SOUND AGRICULTURAL PRACTICE
Opinion Number 01-4

SUBJECT: Request for an opinion pursuant to Section 308 of the Agriculture and Markets Law as to the soundness of the aerial application of pesticides from a drift and noise perspective by Gill Corn Farms, Inc. in the Town of Hurley, Ulster County.

REQUESTOR: Mr. John H. Gill
President, Gill Corn Farms, Inc.
P.O. Box 225
Hurley, New York 12443

Preliminary Statement

By letter dated November 26, 1999, John H. Gill, President of Gill Corn Farms, Inc., requested that the Department review the soundness of an agricultural practice conducted by the farm. Mr. Gill requested that the Commissioner issue an opinion as to the soundness of the aerial application, from a drift and noise perspective, of pesticides for the protection of crops grown on the farm. A number of the farm's neighbors have expressed concerns about pesticide drift and noise from the plane. The Department has conducted a sound agricultural practice review of the aerial application of pesticides by the Gill farm. On July 26 and August 10, 2000, Matt Brower, Department Agricultural Resource Specialist, visited the Gill Farm to gather information on the aerial application of the pesticides.

Information Considered in Support of the Opinion

1. The Gill Farm is located on Hurley Mountain Road in the Town of Hurley, Ulster County, and consists of a total of approximately 1,600 acres of cropland, which is owned and rented by the farm. The cropland is located in the Towns of Kingston, Hurley and Marbletown and consists of approximately 1,050 acres, which is owned by the Farm and approximately 550 acres, which is rented. According to Mr. Gill, approximately 1,300 acres of sweet corn, 225 acres of grain corn, and 75 acres of mixed vegetables are grown on the farm. According to Department records, the farm is in Ulster County Agricultural District #4, which was recertified on or about February 4, 1999.

2. Mr. Gill indicated that a commercial pesticide applicator (Don Webber and Sons from Livingston, New York) is hired to conduct the aerial application of the insecticides and fungicides to the sweet corn and vegetable crops to control insects and diseases. Mr. Gill stated that the plane is owned and operated by Chuck Webber and that Mr. Webber has been applying the pesticides since the 1996 growing season.

3. Mr. Gill provided the Department with a copy of his pesticide application records for the 1999 and 2000 growing seasons. According to Mr. Gill, the insecticides are used to control a variety of pests in corn, pumpkins, and mixed vegetables including grasshoppers, aphids, corn borers, ear worms, army worms, and cabbage loopers. The fungicides are used on the pumpkins, corn and cole crops for the control of powdery mildew, downy mildew, and early blight.

4. The Gill Farm borders the Esopus Creek. The label for one of the insecticides used by Mr. Gill, *Warrior®*, states that it should not be applied "by air within 150 feet of lakes, reservoirs, rivers, permanent streams, marshes, pot holes, or natural ponds, estuaries and commercial fish ponds." Mr. Brower asked Mr. Gill what measures he takes when applying this insecticide in the vicinity of the Esopus Creek. He explained that he uses *Pounce®*, which has no buffer zone requirement, within the 150 feet area adjacent to the stream and uses *Warrior®* on the rest of the field. None of the other labels for pesticides applied on the Gill farm require a buffer zone.

5. Mr. Gill indicated to Mr. Brower that he generally begins the aerial spraying of pesticides during the last week in June and concludes the spraying in mid to late September. Mr. Gill also indicated that the average spraying interval is once every 5 days, depending on pest pressure. According to Mr. Gill, the spraying begins at first sunlight and takes up to three hours to complete. Mr. Gill also stated that on some occasions it is necessary to spray in the evening before dark. Mr. Gill indicated that the application is done early morning and early evening because that is when the wind is generally the calmest and the risk of drift is reduced.

6. Mr. Gill's spray records indicate that the spraying generally begins at 6:00 a.m. or later. The spraying began nine times before 6:00 a.m. during the 1999 growing season. During the 2000 growing season, the spraying began three times before 6:00 a.m. Below is a summary of the number of days that the aerial application was conducted during the 1999 and 2000 growing seasons:

YEAR	MONTH	NUMBER OF DAYS
1999	June	4
1999	July	10
1999	August	12
1999	September	4
2000	June	3
2000	July	11
2000	August	9
2000	September	3

7. Mr. Gill stated that he has implemented a number of changes to address the noise complaints from the neighbors. According to Mr. Gill, he has purchased a new propeller for the plane, at a cost of $12,000, which has reduced the noise. Mr. Gill stated that he also moved the runway, at a cost of $5,500, as far away from the complainants' homes as possible. According to Mr. Gill, he does not spray on Sunday unless it is absolutely necessary. Mr. Gill's application records indicate that he sprayed on Sunday three times during 1999 and four times during 2000.

8. According to Mr. Gill, he markets his corn as "US Fancy" and the corn must meet strict standards to be sold at market price. If the corn has more than ten percent defect overall, it does not meet the US Fancy grade. Mr. Gill indicated that if his corn does not meet the grade, he either receives a lower price or the buyer rejects the corn. Mr. Gill also indicated that in order to meet the grade, he must control insect and disease damage, as well as bird damage. Mr. Gill stated that since the bird damage is difficult to control, the need for insect and disease control becomes even more important. According to Stephen Biehler, the Department's Food Product Quality Manager, the information provided by Mr. Gill relative to the effects of insect and other damage on the price received for the sweet corn is accurate. Mr. Gill stated that the need for spraying is based on field scouting as well as pest population reports, which are sent to him throughout the growing season by Dr. Richard Straub from the Entomology Department at Cornell University's Hudson Valley Laboratory.

