, the individuals providing general anesthesia within San Quentin prison 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 San Quentin prison (or anywhere else in California).

23. CDC's execution protocol fails to specify whether the injection team has any training in administering anesthesia, or, if personnel are given training, what that training might be. See Procedure No. 770 at 39 ("The angiocath shall be inserted into a usable vein by a person qualified,

trained, or otherwise authorized by law to initiate such a procedure."). 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.

3. Procedure No. 770's Failure to Account for Foreseeable Problems in Anesthesia Administration

24. In addition to lacking any policy on the training necessary to perform a lethal injection, Procedure No. 770 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, Procedure No. 770 prevents any type of effective monitoring of the inmate's condition or whether he is anesthetized and unconscious. After the IV lines are inserted into the inmate but before the administration of the sodium thiopental, the execution chamber is closed and the prisoner is left alone in the chamber for the duration of the execution. Procedure No. 770 dictates that all prison personnel will be in a separate room, separated from the execution chamber by a window. 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

sodium thiopental is properly flowing into the inmate and that he is properly anesthetized prior to the administration of the pancuronium and potassium.

25. In my opinion, having a properly trained and credentialed individual examine the inmate after the administration of the sodium thiopental (but prior to the administration of pancuronium) to verify that the inmate is completely unconscious would substantially mitigate the danger that the inmate will suffer excruciating pain during his execution. As discussed later in this affidavit, this is the standard of care, and in many states the law, that is set forth for dogs and cats and other household pets when they subjected to euthanasia by potassium injection. Yet Procedure No. 770 does not provide for such verification, and indeed actively prevents the injection team from determining whether or not the inmate remains conscious by requiring that all of the drugs must be administered remotely, from another room.

26. By requiring that the drugs be administered remotely, Procedure No. 770 necessitates the use of multiple 72-inch extension sets of IV tubing. This unnecessarily increases the risk of leakage and/or pinching of the tubes, and therefore creates a greater risk that the inmate will not be properly sedated. Any reasonable standard of care would require a system to be in place to ensure that the prisoner is properly anesthetized.

27. Procedure No. 770 provides no specifications regarding the timing of the administration of the drugs, thereby compounding the risks described in this Declaration. This concern is greatly amplified by the use of an ultrashort-acting barbiturate and is borne out by a review of the execution records from San Quentin. In each of the executions, the time between administrations of the three drugs varied for no apparent reason. The lack of a defined schedule for the administration of the three drugs increases the risk that the sedative effect of the sodium thiopental will wear off, should the inmate not receive the full dose.

28. California's lethal injection protocol does not account for procedures designed to ensure the proper preparation of the drugs used. I have not seen details regarding the credentials,

certification, experience, or proficiency of the personnel who will be responsible for the mixing of the sodium thiopental from powder form, or for the drawing up of the drugs into the syringes. Preparation of drugs, particularly for intravenous use, is a technical task requiring significant training in pharmaceutical concepts and calculations. It is my opinion based on my review of lethal execution procedures in states that have disclosed more detailed information than what I have seen about California's procedures, that there exist many risks associated with drug preparation that, if not properly accounted for, further elevate the risk that the drug will not be properly administered and the inmate will consciously experience excruciating pain during the lethal injection procedures.

29. One of the two alternative methods of injection allowed by Procedure No. 770 dictates that "the lip of the neoprene diaphragm on the "Y" injection site shall be rolled back so that it can easily be removed for insertion of syringe tips instead of a needle." Although Procedure No. 770 does not articulate what type of "Y" site equipment is being used so I am unable to specify if this procedure is likely to cause a disruption in the intravenous flow of drugs, I am unaware of any such medically approved use of this equipment, and would not alter the site myself in such a fashion. Normal medical practice is to insert the needle or needle-less injection device through the diaphragm, thereby assuring a tight and adequate connection. This departure from standard practice is not explained, nor is it clear how this deviation was developed, or why.

30. The altering of established medical procedures without adequate medical review and research, by untrained personnel, causes great concern about the structure of the lethal injection protocol and its medical legitimacy. There is no indication of how Procedure No. 770 was developed, who was consulted, what procedures were considered and why. The protocol may be something the Warden developed alone, or in consultation with other corrections personnel, some of whom may or may not have any medical training, or any specialized knowledge of anesthetic literature and practice. Appropriate mechanisms for medical review, and standardization of the implementation and amendment process, are critical features in any medical protocol so that the

medical professionals and the public can be assured that proper and humane procedures are in place and being followed. Indeed, in other states, physicians and other medical personnel play a role in ensuring that any protocol is consistent with basic medical standards of care and humaneness. Otherwise, the process is subject and prone to ad hoc administration and error, if not gross negligence, or worse, an alteration of the process so as to inflict as much agony as possible. With lethal injection, such concerns are highly elevated.

