MEMORANDUM

**Alaska Department of Environmental Conservation  
Division of Environmental Health  
Pesticide Control Program**

DATE: August 30, 2011

TO: File

FROM: Karin Hendrickson

Environmental Program Manager, Pesticide Program

SUBJECT: Analysis of Rat Island Bird Deaths and Possible Pesticide Violations

**BACKGROUND**

On July 3, 2008, the DEC Pesticide Program issued a pesticide use permit to the United States Fish and Wildlife Service (USFWS) to apply rodenticide on Rat Island, in the Alaska Maritime National Wildlife Refuge in the central Aleutian Islands. Specifically, the permit allowed the USFWS to aerially broadcast pellets of the restricted use pesticide Brodifacoum-25W Conservation, EPA Registration Number 56228-36, with active ingredient Brodifacoum, to the entire land area of Rat Island and adjacent vegetated islets, an area of approximately 2,753 hectares. The permit application, which describes the details of the application including type, quantity, and rate of pesticide application, is incorporated into the permit, and is therefore enforceable.

The permit stipulations included a prohibition against using pesticides in a manner not specified by the label instructions and required the applicant to adhere to all requirements specified under the product label. Use of a pesticide inconsistent with labeling instructions is also prohibited under Title 18, Chapter 90, Section 020(5) of the Alaska Administrative Code [18 AAC 90.020(5)].

The application took place between September 29, 2008 and October 5, 2008. The first follow-up visit to the island after application took place on May 26, 2009. At that time, USFWS determined that the pesticide application appeared to have successfully eradicated rats on the island. However, the follow-up visit uncovered a large number of deaths to non-target birds as a result of the pesticide application. Over the course of the visit and at least one additional follow-up visit, carcasses were found from a total of 320 glaucus-winged gulls, 46 bald eagles, and 54 various other birds. It is assumed that these numbers underreport the actual percentage of deaths, since the follow-up visit occurred seven months after the application of the bait and deaths that occurred closer to the bait application were likely scavenged or deteriorated due to weather. In addition, it is presumed that not all birds would have died on the island.

Necropsy and residue analysis was conducted on 70 bird carcasses. For those where a cause of death could be determined, results confirmed that Brodifacoum poisoning was the cause of death.

Following the unexpectedly large number of non-target bird deaths, the Ornithological Council prepared an independent report, The Rat Island Rat Eradication Project: A Critical Evaluation of Nontarget Mortality, dated December 2010 (Ornithological Council Report). This report states that, “…*the primary reason for nontarget mortality was the abandonment of the planned bait rates and application strategy*” (Page 3).

The USFWS also developed an internal investigation report, dated, October 2009 (Internal Investigation). This report made many similar conclusions to those in the Ornithological Council Report, although the data in the two reports did not correspond precisely.

Application rates, schedules, and other findings in the Ornithological Council Report conflict with data reported in the Rat Island Habitat Restoration Project: Operational Report, submitted August 11, 2009, theOperational Report Addendum, submitted December 15, 2009, the Internal Investigation, and other reports submitted to DEC.

The Ornithological Council Report has been determined to contain the most accurate analysis and description of application rates, amounts, and schedule. However interpretation of this report has been somewhat problematic at times.

**NON-TARGET MORTALITY PRECAUTIONS OUTLINED IN THE APPLICATION FOR PERMIT TO DEC**

The permit application describes specific precautions and/or circumstances that would limit non-target deaths DEC considered these precautions/circumstances an extremely important part of the evaluation of the permit. These items included:

* Seasonal timing - rodenticide was applied in fall, after the breeding season and peak population of birds on the islands.
* Seasonal timing – it was anticipated that in October, Bald Eagles would travel to other islands for salmon feeding and therefore would be less likely to feed on dead rats.
* Quantity of bait – the amount of rodenticide applied was calculated to ensure that the majority would be consumed by rats within four days of application, limiting the amount of time bait is available for non-target species.
* Biodegradable bait – unconsumed rodenticide would degrade quickly and no longer be available for consumption.
* Bait size – pellets would be too large for smaller birds to easily consume, and too small to interest larger birds.
* Grain-based bait - Bait pellet would be composed of compressed grain, which is attractive only to granivorous birds. There are limited numbers of these birds in the treatment area.
* Bait color – pellets would be dyed blue, which is thought to make the bait less attractive to birds.
* Rats die underground – carcasses of rats would be unlikely to be available for scavenging, as previous studies showed 88% of rats died underground. (Environmental Assessment, page 53).
* Rat carcass removal – any carcasses found “during and immediately after baiting” were to be removed”, as required by the product label and mentioned in the Finding of No Significant Impact, page 1.

(From Permit Application pages 4 & 31, and the permit attachment Environmental Assessment).

The decision document related to issuance of this permit considered the possibility of non-target bird deaths due to both primary and secondary exposure. Although mortality of some individual birds was anticipated, the long-term impacts were expected to be beneficial to bird populations on the island.

“*Overall long‑term impact on bird populations is expected to be beneficial, as the removal of rats will increase abundance and diversity of breeding birds. In the short-term, some species of birds could be negatively impacted. However, the negative impacts are expected to be short lived, and population numbers are expected to quickly recover*.”

Bird mortality due to direct ingestion was also expected to be small. Bird mortality due to scavenging of dead rats was expected to be limited, as most rats were expected to die underground in burrows, and rat carcasses on the surface were to be collected, and removed.

**EQUIPMENT CALIBRATION**

**Equipment calibration reported in Internal Investigation**

The Internal Investigation reports that the dribble bucket and directional deflector used to apply the pesticide were either never calibrated, or were not calibrated correctly (per testimony by Steve Ebber, Attachment 5, page 8).

**Equipment calibration required by DEC permit**

The DEC pesticide use permit stipulates that pesticides must be applied using properly calibrated equipment (stipulation 3), and that a directional deflector must be used near water bodies (stipulation 4).

**Conclusion**

If the analysis in the Internal Investigation is correct, and calibration was not conducted adequately, then violations of the pesticide use permit and 18 AAC 90.020(5), prohibiting the use of a pesticide in a manner that is inconsistent with the conditions of a permit were committed.

**APPLICATION RATES**

**Rates determined in Ornithological Report**

The Ornithological Council Report states that records of application rates are inconsistent and contradictory. Appendix A of the Ornithological Council Report provides a detailed discussion of the various reported rates, and includes a complex chart of the rates and exceedances of allowable limits. The report makes the following conclusions:

* The second application to inland areas of the island exceeded the target rate (rate allowed under the DEC pesticide use permit) by 4.0 kg/ha.
* The second application to the inner perimeter of the island exceeded the target rate (rate allowed under the DEC pesticide use permit) by up to 8.43 kg/ha and exceeded the label rate by up to 5.43 kg/ha.
* The second application to the coastal perimeter exceeded the target rate (rate allowed under the DEC pesticide use permit) by 1.3 kg/ha.
* There was a third application (‘contingency application’) to the inner perimeter of the island which exceeded the label rate by up to 7.9 kg/ha.
* There was also a third application (‘contingency application’) to the coastal area of the island which exceeded the label rate by up to 6.5 kg/ha.

Not having access to all the records reviewed, I cannot verify how the Ornithological Council determined which report was most accurate, how they generated their results, or how they arrived at these conclusions.

**Rates determined in Internal Investigation**

The Internal Investigation also found records of application rates to be inconsistent and contradictory. It states (page 10) that the combined second and third applications to coastal areas totaled 15.36 kg/ha, which exceeds the maximum label rate.

**Allowable rates of bait application from the EPA approved product label**

The product label provides specific allowable application rates. Under federal and state law, these rates may not be exceeded.