9. Agriculture and Markets Law §308, subdivision 1, paragraph b requires that the Commissioner consider whether an agricultural practice is conducted by a farm owner or operator as part of his or her participation in the Agricultural Environmental Management (AEM) program as set forth in Agriculture and Markets Law Article 11-A. Mr. Gill stated that he is not involved in the AEM program.

10. Mr. Brower discussed with Mr. Gill the alternative of using ground application equipment to address the noise and drift complaints. Mr. Gill indicated that he is able to spray 200 acres per hour using aerial application as compared to 200 acres per day using ground equipment. He stated that if he were to use ground equipment he would need to spray continuously throughout the growing season and would be forced to spray at times during the day when the drift potential is greater. Mr. Gill also stated that because he would be spraying on a continual basis and because it would take him longer to spray each field, the noise impact to the neighbors would be greater. He indicated that he would still have to use aerial application when the fields are too wet for ground application or when insect and disease pressure reach a level at which he can not achieve adequate protection with the ground equipment.

11. Mr. Gill provided the Department with an estimated cost of converting to ground application. Mr. Gill indicated that with aerial application, he is able to have one water supply centrally located because the travel time from the mixing site to each field is minimal with the plane. However, with ground application he would need two sprayers to be able to treat all the fields. He indicated that he would need to

develop two water supplies to reduce the travel time from the mixing site to the fields. According to the information provided, the cost of purchasing the ground application equipment and developing an adequate water supply would be approximately $261,327. Mr. Gill indicated that ground application would increase his annual operating costs by approximately $18,341.

12. On July 26, 2000 Mr. Brower visited the Gill farm to observe the aerial application with Dr. Straub and Tom DeChillo, Pesticide Control Specialist II from the Department of Environmental Conservation Region 3 office. Mr. Brower noted that dense shrubs and trees surrounded most of the fields. At the time of the visit there was no wind, the spray settled immediately into the corn and Mr. Brower did not observe any drift during the spraying. Mr. Brower reported that he stood within 100 feet of an area being sprayed and did not notice any odor or feel any drift contact him. He observed that the pilot did not begin spraying until the plane was over the application area and the spray was turned off before the plane pulled up at the end of the swath. Mr. Brower reported that none of the people present appeared to experience any breathing problems or other health related symptoms from the spraying.

13. At the time of his visit, Mr. Brower talked with the pilot, Chuck Webber, to gather information about the plane and any drift control measures. According to Mr. Webber, the plane is an AT-301A Air Tractor. Mr. Webber stated that the plane has a computer and Global Positioning System on board to control spray rate and coverage. Mr. Webber also stated that he sprays the pesticides at a height of between 5 and 15 feet above the crop. Mr. Webber indicated that the length of the boom is 65% of the length of the wings. According to Mr. Webber, he uses a drift retardant called *Intact*® and uses straight stream nozzles. He also stated that he uses the largest droplet size he can, 500-700 microns, while still getting adequate coverage. Mr. Webber indicated that he dispenses smoke from the plane to check wind speed and direction during spraying and adjusts his spray swath accordingly. Mr. Brower observed that the nozzles were arranged on the boom so they sprayed parallel to the ground. Mr. Webber explained that he tries to finish the spraying as early as possible in the morning, before the wind starts blowing.

14. Mr. Brower visited the site again on August 10, 2000 to observe the spraying unannounced to Mr. Gill and Mr. Webber. The spraying began at approximately 7:00 a.m. There was no wind and Mr. Brower did not observe any drift. Mr. Brower observed the spraying from several different locations in the vicinity of the fields being sprayed. Mr. Brower reported that the material settled immediately into the corn. He did not observe any odor from the spraying and he did not observe any material settling onto his vehicle. Mr. Brower reported being, at times, approximately 200 feet from the application area and that he did not feel any drift contact him, nor did he experience any breathing problems or other health related symptoms from the spraying.

15. While at the site on August 10, Mr. Brower stopped at the New York State Police Station on Route 209 in Hurley to gather information on the spraying. The station is surrounded by fields that are treated by the aerial application method. Mr. Brower talked to Officer Robert Nuzzo about his observations relative to the spraying. Officer Nuzzo stated that the spray sinks immediately into the corn and he has never observed any drift from the spraying. Officer Nuzzo also stated that he has never noticed any odor from the spraying and that he has not ever observed any spray material on the vehicles parked at the station.

16. While observing the aerial application during his two visits to the site, Mr. Brower could clearly hear the plane when it passed over head. However, because the fields are distributed over a large area and because it takes the pilot very little time to treat an area, Mr. Brower could only hear the plane for a short period of time at a given location.

17. Mr. Brower reviewed the application instructions on the labels for the pesticides applied by the Gill farm, using aerial application, in 1999 and 2000. It appears that, with the exception of one spray application, the rates and methods used for the pesticide applications during these two years, as stated by Mr. Gill and as shown in his records, are consistent with the instructions on the labels. On one occasion, *Pounce®* was applied to the mixed vegetables at a rate of 6.0 ounces/acre. The label rate for broccoli, Chinese broccoli, brussel sprouts, cauliflower, cavalo broccoli, and kohlrabi is 2-4 ounces/acre. The rate for other vegetables is 2 to 8 ounces or 4 to 8 ounces depending on the insects being controlled. Mr. Gill stated to Mr. Brower that broccoli, brussel sprouts, and cauliflower were probably being grown with the mixed vegetables and consequently, were probably treated with the higher application rate. Mr. Gill also stated that this was an oversight on his part.

18. Mr. Gill stated to Mr. Brower that he has no record or memory of specific complaints during 1999 and 2000. Mr. Gill also stated that he does not recall observing any drift incidents in 1999 or 2000.