31. Procedure No. 770 unnecessarily calls for a saline solution to be administered between the pancuronium bromide and the potassium chloride. I do not see a medical purpose for this to be included in the procedure, and question whether it is necessary to achieve the goal of a humane execution. Moreover, it can create a risk of critical errors including medication errors caused by syringe "mix-ups."

32. There are no procedures contained within Procedure No. 770 for the resuscitation of the inmate once the sodium thiopental is administered. This would foreclose the possibility of altering the course of an execution in the event of legal relief. Any time up until the potassium chloride is administered, the prisoner could be readily resuscitated given the appropriately trained personnel and routine resuscitation medication and equipment. If this were to occur after the potassium chloride was administered, resuscitation would be more challenging but still possible. Resuscitation would therefore require equipment close-by, and properly credentialed personnel, neither of which are specified in Procedure No. 770.

33. The information available to me about CDC's lethal injection execution protocol contains no reference to plans for dealing with the foreseeable circumstance wherein peripheral intravenous access cannot be obtained in the arm or leg. Based on my medical training and experience, and based on my research into lethal injection procedures and practices, it is my opinion to a reasonable degree of medical certainty that any reliable, humane lethal injection procedure must account for the foreseeable circumstance of a condemned inmate having physical characteristics that

prevent intravenous access from being obtained by a needle piercing the skin and entering a superficial vein suitable for the reliable delivery of drugs. There have been multiple lethal injections in which this problem has arisen from a variety of circumstances. Some of these circumstances could be due to conditions including obesity, corticosteroid treatment, history of intravenous drug use, history of undergoing chemotherapy. Additionally, some people happen to have veins that are too small or deep to permit peripheral access. It is often not possible to anticipate difficult intravenous access situations, and there are multiple examples of executions in which the "IV team" struggled to obtain peripheral IV access and eventually abandoned the effort. Procedure No. 770 is deficient in its failure to plan for the foreseeable possibility that peripheral IV access can not be obtained.

34. In this setting, state lethal injection protocols typically specify the use of a "cut-down" procedure to access a vein adequate for the reliable infusion of the lethal drugs. No equipment or supplies for performing a cut-down procedure are listed in the California lethal injection protocol, nor is there information regarding the training, experience, expertise, credentials, certification, or proficiency of the personnel who would perform such a "cut down" procedure. In this regard, CDC's lethal injection protocol is deficient in comparison to those of other states that I have reviewed. This complicated medical procedure requires equipment and skill that are not accounted for in Procedure No. 770. 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 other states have at times required the use of a central intravenous line. The defendants have not, to my knowledge, released information about the need for central intravenous access during prior executions, and therefore it is not possible to make any assessment about whether the necessary safeguards have been set in place to ensure that the procedure is reasonably humane.

35. This concern over medically deficient IV placement was demonstrated in three of the California executions for which records and other information are available. Most recently, during the execution of Stanley "Tookie" Williams, the injection team took 12 minutes to insert the IV lines. The first line was placed quickly but spurted blood, and the staff struggled for 11 minutes to insert the second line, having so much difficulty that Williams asked whether they were "doing that right." *See The Execution of Stanley Tookie Williams,* SFGate.com (Dec. 14, 2005), attached hereto as Exhibit 8. The difficulty of the challenge presented to the IV team is evidenced by the comment that "By 12:10 a.m., the medical tech's lips were tight and white and sweat was pooling on her forehead as she probed Williams' arm." Similarly, the execution log of Donald Beardslee's execution indicates that the second IV line was inserted with "difficulty," and the time entries indicate that it took 12 minutes to insert the second line, which is consistent with encountering problems in inserting the IV. When it proceeds smoothly, placement of a peripheral IV should, in my experience, take on the order of two minutes or less. In the execution of William Bonin, it took the staff assigned anywhere between 18 and 27 minutes to fashion the IV lines (the records are unclear as to this point). This is an unusually long period of time for an experienced and properly trained professional. In the execution of Stephen Anderson on January 29, 2002, one of the persons who attempted to secure an IV was unable to do so without causing significant bleeding and the need to remove his gloves. Again, this indicates that the process is a difficult one and that it is necessary that the persons doing it are properly trained and experienced. As is widely recognized in the medical community, administration of intravenous medications and the management of intravenous systems are complex endeavors. While speculative and not evidence-based, it is my opinion that it is likely that IV placement is rendered more difficult in the context of executions because the inmates are often in a very anxious status, which causes the release of epinephrine (adrenalin) and norepinephrine, thereby causing constriction (narrowing) of blood vessels (including veins). When veins are constricted/narrowed it can be difficult or impossible to insert an IV catheter. This is the best