The first application should be made, “*at a rate no greater than 16 lbs of bait per acre (18 kg bait/hectare) per application. Make a second broadcast application…at a rate no higher than 8 lbs. of bait per acre (9 kg bait/hectare)*.” (Product Label, page 2)

**Allowable rates of bait application from DEC permit**

The pesticide use permit, based on information in the submitted permit application, was more restrictive than the pesticide product label, specifying lower application rates. These application rates are enforceable under the permit that was issued.

*“The rates of application during the first broadcast will be 12 kg/ha (10.7 lb/acre) on the coast and 6 kg/ha (5.4 lb/acre) inland, and 6 kg/ha (5.4 lb/acre) on the coast and 3 kg/ha (2.7 lb/acre) inland during the second broadcast.”* (Permit Application, page 5).

**Conclusion**

If the analyses made in the Ornithological Council Report and/or Internal Investigation are correct and both label rates and permitted application rates were exceeded, then a violations of federal label requirements, 18 AAC 90.020(5), and the pesticide use permit was committed.

**SCHEDULE OF SECOND APPLICATION**

**Application schedule determined in Ornithological Report**

The Ornithological Council Report states that records of the days when applications were made are inconsistent and contradictory. Table 1 of the Ornithological Council Report provides a comparison of the various records of application location and date, including their review of the helicopter GPS records. The report concludes that “*At most, however, the interval between the first and second application for any particular part of the island was two days…*” (page 23).

Without access to all the records reviewed, verification of how they determined which report was most accurate, and thus arrived at this conclusion is not possible.

**Application schedule determined in Internal Investigation**

The Internal Investigation states that the two applications made in the mountainous regions had a three day pause between the applications, and that applications to other areas had a five day pause between the applications (page 1, page 10).

**Timing of second application allowed by the EPA approved product label**

The product label provides some information about application timing; “*Make a second broadcast application, typically 5 to 7 days after the first application, depending on local weather conditions..*.” (Product label, page 2)

On this product label, the schedule for the second applications appears to be a recommendation, and is not enforceable.

**Timing of second application allowed by DEC permit**

The submitted permit application, which is incorporated into the pesticide use permit, provided a more definite schedule for subsequent applications; “*The second application will begin 5 to 7 days following the first application…”* (Permit Application page 5.) This application schedule is enforceable under the permit that was issued.

**Conclusion**

If either the analysis made in the Ornithological Council Report is correct, and two or fewer days elapsed between the first and second applications, or the Internal Investigation is correct, and only three days elapsed between applications to the mountainous regions, then a permit violation was committed.

**ADDITIONAL (CONTINGENCY) BAITING**

**Additional (contingency) application determined in Ornithological Report**

The Ornithological Council Report states that something close to 30% excess bait was purchased to use for “contingency” applications. The contingency bait was to ensure that enough bait would be available to complete the operation in case bait was damaged or spilled; if additional target areas within the island were identified; and also to treat any skips or gaps where the target application rate was not met, as identified through the GPS tracking system (page 44).

The Ornithological Council Report found that the entire amount of excess contingency bait was distributed in an additional application made immediately after the second application. The excess bait was applied to the entire coastal perimeter and the freshwater drainages through both aerial and hand broadcast. No gaps in bait application were identified that would indicate additional bait was needed to meet target application rates in any areas (page 24).

The Ornithological Council Report points out that since it was made on the same day, the additional application should be considered part of the second application (page 41). Therefore, the combined second application to the coastal areas exceeded the target rate (rate allowed under the DEC pesticide use permit) and the label rate by an additional 7.76 kg/ha.

Without access to all the records reviewed, verification of how they determined application rate exceedances is not possible.

**Additional (contingency) application determined in Internal Investigation**

The Internal Investigation, in consultation with EPA, determined that two applications made on the same day should be considered as a single application. It states that the combined second and third applications to coastal areas totaled 15.36 kg/ha, which exceeds the maximum label rate by 6.36 kg/ha (page 10).