19. Mr. Brower mailed a letter, dated February 1, 2000, to 139 landowners adjacent to the Gill Farm notifying them of the agricultural practice review and inviting them to comment on the practice. The Department received 32 responses from the adjacent landowners and other residents in the area. Mr. Brower also reviewed complaints submitted to the New York State Attorney General's office. Mr. Brower contacted all of the respondents, as well as the individuals named by the Attorney General's office and some additional individuals, by phone to gather additional information concerning the aerial spraying. On April 11, 2000, Mr. Brower and Dr. Robert Somers, Chief of the Department's Agricultural Protection Unit, held a meeting with concerned residents from the Hurley area at the Hurley Town Hall.

20. After reviewing all the comments, Mr. Brower reported that unusual odor is the most often reported complaint from the spraying, with 24 people stating that they noticed an unusual odor during or after the spraying in 1999 and 23 in 2000. Noise from the plane was identified by 12 people as being an important concern during 1999 and 2000. Eight people said that they observed film or residue on objects outside their homes in 1999 and 8 in 2000. Five people said they observed drift from the spraying during 1999 and 5 people said they did during 2000. Two of these people provided more detailed information concerning spray drift across NYS Route 209 during 2000. None of these individuals provided the Department with any documentary or other corroborating evidence which substantiates their observations. In 1999, one person said he reported a drift incident to DEC and one person said he reported a drift incident to Mr. Gill. In 2000, one person said she reported a drift incident to DEC. DEC has informed the Department that neither their central nor regional offices have a record of these complaints.

21. Five people reported experiencing specific physical health impacts from the spraying during 1999; none of the people sought medical treatment. One person reported experiencing headaches, nausea, throat irritation, respiratory problems and jitters from one spraying incident in 2000. This person sought medical advice but did not speak directly with a physician. According to the complainant, she was told that nothing could be done unless she was experiencing vomiting or diarrhea. One person initially stated that he believed a family member's cancer was a direct result of the spraying. During a follow-up telephone discussion, that person stated he did discuss the pesticide application with the doctors and he no longer believes that the cancer is caused by the pesticides. Three people discussed the link between the pesticide application and health effects with their physician. One person stated that their physician indicated that it was not possible to determine whether their health effects were related to the pesticide application; one person indicated that he had a general discussion about the pesticide application with his physician; and the third person indicated that testing would be done to determine if her daughter's tumor was related to the pesticide application. None of these people indicated what date they discussed the pesticide application with their physicians. Nine people indicated that they have not experienced drift, noise and/or odor problems as a result of the practice.

22. On August 18, 2000, Mr. Brower contacted Dr. Ivan Kirk, an Agricultural Engineer from the USDA Southern Plains Agricultural Research Center in College Station Texas. Dr. Kirk conducts research related to aerial application. Mr. Brower described the drift control measures that are being used by Gill Farms to Dr. Kirk. Dr. Kirk stated that the boom length, nozzle alignment, and droplet size are consistent with the best management practices for reducing spray drift from aerial application. In a letter to the Department, dated August 18, 2000, Dr. Kirk stated that based upon the information Mr. Brower provided about Gill Farms' aerial application, it seems the applicator is doing everything possible to keep spray drift to a minimum. Dr. Kirk noted that an application height over the crop canopy higher than 5-8 feet will increase the potential for drift and the spray should not be turned on "until application

height is reached at the start of a swath" and should be turned off before the plane pulls up at the end of a swath. During a subsequent phone conversation with Dr. Kirk, he stated that spray application height is influenced by site specific conditions, such as safety issues. Obstacles in or near the application area may cause the pilot to have to vary application height. Dr. Kirk stated that an application height of between 5-15 feet is acceptable if drift is not a problem. As indicated in paragraphs 12, 13 23, 24and 42 of the Opinion the aerial pesticide application at Gill Farms is generally consistent with Dr. Kirk's recommendations.

23. Mr. Brower contacted John Ludwig from the Federal Aviation Regional office to discuss the aerial application at the Gill Farm. Mr. Ludwig stated that he has looked at the equipment and spraying several times and has never cited the pilot for any violation of the Federal Aviation regulations. Mr. Ludwig stated that he visited the site on August 24, 2000 to observe the aerial application. According to Mr. Ludwig, he observed the spraying operation and the pilot was flying very safely over the houses. Mr. Ludwig stated that the spray was turned on after the plane lowered into the field and was turned off before rising out of the field. He also indicated that the spray dropped into the crop and he did not observe any drift. Mr. Ludwig also stated that he was standing within 200 feet of the spraying and did not notice any odor or experience any health problems from the spraying.

24. On September 14, 2000 the Department received a letter from James F. Leach, a Research Scientist III with the Bureau of Toxic Substance Assessment at the New York State Department of Health, describing a visit to the Gill farm on September 6, 2000 with Ed Horn, Jim Ridenour and Charlotte Bethoney also from the NYS Department of Health. According to Mr. Leach, the NYS Health Department staff was joined by Maureen Serafini, Tom DeChillo and Paul Clemente from the DEC and Alan Dumas from the Ulster County Department of Health. According to Mr. Leach, the group observed the plane treating a field along NYS Route 209. Mr. Leach stated that "the pilot appeared to leave a buffer zone of corn on the outside of the field before turning the sprayers on or off to apply the pesticides." Mr. Leach also noted that "the pesticide appeared to drop rapidly to the corn foliage and no visible spray drift was noted." According to Mr. Leach's letter, "A very slight odor was noted within the treated area immediately after application. The natural odor from the corn was stronger than that of the pesticide."