explanation I can provide for the otherwise unexplained extremely high incidence of difficult or failed peripheral IV placement, in individuals lacking known risk factors for difficult IV access, in Californian and other states during lethal injection.

36. It is my further opinion that to ensure a lethal injection without substantial risks of inflicting severe pain and suffering, there must be proper procedures that are clear and consistent: there must be qualified personnel to ensure that anesthesia has been achieved prior to the administration of pancuronium bromide and potassium chloride, there must be 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 there must be adequate inspection and testing of the equipment and apparatus by qualified personnel. The California Department of Correction's written procedures for implementing lethal injection, to the extent that they have been made available, provide for none of the above.

C. The Use of Pancuronium Bromide

37. Procedure No. 770's use of the drug pancuronium bromide serves no rational or legitimate purpose and compounds the risk that an inmate may suffer excruciating pain during his execution. Pancuronium paralyzes all voluntary muscles, but does not affect sensation, consciousness, cognition, or the ability to feel pain and suffocation. Because the sodium thiopental and potassium chloride would in themselves be sufficient to cause death, and the potassium is administered well before death would result from the pancuronium alone, it is my opinion held to a reasonable degree of medical certainty that there would be no rational place in the protocol for pancuronium as the lethal amount of potassium chloride is administered.

38. Pancuronium bromide is a neuromuscular blocking agent. Its effect is to render the muscles unable to contract but it does not affect the brain or the nerves. It is used in surgery to ensure that there is no movement and that the patient is securely paralyzed so that surgery can be performed without contraction of the muscles. In surgery, pancuronium bromide is not administered

until the patient is adequately anesthetized. The anesthetic drugs must first be administered so that the patient is unconscious and does not feel, see, or perceive the procedure. This can be determined by a trained medical professional, either a physician anesthesiologist or a nurse anesthetist, who provides close and vigilant monitoring of the patient, their vital signs, and various diagnostic indicators of anesthetic depth. Procedure No. 770, to the extent disclosed, fails to provide an assurance that anesthetic depth will be properly assessed prior to the administration of pancuronium bromide.

39. If sodium thiopental is not properly administered in a dose sufficient to cause death or at least the loss of consciousness for the duration of the execution procedure, then it is my opinion held to a reasonable degree of medical certainty that the use of pancuronium places the condemned inmate at risk for consciously experiencing paralysis, suffocation and the excruciating pain of the intravenous injection of high dose potassium chloride.

40. If administered alone, a lethal dose of pancuronium would not immediately cause a condemned inmate to lose consciousness. 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 pancuronium. Rather, the loss of consciousness would be due to suffocation, and 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.

41. Because the administration of a paralyzing dose of pancuronium bromide to a conscious person would necessarily cause excruciating suffering, it would be unconscionable to administer pancuronium without first anesthetizing the inmate.

42. Based on the information available to me, it is my opinion held to a reasonable degree of medical certainty that California's lethal injection protocol creates an unacceptable risk that the

inmate will not be anesthetized to the point of being unconscious and unaware of pain for the duration of the execution procedure. If the inmate is not first successfully anesthetized, then it is my opinion to a reasonable degree of medical certainty that the pancuronium will paralyze all voluntary muscles and mask external, physical indications of the excruciating pain being experienced by the inmate during the process of suffocating (caused by the pancuronium) and having a cardiac arrest (caused by the potassium chloride).