**Additional (contingency) application allowed by the EPA approved product label**

The product label provides specific information about any additional applications after the second application; “*Assess baited areas for signs of residual rodent activity…If rodent activity persists…continue with broadcast baiting, limiting such treatments to areas where active signs of rodents are seen.”* (Product label, page 2)

**Additional (contingency) application allowed by DEC permit**

The pesticide use permit allowed application of no more than 6 kg/ha on coastal areas during the second application. In addition, the permit application specifically states that the project had been planned “*such that no excess rodenticide will be remaining after the completion of operations*.” It goes on to explain that if disposal is required, excess rodenticide would be returned to Island Conservation headquarters in California, and incinerated. (Permit Application page 7).

**Conclusion**

If the analyses made in the Ornithological Council Report and/or the Internal Investigation are correct, and the additional (contingency) applications were made as part of the second application, then exceedances of allowable amounts violated the requirements of the pesticide use permit, federal label requirements, and 18 AAC 90.020(5) by an even greater amount than determined above under “Application Rates”.

**COLLECTION OF RAT CARCASSES TO MINIMIZE SCAVENGING**

**Rat carcass collection activity determined in Internal Investigation**

The Internal Investigation reports that carcass collection was not conducted, and in fact a specific decision not to collect carcasses was made by in advance (per testimony by Stacey Bucklew, Attachment 5, page 13).

**Rat carcass collection activity determined in Ornithological Report**

The Ornithological Council Report specifies the project manager stated that a search for rat carcasses could not be done on Rat Island due to its size and vegetation (page 49). As a result, no rat carcasses were removed from the island to prevent possible scavenging, as is standard practice for Island Conservation.

**Rat carcass collection activity required by the EPA approved product label**

The product label requires the applicator to “monitor the baited area periodically” and dispose of any dead animals.

**Rat carcass collection activity required by DEC permit**

The submitted permit application, which is incorporated into the pesticide use permit, specifically stated that any carcasses found “during and immediately after baiting will be removed” (Finding of No Significant Impact, page 1).

**Conclusion**

If the Ornithological Council Report and/or the Internal Investigation are correct, and no collection of rat carcasses was conducted, then both the label and pesticide use permit were violated.

**RECORDKEEPING**

**Recordkeeping activity determined in Ornithological Report**

The Ornithological Council Report found that records of application rates and schedules were inconsistent and contradictory. This report considered several different sources of information, including the project manager’s spreadsheet, GPS data taken from helicopters, refuge manager’s spreadsheet, the 2008 Final Operational Report, and other sources.

**Recordkeeping activity required by DEC regulation**

18 AAC 90.415(2) establishes requirements for recordkeeping for applicators of restricted use pesticides. These records must include (among other things) date of application, rate of application, and total amount of pesticide applied.

**Conclusion**

If the Ornithological Council Report is correct, and accurate records of pesticide application were not kept, then a violation of 18 AAC 90.415(2) was committed.

**REPORTING**

The DEC pesticide use permit stipulates that a Summary of Treatment Results must be submitted to DEC after the conclusion of the term of the permit. Submitting false data to DEC would be a violation of 18 AAC 90.020(7).

Treatment results were provided in a number of different documents submitted at various times. In an e-mail dated September 22, 2010, Steve Delehanty, Refuge Manager, confirmed that the Rat Island Habitat Restoration Project: Operational Report, submitted August 11, 2009, and theOperational Report Addendum, submitted December 15, 2009 included the required information and were “*the best and official numbers to use associated with the* permit”.

However, the application rates, schedules, and other findings of the Ornithological Council Report conflict with the data provided in the Operational Report and the Operational Report Addendum.

In addition, the Operational Report, submitted to DEC on August 11, 2009, specifically stated, “No observed impacts to birds were detected during or immediately following the first bait broadcast. Specifically, no birds on the island were encountered dead or displayed behavioral symptoms of anti-coagulant poisoning” (page 19). However, DEC was already aware that the follow-up visit in May of that year (prior to submittal of the report) had found non-target bird deaths, and had asked for further clarification at that time.