25. On January 5, 2001 Mr. Brower contacted Alan Dumas from the Ulster County Health Department to gather information concerning complaints filed with his office. According to Mr. Dumas, his office did not receive any formal complaints during 1999 and 2000. Mr. Dumas said that any calls they received concerning the spraying would be referred to DEC. According to DEC staff, the central and regional offices do not have a record of any complaint.

26. On January 9, 2001 Mr. Brower contacted Gunther Fishgold to gather details concerning his involvement in the aerial spraying issue. Mr. Fishgold stated that he is

a pest management consultant and he was asked to speak at some public meetings in Hurley. Mr. Fishgold stated that he is not familiar with the farm practices at the Gill Farm specifically. According to Mr. Fishgold, it is his opinion that aerial spraying in general is not necessary. However, Mr. Fishgold acknowledged that aerial spraying is more economical than ground spraying.

27. On January 10, 2001 Mr. Brower contacted Dr. Richard McNally at Benedictine Hospital in Kingston, New York, concerning a pesticide study that Dr. McNally is working on. Dr. McNally stated that blood and tissue samples from women with breast cancer are being tested for various pesticides. On January 30, 2001, Dr. McNally informed Mr. Brower that he received the test results for 3 people from Hurley and 2 people from West Hurley. According to Dr. McNally, "One person from West Hurley had elevated levels of DDT, DDE, Heptachlor, Epoxide, and g-Chlordane. One person from Hurley had mildly elevated levels of DDT, DDE, a-HCH and borderline levels of a variety of others." Dr. McNally stated that "Overall, I think there is nothing striking as far as tissue or blood levels. Please keep in mind we find DDE in every person and DDT in the vast majority."

28. In a letter to the Department dated January 10, 2001, Dr. Richard Straub, Professor of Entomology at Cornell University's Hudson Valley Laboratory in Highland, New York, summarized his comments and observations concerning the aerial spraying at the Gill Farm. In his letter, Dr. Straub states that it is his opinion that, because of the monitoring equipment that is used for the aerial spraying, "the applications in question are considerably more precise than are other types of application to sweet corn, or other agricultural crops." Dr. Straub also stated that the pesticides used by Mr. Gill are consistent with Cornell Cooperative Extension guidelines. Dr. Straub stated that in his opinion "Mr. Gill is using the most efficacious and cost-effective insecticides available to him." According to Dr. Straub, ground application of pesticides is adequate for many growers. However, aerial application "is certainly optimum for the scope of his (Gill's) operation."

29. Dr. Straub indicated in his letter that he had reviewed the cost comparison for ground application and aerial application as prepared by Mr. Gill. He indicated that the comparison "appears to be an honest and straightforward analysis of the relative costs between aerial and ground application." Dr. Straub also indicated that aerial application is "logical and cost-effective." According to Dr. Straub, Mr. Gill has been working with him to reduce the number of pesticide applications and still achieve adequate protection. Dr. Straub stated in his letter that he observed the spraying three times during 2000 (one visit was a planned demonstration) and he did not see any off site drift or notice any odor. Dr. Straub also stated that he did not experience any health effects during any of the visits. According to Dr. Straub, "the odor associated with most pesticides is a deliberate addition by the manufacturer to discourage accidental ingestion. Detection of odor is generally the detection of volatiles, which do not carry pesticides."

30. On January 17, 2001 Mr. Brower talked to Gary Bellows, Supervisor for the Town of Hurley. Mr. Bellows stated that the Town does not have a noise ordinance. Mr. Bellows stated that he received one complaint relative to the Gill Farm in 1999. He said that the complainant informed him that they had pesticide drift come in contact with them while they were swimming in their pool. Mr. Bellows stated that he refers all complaints to the Department of Agriculture and Markets. The Department of Agriculture and Markets did not receive this 1999 complaint or any others based on referrals by Mr. Bellows. According to Mr. Bellows, his house is adjacent to some of the fields. He stated that he has not observed any drift himself. However, on some occasions from his property he has smelled the material during or after the spraying.

31. In a memo to the Department dated February 16, 2001, Tom DeChillo, Pesticide Compliance Inspector II with DEC Region 3 in New Paltz, New York, provided information on DEC's involvement with the Gill Farm aerial spraying practice. According to Mr. DeChillo, DEC reviewed the 1999 and 2000 pesticide application records provided by Mr. Gill and "found no inconsistencies with label directions" and "all applications appeared to have been made in compliance with DEC Regulations relating to the use of pesticides." According to Mr. DeChillo, no drift test sampling was performed by DEC at or around the Gill Farm during 1999. Mr. DeChillo stated that drift testing performed by his Department "during the 2000 spray season showed no violations of DEC pesticide regulations." Mr. DeChillo also stated that neither John Gill nor Chuck Webber was cited for any violation of DEC pesticide regulations during the 1999 or 2000 spray season. Mr. DeChillo indicated that DEC did not visit the Gill Farm during the 1999 season; however, several visits were made to the Gill Farm and adjacent properties during the 2000 spray season. Mr. DeChillo stated that DEC personnel did not observe any spray drift; however, they did "detect some odor from the spraying." Mr. DeChillo also stated that none of the DEC staff experienced adverse health effects as a result of the spraying. According to Mr. DeChillo, concern had been expressed to DEC that farm workers were being sprayed while in the fields and that "pesticides may be drifting on the migrant camp." Mr. DeChillo stated that he "spoke with migrant workers living at Gill Farm and a representative from Rural Opportunities who visits the farm." According to Mr. DeChillo, "there has never been a reported incident of a worker being sprayed." Mr. DeChillo stated that he took a wipe sample at the migrant camp immediately after pesticide application and no residue was detected.

