

New York State Department of Environmental Conservation

Division of Materials Management

Bureau of Pest Management

Product Registration & Pest Management Alternatives Section

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Joe Martens
Commissioner

March 9, 2012

Via UPS (Co. No. 55050)

Ms. Laura Anderson
Arkema, Inc.
900 First Avenue
King of Prussia, Pennsylvania 19406-1308

Dear Ms. Anderson:

Re: Registration of Paladin (EPA Reg. No. 55050-4) and Paladin EC (EPA Reg. No. 55050-5) Containing the New Active Ingredient Dimethyl Disulfide (Chemical Code 029088)

The New York State Department of Environmental Conservation (Department) has evaluated your application, received September 21, 2010, and supplemental materials received to date in support of the registration of the above-referenced pesticide products.

Paladin (EPA Reg. No. 55050-4) contains 98.8% of the active ingredient dimethyl disulfide (DMDS) and Paladin EC (EPA Reg. No. 55050-5) contains 93.8%. Both products are formulated as liquids and are labeled as a preplant soil fumigant for the control and suppression of weeds, soil-borne plant pathogens, and nematodes in tomatoes, peppers, eggplants, cucumbers, squash, melons, strawberries, blueberries, field-grown ornamentals, and forest nursery stock. The products are federally restricted due to inhalation exposure to humans. Application of Paladin and Paladin EC are limited to a maximum of 40 contiguous acres and a maximum rate of 449 pounds of dimethyl disulfide per acre.

The application package was deemed complete for purposes of technical review on March 18, 2011. Pursuant to the review time frame specified in Environmental Conservation Law §33-0704.2, a registration decision date of August 15, 2011 was established. However, the decision date was waived on August 11, 2011 to allow Arkema, Inc. (Arkema) time to respond to technical issues presented by the Department.

Technical reviews of the proposed uses included on the Paladin labels have been performed by the Department and the New York State Department of Health. These reviews encompassed the expected impacts of labeled use of the subject products with respect to human health, ecological effects, and environmental fate. The technical reviews are shown below.

ENVIRONMENTAL FATE ASSESSMENT:

The following assessment was produced by the Department's Engineering Geology staff within the Bureau of Pest Management:

Transformation Products

methanesulfonic acid (CH₄S)

methanesulfinic acid (CH₄O₂S)

sulfuric acid (H₂SO₄)

Solubility: Dimethyl disulfide (DMDS) has a solubility of 2,702 mg/L at pH 6.

Solubility of Methanesulfonic Acid: The solubility of the transformation product methanesulfonic acid is 1,000,000 mg/L at 20°C.

Hydrolysis: Dimethyl disulfide was stable at pHs 5, 7, 9.

Aqueous Photolysis: The half-life was 1.3 days with possible degradates methanesulfonic acid (CH₄S), methanesulfinic acid (CH₄O₂S), or sulfuric acid (H₂SO₄) (total 54.2%).

Soil Photolysis: This study was waived.

Air Photolysis: The half-life in air was calculated to be 1.1 hours.

Aerobic Soil Metabolism: In a clay loam from France, the half-life was 3.74 days. In a clay soil from Switzerland, the half-life was 2.86 days. In a closed system, the vast majority of DMDS was detected in the soil within 5 minutes of application, and the subsequent buildup of degradates was in the soil. Methanesulfonic acid accounted for 33.17% in the French soil, and 32.86% in the Swiss soil. CO₂ was also detected in both soils. In a Florida sand and a California sandy loam, no major transformation products were found through day 120 as most of the DMDS residues remained in the headspace. The United States Environmental Protection Agency (U.S. EPA) believed that the French and Swiss scenarios were possible in the environment at environmental conditions using a high-barrier tarp, and back calculated the half-lives.

Aerobic Soil Metabolism of Methanesulfonic Acid: According to the International Uniform Chemical Information Database (IUCLID) Data Set #201-14249B provided by the registrant for methanesulphonic acid (CAS 775-75-2), the half-life in soil is 15 days.

Aerobic Aquatic Metabolism: Outstanding data gap.

Anaerobic Aquatic Metabolism: Outstanding data gap.

Adsorption/Desorption Studies: In a California sandy loam (0.6% OC), the K_{oc} was 42. In a German Sandy loam (2.3% OC), the K_{oc} was 23. In a German loam (1.28% OC), the K_{oc} was 47. In a French clay loam (2.98 % OC), the K_{oc} was 15. In a French silt loam (2.0% OC), the K_{oc} was 47.

Adsorption/Desorption of Methanesulfonic Acid: According to the U.S. EPA Supporting Documents for Initial Risk-Based Prioritization of High Production Volume chemicals dated July 2008 for methanesulfonic acid, the log K_{oc} is (0.0)³, therefore the K_{oc} is also 0.

Field Dissipation: This study was waived.

Aquatic Field Dissipation: This study was waived.

Label Statements: The following statement appears on both labels in the Environmental Hazards Box: “Dimethyl disulfide has certain properties and characteristics in common with chemicals that have been detected in groundwater (dimethyl disulfide is highly soluble and has low adsorption to soil).”