In addition, the Operational Report also stated (page 19), “in the course of operations, any dead rat carcasses observed above ground following bait application were removed. Given the total size of the island, the area that was searched and cleared of carcasses was limited. We feel secondary exposure through consumption of other species was minimal, as densities of migratory birds were low following the summer breeding season and most rats die below ground.” The Operational Report Addendum, submitted to DEC on December 15, 2009, does note that monitoring for rat and non-target mortality was “very limited”. This explanation does not make clear that essentially no rat carcass collection or non-target mortality monitoring was actually conducted, as was found by the Ornithological Council Report and the Internal Investigation.

**Conclusion**

It is clear that the Operational Report provided inaccurate information about the occurrence of non-target mortality, which is a violation of 18 AAC 90.020(7).

In addition, if the analyses made in the Ornithological Council Report and/or Internal Investigation are correct, and no rat carcass collection was conducted, then the Operational Report provided inaccurate information about carcass collection, which is an additional violation of 18 AAC 90.020(7).

**SUMMARY**

If the information in the Ornithological Council Report and/or Internal Investigation is correct, then the following violations were committed:

* Pesticides were applied in a manner that resulted in significant non-target mortality of gulls, Bald Eagles, and other birds, which is a violation of
  + 18 AAC 90.020(1), prohibiting the use of a pesticide in a manner that endangers animals or the environment, and
  + 18 AAC 90.020(4), which prohibits the use of a pesticide in a faulty, careless, or negligent manner;
* Equipment calibration was not conducted adequately, which is a violation of
  + Stipulation three in the pesticide use permit, requiring the permit holder to apply pesticides using properly calibrated equipment; and
  + 18 AAC 90.020(5), prohibiting the use of a pesticide in a manner that is inconsistent with the conditions of a permit;
* The directional deflector was not functioning adequately, which is a violation of
  + Stipulation four in the pesticide use permit, requiring the permit holder to apply pesticides using a directional deflector near water bodies; and
  + 18 AAC 90.020(5), prohibiting the use of a pesticide in a manner that is inconsistent with the conditions of a permit;
* Application rates allowed by the product label were exceeded, which is a violation of
  + Federal label requirements;
  + 18 AAC 90.020(5), prohibiting the use of a pesticide in a manner that is inconsistent with labeling instructions;
  + Stipulation one of the pesticide use permit, requiring the permit holder to adhere to all requirements specified on the pesticide product label; and
  + a further violation of 18 AAC 90.020(5), which also prohibits the use of a pesticide in a manner that is inconsistent with the conditions of a permit;
* Application rates allowed by the pesticide use permit were exceeded, which is a violation of
  + General requirements of the pesticide use permit, requiring the permit holder to apply pesticides in accordance with the submitted permit application materials; and
  + 18 AAC 90.020(5), which prohibits the use of a pesticide in a manner that is inconsistent with the conditions of a permit;
* The time elapsed between applications was not sufficient, which is a violation of
  + General requirements of the pesticide use permit, requiring the permit holder to apply pesticides in accordance with the submitted permit application materials; and
  + 18 AAC 90.020(5), which prohibits the use of a pesticide in a manner that is inconsistent with the conditions of a permit;
* No attempt was made to collect and remove rat carcasses, which is a violation of
  + Federal label requirements;
  + Stipulation one of the pesticide use permit, requiring the permit holder to adhere to all requirements specified on the pesticide product label;
  + 18 AAC 90.020(5), prohibiting the use of a pesticide in a manner that is inconsistent with labeling instructions; and
  + a further violation of 18 AAC 90.020(5), which also prohibits the use of a pesticide in a manner that is inconsistent with the conditions of a permit;
* Inaccurate records regarding pesticide application were kept, which is a violation of 18 AAC 90.415(2), requiring applicators to keep accurate written records regarding the use of a restricted use pesticide; and
* Inaccurate data regarding pesticide application were reported to DEC, which is a violation of 18 AAC 90.020(7), prohibiting the submission of false, misleading, fraudulent, or incomplete records.