32. According to information provided by DEC, they conducted drift testing, at the request of the New York State Attorney General's office, near fields treated by Mr. Gill with aerial spraying. DEC took seventeen surface residue wipe samples on August 10th, 11th and 14th, 2000 from various surfaces at distances ranging from 30 to 1000 feet from fields treated with aerial pesticide application. According to Mr. Gill's application records, he applied permethrin, propiconazole, and lambda-cyhalothrin on August 10, 2000 and permethrin, spinosad, and lambda-cyhalothrin on August 14, 2000. The samples were analyzed for three chemicals used by Mr. Gill and fourteen of the samples showed no detectable levels. All the samples tested negative for

permethrin. Two samples tested positive for propiconazole and a third sample tested positive for propiconazole and lambda-cyhalothrin.

33. The DEC evaluated the results of its drift testing by comparing them to the cumulative probability curve from the EPA Spray Drift Task Force Report (SDTF), dated January 25, 1996 ("Off Target Deposition of Pesticides from Agricultural Spray Applications" by Bird, Esterly and Perry). The probability curve was developed by examining deposition patterns of aerially applied pesticides at differing distances from the target area, when the pesticides were applied according to label requirements. The closest deposition curve presented was at a distance of 30.5 meters or 100 feet from the target area. DEC reported that examination of the Gill Farms data included 13 out of 17 samples that were collected. Only 13 samples were used because these samples "more closely matched the conditions of the SDTF probability curve (deposition at 100 feet)." The highest percentage of application rate found, for lambda-cyhalothrin, was 4.4%, or less than the approximately 5.5% predicted by the SDTF probability curve. DEC states that two caveats which must be considered when comparing data to this curve are that: 1) the values in the curve were generated using deposition cards; and 2) the curve predicts deposition probability at 100 feet from the application area. Peter Furdyna, an Environmental Chemist II with DEC, was the quality assurance coordinator for the DEC's Gill Farm aerial application monitoring project. According to Mr. Furdyna, while wipe samples can be limited by the amount of material removed from the surface being wiped, in this analysis the wipe samples and deposition card samples "produced similar results" with the wipe samples producing higher values than the deposition cards. The Gill data were produced using wipe samples, with the highest residue detected being within 45 feet of the application area. (The three positive samples were found at distances of 30, 32 and 42 feet from the field edge.) This indicates that this comparison between the SDTF report and the sample findings in this case is very conservative. Mr. Furdyna concluded that because the amount of material found at a distance of 30 to 45 feet from the spray area was less than the amount predicted by the curve at a distance of 100 feet, the results from the Gill Farm analysis indicates that the drift from the aerial pesticide application is below the level expected using the SDTF curve, and the applicators are doing a better job applying the pesticides than what would be expected.

34. In a letter to the Department dated March 20, 2001, Dr. Edward G. Horn, Director of the Bureau of Toxic Substance Assessment for the New York State Department of Health (DOH), provided information concerning the health issues associated with the aerial spraying of pesticides at the Gill Farm. The Health Department reviewed the drift sample results obtained by DEC during the summer of 2000. Dr. Horn stated that DEC took seventeen surface residue wipe samples from various surfaces near fields treated with aerial pesticide application. Dr. Horn also stated that the samples were analyzed for three chemicals used by Mr. Gill and fourteen of the samples showed no detectable levels. Two samples tested positive for propiconazole and a third sample tested positive for propiconazole and lambda-cyhalothrin. These

positive samples were found on neighboring properties. Dr. Horn stated that "the positive propiconazole residues ranged from 0.012 to 0.024 micrograms per square centimeter ($\mu g/cm^2$). The single positive lambda-cyhalothrin sample was 0.012 $\mu g/cm^2$."

35. In reference to the three positive samples, Dr. Horn stated "there are no Federal or State surface residue standards for these pesticides to which the results from the samples taken near the Gill Farm can be compared for the purpose of assessing potential exposure and risks." Dr. Horn indicated, however, that assumptions could be made concerning exposure to surface residue. Dr. Horn stated that if a person weighing 70 kilograms (154 lbs.) "absorbs all the pesticide residue that they contact with their skin, an individual would have to contact all the propiconazole residues in an area the size of 365 square meters (m^2) (3,900 square feet) per day or all the lambda-cyhalothrin residues in an area the size of 58 m^2 (623 square feet) per day to reach the no-observed-effect level (NOEL) in the long-term toxicity studies that the U.S. Environmental Protection Agency used to derive the reference dose (RfD) values for these compounds." According to Dr. Horn, if the RfD values are used, a person would have to contact all the propiconazole residue in a 41 $ft.^2$ size area per day, or all the lambda-cyhalothrin in a 6 $ft.^2$ size area per day. Dr. Horn stated that these comparisons are a likely overestimation of the exposure because "they assume that all residues are dislodgeable, 100 percent dermal absorption of the pesticides, daily exposures for a long period of time and that no change in the surface residues of propiconazole and lambda-cyhalothrin will occur."

36. Dr. Horn also estimated the "direct exposure and risk to a person who may have been standing on the property to which the pesticide residues deposited." According to Dr. Horn, the estimation is based on direct deposition of the pesticides at concentrations of 0.024 $\mu g/cm^2$ and 0.012 $\mu g/cm^2$ for propiconazole and lambda-cyhalothrin, respectively. Dr. Horn also indicated that the estimation was based on direct deposition to "a large portion of the skin" of an average adult and child wearing only shorts and weighing 70 kg. (154 lbs.) and 20.8 kg. (46 lbs.), respectively. According to Dr. Horn, the exposure under such conditions for propiconazole "would be about 370-fold and 190-fold less than the NOEL for adults and children, respectively." Dr. Horn stated that the exposures for lambda-cyhalothrin "would be about 60-fold and 30-fold less than the NOEL for adults and children, respectively." Dr. Horn stated that the "exposures to propiconazole would be about 4-fold and 2-fold less for adults and children, respectively, than the RfD." Dr. Horn also stated that the exposures for lambda-cyhalothrin "exceed the RfD by about 2-fold and 3-fold for adults and children, respectively." According to Dr. Horn, such comparisons are likely an overestimation of exposure because "they assume 100 percent dermal absorption of the pesticides and daily exposures for a long period of time." He also pointed out that "most of the surface residue samples analyzed did not contain detectable levels of these chemicals (or permethrin) and the highest residues measured were used in the above calculations." Dr. Horn stated that "The positive samples contained residues at

low levels, representing about four percent or less of the target application rate of the respective pesticide product's active ingredients."

