13 July 2018

Ms. Jolie Harrison, Chief
Permits and Conservation Division
Office of Protected Resources
National Marine Fisheries Service
1315 East-West Highway
Silver Spring, MD 20910-3225

Re: Permit Amendment Application No. 21006
(Linnea Pearson, Ph.D.,
California Polytechnic State University)

Dear Ms. Harrison:

The Marine Mammal Commission (the Commission), in consultation with its Committee of Scientific Advisors on Marine Mammals, has reviewed the above-referenced permit amendment request with regard to the goals, policies, and requirements of the Marine Mammal Protection Act (the MMPA). Dr. Pearson proposes to amend her permit to conduct research on Weddell seals in Antarctica—permit 21006 expires on 1 October 2020. Researchers are authorized to harass, capture, handle, restrain, measure/weigh, sedate, mark, sample, conduct procedures on, and/or attach instruments to up to 10 Weddell seal pups per year[1]. Researchers also are authorized to conduct ground-based surveys and would collect samples from dead seals. The purpose of the research is to (1) determine the thermoregulatory strategies by which Weddell seal pups maintain euthermia in air and in water and (2) examine the development of diving capability as the animals prepare for independent foraging.

Dr. Pearson has requested numerous amendments to her permit (see the application for details). One of the requested amendments included sedating pups in Cohort B[2] with a combination of midazolam and butorphanol[3] at 1-week of age. During last year's activities, Dr. Pearson reported that some of the 1-week old animals in Cohort B were difficult to handle and became agitated and stressed during the procedures. Dr. Pearson also clarified that the researchers tried using midazolam alone for the first 1-week old pup in Cohort A[4], but the drug didn't result in any level of sedation. Consequently, they then used midazolam and butorphanol for all pups at all sampling time points,

[1] Researchers also are authorized for up to two pup mortalities per year, not to exceed three mortalities during the permit duration.
[2] Including measuring morphometrics including ultrasound, collecting thermal images, conducting in-air metabolic measurements, and attaching a TDR.
[3] Sedation would not be used on animals during metabolic measurements.
[4] Including a full physiology workup administering sedation, measuring morphometrics including ultrasound, collecting thermal images, administering tritiated water and Evan's blue dye, collecting serial blood samples, collecting muscle and blubber biopsies, and attaching a TDR.

including the remaining three 1-week old pups in Cohort A. Permit 21006[5] currently authorizes Dr. Pearson to use only midazolam for 1-week old pups in Cohort A and midazolam and butorphanol only for 3-week old pups in Cohort B[6]. The original research protocols approved by Dr. Pearson's Institutional Care and Use Committee (IACUC) also stipulated only midazolam was to be used for 1-week old pups in Cohort A and midazolam and butorphanol was to be used only for 3-week old pups in Cohort B[5].

The researchers, including the veterinarian, did not abide by the underlying application regarding what drugs were stipulated to be used on various ages of pups or whether sedation was even authorized to be used on some ages of pups. Specifically, sedating 1-week old pups in Cohort A with midazolam and butorphanol and sedating 5-week old and 7- to 8-week old pups in Cohort B was not authorized by the original permit[7]. Dr. Pearson also did not request in the permit amendment application[8] to sedate 1-week old pups in Cohort A and 5-week old and 7- to 8-week old pups in Cohort B with the combination of midazolam and butorphanol. In addition, justification to use midazolam and butorphanol in 1-week old pups in Cohort B, which was the only request in the amendment application, was inconsistent and unsubstantiated. In one place, sedation was needed to facilitate collecting morphometrics, in another it was to collect blood, and in yet another it was to attach instruments. Compliance and consistency issues aside, there are some underlying questions regarding the necessity of using both midazolam and butorphanol.

Dr. Pearson originally proposed to use midazolam by itself because it should induce sufficient sedation and muscle relaxation without causing deep sedation or loss of awareness, which will help ensure continued vocalizations with the mother to reduce the chance of maternal abandonment for pups 1-week of age. In an earlier version of the amendment application, Dr. Pearson noted that midazolam by itself is sufficient for conducting procedures that last 30 to 40 minutes. Midazolam also is used routinely in pinnipeds to reduce stress; whereas, butorphanol is an opioid analgesic used for short-acting pain relief. The procedures that are authorized to be conducted on pups in Cohort B are much less extensive and invasive than those in Cohort A. In addition, animals have a greater chance of exhibiting respiratory distress on butorphanol than midazolam or another benzodiazepine. Although the drugs can be reversed, such young pups are more prone to possible negative effects than older pups, juveniles, or adults. Further, it is easier to reverse negative effects from a single family of drugs than two different families of drugs. Thus, it may have been more prudent to propose to add intravenous diazepam, which is commonly used in phocids, rather than butorphanol to midazolam. The Commission contends that researchers should be sedating pups only with the types and quantities of drugs absolutely necessary to conduct the authorized procedures successfully and safely and is not convinced butorphanol is necessary for pups in Cohort B. Based on all these issues, the Commission recommends that NMFS deny Dr. Pearson's request to amend the sedation protocol from what was originally authorized under permit 21006, which would in turn require denial of Dr. Pearson's request to collect blood samples[9] from

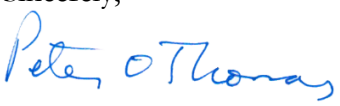
[5] See the original application and longitudinal sampling scheme document.
[6] Permit 21006 does not authorize sedation for 1-week old, 5-week old, or 7 to 8-week old pups in Cohort B.
[7] Or approved by the IACUC.
[8] Or accurately clarify the drug combinations to be used at the various age classes in the revised research protocols that were submitted and approved by her IACUC. The revised research protocols are internally inconsistent, with the original sedation plan in one portion of the protocols and the plan to use midazolam and butorphanol at all four ages classes for both Cohorts A and B in another portion.
[9] Based on requesting to collect blood samples only under sedation.

sedated pups in Cohort B at 1-, 5-, and 7- to 8-weeks of age.

Furthermore, the Commission recommends that NMFS advise Dr. Pearson that, prior to submitting another amendment application for changes to her sedation plan, she (1) review the current permit and submit an amendment request based on what is currently authorized, (2) discuss with experienced veterinarians appropriate/alternative drug options based on the activities to be conducted and age classes of pups, and (3) stipulate in any amendment request what drugs are to be used at the four specific age classes for both Cohort A and B pups, including justification for what drugs are necessary for which activities. The Commission additionally recommends that NMFS advise Dr. Pearson that all research protocols reviewed and approved by her IACUC must match those procedures authorized under her research permit prior to conducting any procedures. Thus, if Dr. Pearson plans to submit another amendment application, she must revise her research protocols yet again, ensure the protocols are internally consistent, submit those revisions to her IACUC for review, and obtain approval before the upcoming field season. Dr. Pearson and all affiliated personnel must abide by the procedures specified in the permit application or amendment application, otherwise they again will be in violation of permit 21006 as issued under section 104(c) of the MMPA.

Please contact me if you have any questions regarding the Commission's recommendations.

Sincerely,



Peter O. Thomas, Ph.D.,
Executive Director

cc: Dr. Barbara Kohn, Animal and Plant Health Inspection Service
Dr. Nature McGinn, National Science Foundation