43. It is my understanding that CDC's execution protocol requires the presence of media witnesses to the execution, and permits the presence of witnesses chosen by the inmate and chosen by the victim's surviving family members. It is my opinion based on a reasonable degree of medical certainty that pancuronium, when properly and successfully administered, effectively nullifies the ability of witnesses to discern whether or not the condemned prisoner is experiencing a peaceful or agonizing death. Regardless of the experience of the condemned prisoner, whether he or she is deeply unconscious or experiencing the excruciation of suffocation, paralysis, and potassium injection, he or she will appear to witnesses to be serene and peaceful due to the relaxation and immobilization of the facial and other skeletal muscles. The use of pancuronium, in my opinion, therefore prevents the press from fulfilling its essential function of informing the citizens, officials, and courts of California about whether execution by lethal injection is conducted in San Quentin Prisons in a manner that is constitutionally compliant and humane.

44. I agree with the statement of the CDC that the doses of sodium thiopental and potassium chloride are lethal doses. Therefore, it is unnecessary to administer pancuronium bromide in the course of an execution when it is quickly followed by a lethal dose of potassium chloride. It serves no legitimate purpose and only places a chemical veil on the process that prevents an adequate assessment of whether or not the condemned is suffering in agony, and greatly increases the risks that such agony will ensue. Removal of pancuronium from the protocol would eliminate the risk of conscious paralysis from occurring. It would also eliminate the risk that an inhumane execution

would appear humane to witnesses. Finally, removal of pancuronium would vastly reduce the possibility that the citizens, officials, and courts of California could be inadvertently misled by media reports describing a peaceful-appearing execution when in fact the prisoner could be experiencing excruciating suffering.

D. Consequences of Improper Anesthesia Administration

45. The risk of improper anesthesia administration has been realized in at least one, and possibly three California executions. The description of the execution of Stephen Anderson set forth in the Rocconi Declaration suggests that the administration in the bloodstream of five grams of sodium thiopental did not have the desired effect of sedating Mr. Anderson sufficiently, for reasons that cannot be identified without further information. The "normal" or "typical" reaction to sodium thiopental administration, as commonly seen in the operating room setting, is that the patient's eyelids will drop and close, they may yawn or draw one or two deep breaths, they may exhale visibly so that the cheeks puff out, and then they become motionless. The Rocconi Declaration describes Mr. Anderson's chest and stomach as heaving for more than 30 seconds, which does not comport with a successful administration of a large dose of sodium thiopental. The intermittent and irregular heaving of the chest is not compatible with the profound depression of the central nervous system that is the intent of the sodium thiopental administration. The apparent labored respiratory activity strongly suggests that significant central nervous system activity persisted, and indeed is consistent with (although does not prove with certainty) the appearance of a person who was struggling against the development of paralysis induced by pancuronium.

46. The administration of a second dose of pancuronium, as indicated in the execution log of the Bonin execution of February 23, 1996, is a source of great concern. The initial dose of pancuronium would be expected to paralyze an inmate for several hours. Administration of additional pancuronium was presumably performed because of some perceived problem or failure of the first round of drugs, perhaps a concern that the inmate was not anesthetized. If so, it is difficult to

understand why additional pancuronium was administered, because pancuronium is not an anesthetic drug and it would not address this concern. I am aware that the protocols of other states such as Arizona and Georgia provide for a backup dose of sodium thiopental, which is not part of Procedure No. 770. The administration of redundant and inappropriate doses of pancuronium raises enormous concerns about the discipline, logic, medical judgment, and rigor that was applied to the conduct of this execution.

47. The execution of Manuel Babbit also raises grave concerns about whether he was properly sedated. Although I have not seen any witness accounts of the execution, a review of his execution log shows that his heart rate maintained a steady rate of between 95 and 96 beats per minute a full seven minutes after the sodium thiopental was administered to him. If the full five gram dose of sodium thiopental was properly administered, it is my expectation that there would be significant hemodynamic consequences including a change of heart rate during this time period. Such changes in heart rate occurred with the executions of Keith Daniel Williams, Jaturun Siripongs, and William Bonin in California, according to the logs that I have reviewed. Moreover, the log indicates that Mr. Babbit had spasmodic movements of the upper chest after the pancuronium bromide was administered, similar to what was noted during the Stephen Anderson execution, again raising the concern that Mr. Babbit did not properly receive the full five grams of sodium thiopental and raises the possibility that he was conscious during the administration of the pancuronium bromide.

E. Procedure No. 770 Falls Below the Minimum Standards Mandated for Veterinary Euthanasia

48. The injection protocol employed by CDC is strongly discouraged by the American Veterinary Medical Association (AVMA) and prohibited by law from being used on animals in 19 states. Specifically, the 2000 Report of the Panel on Euthanasia of the American Veterinary Medical

Association, at p. 680, states: "A combination of pentobarbital [such as sodium thiopental] with a neuromuscular blocking agent [such as pancuronium bromide] is not an acceptable euthanasia agent."