37. Dr. Horn stated that the RfD is a dose that is believed not to cause an effect in humans, even after a lifetime daily exposure. The RfD is generally established from the NOEL and is lower than the NOEL in order to provide a level of safety. The RfD is used as a reference when evaluating exposure. James Leach stated that according to the U.S. EPA, a reference dose is "an estimate (with uncertainty spanning perhaps an order of magnitude) of a daily exposure to the human population (including sensitive subgroups) that is likely to be without an appreciable risk of deleterious effects during a lifetime."

38. Mr. Leach explained that the highest residue levels for the lambda-cyhalothrin found during the drift testing does not indicate "that health effects are likely to occur from the use of this pesticide at Gill Farms." Mr. Leach stated that daily life-long exposure from direct spraying of the pesticide is unlikely because the pesticide is not applied daily and year round. Also, lambda-cyhalothrin was detected at only one of the seventeen sites tested.

39. According to Dr. Horn, five of the pesticides applied by Mr. Gill using aerial application "have been determined by the U.S. Environmental Protection Agency to have some cancer causing potential." Dr. Horn stated that if there is no exposure to the cancer-causing agent then there is no risk of getting cancer or other health effects. Dr. Horn also stated that: "If there is exposure to these chemicals, the risk is proportional to the exposure." Dr. Horn indicated that the risk of developing cancer is also determined by other factors such as genetics, diet, occupational exposures, etc. Dr. Horn stated that his Department reviewed all cases of brain cancer (primary malignant tumors only) in the Health Department's Cancer Registry. Dr. Horn stated that based on their analysis, "ten brain cancer cases were found in Hurley, NY over a twenty-year period. When resident locations of these cases were plotted on a map of Hurley, there was no obvious clustering of the cases around the Gill Farm or anywhere else."

40. The Suffolk County Department of Health Services analyzed water samples from 11 private wells from the Hurley, New York area during 2000 at the request of the NYS Attorney General's office. Dr. Horn stated that the water samples were tested for a number of pesticides and pesticide degradates as well as other contaminants using various methods including EPA 531, 505, 200.8, 300, 525 and 524.2; SM 18 9223 and SM 18 2510B; Lachat 10-107-05-1-A; and Suffolk County methods for dachthal pesticides and herbicide metabolites. According to the NYS DOH, 8 of the 12 materials applied aerially by Mr. Gill were included on the list of analytes tested by the Suffolk County Department of Health Services. The materials not tested were thiodicarb, manganese ethylenebisdithiocarbamate, spinosad and lambda-cyalothrin. The methods used did not include testing for these 4 pesticides applied aerially by Mr. Gill. No specific, sensitive method currently exists for manganese

ethylenebisdithiocarbamate and spinosad is a biological control and is not applicable for this type of analysis. Also, lambda-cyhalothrin has a very low potential to leach into groundwater. Dr. Horn stated that five of the samples had "detectable levels of pesticide residue." According to Dr. Horn, "Alachlor ESA was present in samples from all five wells that had detectable residues at concentrations ranging from 0.24μg/L to 3.9μg/L. Metolachlor ESA was present in samples from two of these wells at concentrations of either 0.4μg/L and 0.51μg/L." Dr. Horn stated: "There are no New York State or Federal chemical-specific drinking water standards for alachlor ESA or metolachlor ESA. Based on their chemical structure, both of these compounds fall under the general drinking water standard of 50μg/L each for UOCs (Unspecified Organic Contaminants)." Alachlor ESA and metolachlor ESA are degradates of two herbicides, alachlor and metolachlor, used by the Gill Farm but are not applied using aerial application according to the pesticide application information provided by Mr. Gill.

41. Dr. Horn stated that NYS DOH obtained and analyzed various water supply samples in Hurley for certain pesticides, according to EPA testing procedures 507, 508, and 531.1, as well as additional sampling for chlorothalonil. Dr. Horn stated that water samples were analyzed from six private residences, four Hurley water supply wells, and one well on the Gill farm. Dr. Horn also stated that five of the private residence wells were also analyzed by the Suffolk County Department of Health Services. Information provided by Dr. Horn indicates that the water samples were tested for various analytes, including two of the 12 materials applied aerially by Gill Farms during 1999 and 2000. Mr. Leach explained that chlorothalonil and methomyl are the only two pesticides applied aerially by Mr. Gill which are typically included in the NYS DOH's water sample evaluations. According to the information provided by Dr. Horn, two of the private well samples contained low levels of chlorpyrifos, "a pesticide that is commonly used around homes for control of termites and other household and lawn insects." Dr. Horn stated that one public well sample contained dieldrin and chlordane and that "two insecticides are no longer allowed for use in New York State but were previously registered for termite and other insect control." Dr. Horn said that none of the pesticides found were contained in the listed pesticides used by Mr. Gill during 1999 and 2000.