U.S. EPA Comments: Because this is a soil fumigant, loss of DMDS in the terrestrial environment appears to be predominantly dependent on volatilization and to a lesser extent on leaching and soil biodegradation. The importance of other competing processes such as leaching, biodegradation, and adsorption to the soil particles will depend on DMDS emission rate from the fumigated fields, which may be mitigated by a substantial amount using high barrier tarps with material of low permeability.

Summary: The application rate is very high, the K_{oc} is very low, the aerobic metabolism half-life is 3.74 days and the air volatilization half-life is 1.1 hours. Approximately 65% of the applied product should be aerobically metabolized during the 12 days the tarp is on. Assuming the tarp is removed by noon as required by the label, there is no rain, the sun is out, and the air temperature is warm, there should be a negligible amount remaining in the soil by sundown.

In addition, the Paladin products are classified as Federally Restricted Use products. The application directions are very specific and contain requirements regarding a soil fumigant training program. Given the very controlled use of the products and their rapid metabolism and air volatilization, staff has no objection to the use of these products as labeled.

ECOLOGICAL EFFECTS ASSESSMENT:

The following assessment was produced by staff within the Department’s Division of Fish, Wildlife & Marine Resources’ Bureau of Habitat (BOH):

Chemical Characteristics:

Molecular wt.	Solubility	Log K_{ow}	K_{oc}	Vapor Pressure
94.2	2702 mg/L	1.77	Mean K_d =.641	22.6mm Hg

Toxicity/Mutagenicity/Genotoxicity Summary:

Moderately toxic to mammals. Slightly toxic to birds. Moderately to highly toxic to aquatic test species. Five valid mutagenicity/genotoxicity studies submitted and all results were negative for adverse effects.

Environmental Fate Summary:

Terrestrial: DMDS is expected to dissipate rapidly through both biotic and abiotic mechanisms. Volatilization with loss to the atmosphere and, to a lesser extent, microbial metabolism and leaching will be the main routes of dissipation.

Aquatic: DMDS is stable to hydrolysis but is subject to aqueous photolysis. The mean photolytic half-life is roughly one day. Aquatic metabolism studies were waived but DMDS will likely biodegrade in aquatic systems as it does in terrestrial compartments.

Metabolite Concerns: None beyond some potential for formation of sulfur based acidic metabolites as intermediate compounds.

Risk Characterization and Assessment:

DMDS treated fields are required to be covered with high-barrier tarps for a minimum of 12 days following application. During that time, nearly all of the applied material should volatilize or degrade.

Four aerobic soil metabolism studies for DMDS were submitted in the Paladin data package. They were conducted in France, Switzerland, California, and Florida. The two European studies yielded half-lives of roughly three days while the U.S. studies showed no appreciable degradation of the applied material through 120 days. The reason for this discrepancy is not addressed in the U.S. EPA Environmental Fate and Effects Division (EFED) review materials provided. The EFED reviewers used a value of 4.66 days for the half-life, described as the 90th percentile of the mean of all values.

Results from eight Field Volatility trials conducted in Arizona, California, Florida, and Georgia were also submitted as part of the Paladin data package. They employed different application methods and used different tarp materials but they provide a range of measured DMDS flux rates (loss rates) from treated areas. The geometric mean of all eight studies is 0.35% loss/hour. This corresponds to a DT₅₀ of roughly 6 days.

The Paladin labels define specific environmental conditions under which successful applications can be made including weather variables, soil condition, soil type and moisture content, landscape features and so on. New York conditions are not well represented in the submitted field trials but the level of detail given in the labels should provide for similar results.

DMDS has relatively low toxicity to terrestrial test species and the exposures anticipated do not rise to levels of concern. Terrestrial exposures are not considered further in this review.

Aquatic exposures from residues remaining at tarp removal should be minimal. The first scenario uses the residues expected to be present in the field at tarp removal if only microbial metabolism were operating, roughly 0.05 lbs.ai/A. To illustrate the expected margin of safety, the second uses a residue level of 10 lbs.ai/A (ca. 200 times the expected concentration), a level where aquatic impacts are becoming problematic. During the 12 day post-application tarped period the two primary dissipation mechanisms will be occurring simultaneously which should result in minimal residues being present when the treated areas are uncovered. With both dissipation mechanisms functioning, the remaining residues should not be as high as those used in the second simulation.

Use of the Paladin products as labeled should not pose undue risks to non-target resources. Therefore, the Bureau of Habitat does not object to the registration of the Paladin products.

HUMAN HEALTH ASSESSMENT:

The following assessment was produced by staff within the Bureau of Toxic Substance Assessment at the New York State Department of Health (DOH):

Acute toxicity studies conducted on the Paladin formulated product were used by the U.S. EPA as representative of dimethyl disulfide since the end product is composed of approximately 99 percent of the active ingredient. In these acute studies, Paladin was moderately toxic to laboratory animals via the oral route of exposure, but not very toxic via the dermal and inhalation routes of exposure. Paladin was a moderate eye irritant, but not a dermal irritant or sensitizer. The Paladin EC formulated product (93.8 percent dimethyl disulfide) was moderately acutely toxic via the oral route of exposure, but not very toxic via the dermal route of exposure. In addition, Paladin EC was a moderate eye and skin irritant (tested on rabbits). Acute inhalation toxicity and dermal sensitization studies were not conducted on the Paladin EC formulated product, but the U.S. EPA allowed the results for the Paladin product to bridge this data gap.