49. The AVMA Report also states that when potassium chloride is to be used as a euthanasia agent, the animals must be under a surgical plane of anesthesia and the personnel performing the euthanasia must be properly trained to assess the depth of anesthesia. The AVMA panel specifically states that the animal must be in a surgical plane of anesthesia characterized not simply by loss of consciousness, but also by "loss of reflex muscle response and loss of response to noxious stimuli." Additionally, the AVMA recommends that sodium pentobarbital be used as an anesthetic, which is much longer lasting and more stable than sodium thiopental. It is difficult to understand why the CDC would chose, at its discretion, to use potassium to execute prisoners and would then fail to adhere to the basic requirements set forth by the AVMA to ensure that animals do not experience the excruciating pain of potassium injection during euthanasia.

50. The AVMA Report also prohibits any use of neuromuscular blocking agents as euthanizing agents, for precisely the reasons outlined above. Veterinary standards forbid creating the risk that household pets would die while pancuronium masks the type of excruciating pain risked by CDC's execution protocol. The use of pancuronium fails to comport with even the minimum "standard of decency" regarding the euthanasia of household pets. In my medical opinion, based on a reasonable degree of medical certainty, the use of pancuronium in the lethal injection protocol for executing human beings violates standards of decency designed to prevent the infliction of excruciating pain and suffering on human beings.

51. Nineteen states have enacted statutes that, like the AVMA Report, "mandate the exclusive use of a sedative or expressly prohibit the use of a neuromuscular blocking agent in the euthanasia of animals." *See Beardslee v. Woodford*, 395 F.3d 1064, 1070 & n.9 (9th Cir. 2005) (citing state laws). Although California has not yet enacted such a statute, the California Code of Regulations require that personnel who perform euthanasia of animals must be properly trained by

veterinarians or registered veterinary nurses in the procedure. No such requirement exists in Procedure No. 770.

F. Deficiencies in Dr. Dershwitz's Opinions

52. In *Beardslee v. Woodford*, 395 F.3d at 1075, the Ninth Circuit relied in part on the statements of the defendants' expert, Mark Dershwitz, M.D., Ph.D., in characterizing the key issue in that case as whether a 5-gram dose of sodium thiopental would be sufficient to render an inmate unconscious. That characterization misses the point, which is not that the specified quantity of sodium thiopental is inadequate, but rather that there has been a failure to take all reasonable and easily taken steps to ensure that the full intended dose of sodium thiopental will in fact be delivered into the prisoner's circulation. Further, in view of the failure to take all such steps, the particular selection of an ultra-short acting barbiturate and a paralytic agent needlessly exposes the prisoner to an increased risk of being inadequately anesthetized.

53. I have reviewed the affidavits that Dr. Dershwitz has filed in other lethal injection challenges, including *Kevin Cooper v. Woodford*, No. C 04 436 JF, *Perkins v. Polk, et. al*, No. 5:04-CT-643-BO. Those affidavits are attached as Exhibits 4 and 7, respectively. He states that approximately 99.999999999% of the population would be anesthetized by the full dose of sodium thiopental, and that successful delivery into the circulation this dose of sodium thiopental would rapidly render an inmate unconscious, and that unconsciousness would persist well beyond the time that death would occur. Dr. Dershwitz, however, does not provide any calculations for what would occur if an error occurred and an insufficient dose of sodium thiopental were to be delivered. None of his affidavits address the probability of error in the administration of sodium thiopental during the execution process, or the reality that such errors are more likely to occur in the hands of personnel who are not trained anesthesiologists or CRNAs.

Conclusion

54. 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 based on a reasonable degree of medical certainty that, given the apparent absence of a central role for a properly trained medical or veterinary professional in CDC's execution procedure, the chemicals used, the lack of adequately defined roles and procedures, and the failure to properly account for foreseeable risks, the lethal injection procedure California employs 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 for the euthanasia of dogs and cats. It is difficult to understand why the CDC has failed to address these problems and has failed to meet the minimum standards set forth for veterinary euthanasia.

55. In addition, in order to more fully and fairly assess the impact of Procedure No. 770's 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 CDC 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 under the laws of the state of California and the United States of America that the foregoing is true and correct. Executed this 12th day of January, 2006 in New York City, New York.

By: 

Dr. Mark Heath