42. Dr. Horn stated that during the September 6, 2000 visit to the Gill Farm by DOH staff, the plane flew approximately 8 to 10 feet above the top of the corn. Dr. Horn also stated that the spray material dropped rapidly into the corn and no drift was visible. Dr. Horn indicated that a "very slight odor" was noticed in the field following the spray application. However, no odor was noticed outside the treated area.

43. Dr. Horn indicated that the chemicals found in the blood and tissue sampling done by Dr. McNally are no longer used on corn farms in New York and haven't been for some time.

44. The Spray Drift Task Force(SDTF)[1] was established in 1990 to "quantify primary spray drift from aerial, ground hydraulic, air blast and chemigation application." The SDTF consists of 38 agricultural chemical companies. The studies conducted by the SDTF were "designed and conducted in consultation with scientists at universities, research institutions, and the EPA." According to the SDTF, the studies confirm that droplet size is the most important factor associated with spray drift. The studies indicate that droplet sizes smaller than 150 microns have the greatest potential to drift. According to the studies, "Based on data generated by the SDTF, in a typical full field aerial application, 98% of the total applied active ingredient stays on the field and only 2% drifts." The studies indicate that when winds are calm, "virtually all of the spray is deposited directly under the aircraft." However, when a cross wind exists during spraying, "the spray swath is displaced downwind." According to the studies, the pilot needs to adjust the position of the aircraft upwind to compensate for the displacement. Such an adjustment can significantly "reduce drift, especially in the first 100 feet."

45. Another factor influencing spray drift, according to the SDTF, is the angle of the nozzles. According to the SDTF, air shear is less when the nozzles are pointing toward the back of the plane, or at a 0° angle. Also, a "solid stream nozzle at a 0° angle produced a much lower volume of small droplets." Consequently, using a solid stream nozzle placed at a 0° angle reduces air shear and results in fewer small droplets, which results in significantly less drift. The SDTF also lists boom length as an important factor affecting drift. The SDTF indicates that "maintaining boom length at 70% or less of the wingspan minimizes drift." The SDTF concludes that "Although drift cannot be eliminated totally with current technology, there are many ways to minimize drift to levels approaching zero." Some of the ways cited include: applying the coarsest droplet size spectrum that provides sufficient coverage and pest control; continuing the standard practice of swath adjustment; controlling the application height; using the shortest boom length that is practical; and applying pesticides when wind speeds are low.

46. The SDTF also states that when drift cannot be reduced to a level that provides protection for sensitive areas, buffer zones should be considered for such areas downwind of the application area.

47. The New York State rules and regulations pertaining to pesticide application are contained in 6 NYCRR, Part 325. Section 325.2(a) states that "Pesticides must be used in such a manner and under such wind and other conditions as to prevent contamination of people, pets, fish, wildlife, crops, property, structures, lands, pasturage or waters adjacent to the area of use." Contamination is defined in §325.1(u) as "the presence of a pesticide or pesticides, in or on areas other than the target area, in quantities which are or may be injurious to humans or the environment." The Appellate Division, Third Department of State Supreme Court

[1] Spray Drift Task Force. "A Summary of Aerial Application Studies." 1997. pp 1-7.

has held that "...the regulations state that pesticides must be used so that contamination is prevented, and define 'contamination' as presence in quantities which may injure the environment. Clearly, this regulatory scheme contemplates more than the mere presence of a pesticide but, rather, presence in quantitatively injurious amounts." *Duflo Spray-Chemical, Inc. v. Jorling*, 153 A.D.2d 244, 550 N.Y.S.2d 497 (3d Dept., 1990). While three of the seventeen drift test samples indicated deposition of spray material on properties other than Mr. Gill's, the information provided by DEC and the NYS DOH indicates that the levels detected are not likely to be injurious to humans or the environment.

48. The Federal Insecticide, Fungicide and Rodenticide Act provides that it is unlawful for any person to use any registered pesticide in a manner inconsistent with its labeling. 7 USCS §136j(a)(2)(G); see also, 6 NYCRR §325.2(b). Pursuant to 40 CFR §156.206(a), agricultural pesticide labels are required to bear the following statement: "Do not apply this product in a way that will contact workers or other persons, either directly or through drift." Based upon its review of the 1999 and 2000 pesticide application records provided by Mr. Gill, DEC concluded that the pesticides were applied according to label directions and all applications appeared to have been made in compliance with DEC regulations relating to the use of pesticides. As discussed in paragraph "17" above, on one occasion a pesticide was applied to mixed vegetables at a higher application rate than noted on the label for broccoli, brussel sprouts and cauliflower. This misapplication did not relate to drift and Mr. Gill stated that this was an oversight on his part. According to Mr. Gill, the broccoli, brussel sprouts and cauliflower were probably being grown with the mixed vegetables, which have a different application rate, and, thus, were treated at the higher rate.

49. While the SDTF has indicated that aerial spray drift cannot be eliminated with current technology, the Department considered several possible alternatives to reduce the potential for spray drift. One method considered was ground application. However, as described in paragraphs "10" and "11" above, this would result in significant cost to the operation and would not eliminate the potential for drift.

50. Another possibility considered by the Department was the establishment of a buffer zone along the edge of fields where a natural buffer does not currently exist. A buffer of corn left untreated was examined. According to Dr. Kirk[2], even when pesticides are applied according to current recommendations, similar to the Gill application method, deposition can be found 1500 feet from the application area. As a result, in order to eliminate the potential for drift, Mr. Gill would have to establish an untreated buffer of corn 1500 feet wide along the edge of portions of his fields. Thus, only 420 acres of corn would be treated out of a total of 1,525 acres of corn being grown by Mr. Gill, resulting in a significant adverse economic impact to the farm operation

[2] I. W. Kirk. "Spray Drift: What Can We Do Now." Agricultural Aviation, September/October 1999. pp.20-23.

51. The Department also evaluated the feasibility of the establishment of trees to create a vertical buffer along the edge of fields that do not currently have a natural buffer of trees. Mr. Brower examined these areas and estimates that approximately 7,000 trees would be needed. The establishment of a buffer using tree seedlings would not provide any benefit for 20-30 years. The establishment of a buffer using trees 20 to 30 feet tall, which would provide immediate benefit, would result in unreasonable cost to the operation. Also, the Department found no information on the efficacy of trees in reducing spray drift.

Findings

Based upon the facts, information and circumstances described above, and in consultation with the New York State Department of Environmental Conservation; the New York State Department of Health; the Advisory Council on Agriculture; the New York State College of Agriculture and Life Sciences at Cornell; and the Sound Agricultural Practice Guidelines[3] by which agricultural practices are evaluated, I find the following:

1. The Department has found no evidence or received other information indicating that Mr. Gill has been cited for any violation of law or regulation in relation to the aerial pesticide applications. Based on information provided by DEC and the FAA, Mr. Gill has done an excellent job in applying pesticides according to federal and State laws and regulations.

2. The Department has found no evidence that the aerial application of pesticides by the Gill Corn Farms, Inc. has resulted in bodily harm or property damage off the site as a result of noise or spray drift. While the spraying takes approximately 3 to 4 hours, the plane can only be heard intermittently and for a short duration at any given location. The Department's review of written statements and other information submitted by residents near the Gill farm, as well as telephone interviews with some of the residents, shows a wide variation in the perceptions of the duration and frequency of noise from the aerial pesticide application. None of the complainants provided the Department with any documentary evidence indicating that they have experienced health problems which were caused by noise associated with the aerial pesticide applications conducted by Gill Corn Farms, Inc.

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[3] On November 1, 1993 the NYS Advisory Council on Agriculture published its report entitled *Protecting the Right of New York Farmers to Engage in Sound Agricultural Practices*. The Council developed guidelines to assist the Commissioner of the Department of Agriculture and Markets in determining what is sound pursuant to Section 308 of the Agriculture and Markets Law. The Guidelines state that the practice 1) should be legal; 2) should not cause bodily harm or property damage off the farm; 3) should achieve the results intended in a reasonable and supportable way; and 4) should be necessary. The sound agricultural practices guidelines recommended by the Advisory Council on Agriculture are given significant weight in assessing agricultural practices.

The Department's review of written statements and other information submitted by residents near the Gill farm, as well as telephone interviews with some of the residents, show a wide variation in the perceptions of the nature and frequency of drift from the aerial pesticide application. Some of the neighbors state that pesticide drift has caused various health problems for them and their families including: throat irritation, nausea, headaches, eye irritation, respiratory problems, runny nose and jitters. The Department also interviewed the people that filed complaints with the Attorney General's office. None of the people provided the Department with any documentary or other corroborating evidence indicating that the health problems they experienced were caused by the aerial pesticide application conducted by Gill Corn Farms, Inc. DEC drift testing and water sampling conducted by the NYS Department of Health and the Suffolk County Department of Health do not show pesticide drift, or the presence of pesticides in domestic wells, at levels which would pose a risk to human health. Blood and tissue sample test results from a study of breast cancer patients conducted by Dr. McNally, thus far, have revealed "nothing striking" as far as pesticide levels and no connection to the Gill Farm.

3. Mr. Gill has addressed noise complaints by spending a total of $17,500 to move the landing strip and modify the plane. While the landing strip is in a more favorable location in relation to homes in the vicinity, the Department was not able to ascertain how effective the steps taken by Mr. Gill were in reducing the noise from the plane. In any event, the plane can only be heard intermittently and for a short duration at any given location. Further, pesticides are only applied when necessary for crop protection.

   Many residents expressed concern about pesticide drift. While many of the complaints were general in nature, the Department received more detailed information from two people concerning spray drift across NYS Route 209 during 2000. However, no documentary or other corroborating evidence was submitted by anyone to show that drift occurred. Nonetheless, Mr. Gill and Mr. Webber use appropriate measures, consistent with the comments provided by Dr. Kirk and the Spray Drift Task Force findings, to control drift including spraying at times when winds are calm, using a boom length less than 70% of the wingspan, placing the nozzles at a 0 degree angle, using a drift retardant, and using a large droplet size. The aerial application of pesticides at the Gill Farm is more precise than other methods available, as a result of the use of modern technology such as GPS (Global Positioning System).

4. The aerial application of the agricultural chemicals is necessary for economical crop production on the Gill farm. Discontinuing the aerial application of pesticides could prevent Gill Corn Farms, Inc. from producing a marketable crop. The costs to switch to ground spraying (approximately $261,000 initially and an additional $18,300 in annual operating costs), which were confirmed by Dr. Straub, are significant. Also, switching to ground application would not necessarily reduce noise and the potential for drift. Use of ground equipment would require spraying for longer periods of time throughout the growing season and at times when the potential for drift is greater.

Due to the increase in spraying time and frequency, the noise impact to the neighbors would likely be greater. No other potential methods were found to be feasible. While Mr. Gill is not involved in the Agricultural Environmental Management program, he uses integrated pest management techniques including carefully monitoring pest pressure and only applying pesticides when necessary and under favorable conditions. Mr. Gill has been working with Dr. Straub to identify methods, such as biological controls, to reduce the number of applications necessary.

Conclusion

Based on the foregoing and in accordance with section 308 of the Agriculture and Markets Law, I conclude that, from a drift and noise perspective, the aerial application of pesticides on the Gill Corn Farms, Inc., for the production of crops, as described above, is sound.

8/13/01
Date

Nathan L. Rudgers
Commissioner