Dimethyl disulfide caused some effects in special acute and subchronic inhalation toxicity studies in rats. In a 24-hour continuous inhalation exposure study, this active ingredient did not cause any systemic toxicity up to a dose level of 18 parts-per-million (ppm) dimethyl disulfide, the highest dose tested. Port-of-entry effects were characterized by an increase in the incidence of microscopic lesions and degeneration of the nasal tissues as well as inflammation of the olfactory and respiratory epithelia at 12.5 ppm; the no-observed-effect-level was 9 ppm. Dimethyl disulfide caused port-of-entry effects of acute inflammation, degeneration and hyperplasia in the nasal tissues at 1-day and 5-days in a 1- and 5-day inhalation toxicity study (6 hours per day exposure) in rats at 50 ppm, the lowest dose tested. Systemic toxicity characterized by decreased body weights and body weight gains was observed at 50 ppm in the 5-day portion of this study. In a 13-week inhalation toxicity study in rats, systemic toxicity consisting of clinical signs of toxicity as well as decreased body weights, body weight gains and food consumption was observed at 50 ppm; the NOEL was 10 ppm. Dimethyl disulfide additionally caused port-of-entry effects including minimal to moderate atrophy and microcavitation of the olfactory epithelia and respiratory squamous metaplasia in the anterior nasal cavity at 10 ppm, the lowest dose tested.

Dimethyl disulfide also caused some effects in acute and subchronic inhalation neurotoxicity studies in rats. In the acute study, port-of-entry effects included red deposits on the mouth in females at 200 ppm and closed eyelids in both sexes at 100 ppm, the lowest dose tested. Systemic effects in this study were characterized by decreased total session locomotor activity in males and decreased total session motor activity in females at 100 ppm. In the subchronic study, dimethyl disulfide caused decreases in total motor activity and body weight in males and decreases in overall body weight gain and food consumption in both sexes at 80 ppm; the NOEL was 20 ppm. Port-of-entry effects were characterized by degeneration of the nasal olfactory epithelium at 20 ppm; the NOEL was 5 ppm.

Dimethyl disulfide caused some developmental toxicity in the offspring of pregnant rats, but not pregnant rabbits, exposed via inhalation to this chemical during organogenesis. In rats, maternal toxicity consisting of rough haircoat and decreased body weight, weight gain and food consumption occurred at

a concentration of 50 ppm; the NOEL was 15 ppm. Developmental toxicity characterized by decreased fetal body weights and multiple skeletal developmental retardations was observed at a maternal concentration of 50 ppm; the NOEL was 15 ppm. Port-of-entry effects were not reported for this study, so a NOEL could not be established for this endpoint. In rabbits, neither maternal systemic effects nor developmental toxicity was observed at concentrations up to 135 ppm, the highest dose tested. Port-of-entry effects consisting of macroscopic lung lesions (dark red discoloration) were observed at all concentrations including 15 ppm, the lowest dose tested. Dimethyl disulfide did not cause any reproductive effects in a two-generation reproduction study in rats up to concentrations of 80 ppm, the highest dose tested. Parental toxicity consisting of decreased body weight, body weight gain and food consumption occurred in F₁ males at 20 ppm; the NOEL was 5 ppm.

The carcinogenic potential of dimethyl disulfide has not been evaluated. Neither chronic toxicity nor carcinogenicity studies have been conducted on this active ingredient via oral or inhalation routes of exposure. However, dimethyl disulfide was negative in a number of genotoxicity studies and the U.S. EPA has stated that a cancer assessment is not warranted at this time given these results.

The U.S. EPA reported the results of an extensive bystander and occupational risk assessment for inhalation exposures to dimethyl disulfide from its labeled use as a pre-plant fumigant on fields. To characterize risks to bystanders and workers, the U.S. EPA estimated a single human equivalency concentration (HEC) of 1.65 ppm based on a port-of-entry NOEL of 9 ppm from the 24-hour continuous inhalation exposure study in rats (increased incidence of microscopic lesions of the nasal tissues, increased incidence of degeneration in multiple nasal levels and inflammation of the olfactory and respiratory epithelia). Since the results from acute, subchronic and developmental toxicity studies demonstrated that concentration, and not duration of exposure, is the key factor in the development of nasal lesions, the U.S. EPA utilized this HEC to estimate margins-of-exposure (MOEs) for all short-, intermediate- and long-term exposure scenarios. A range of MOEs and buffer zone distances were estimated in the risk assessment by analyzing a range of input factors. These factors included field size and application rate (which are restricted on the product label to 40 continuous acres on a single site and 455 pounds per acre, respectively), emission rates from different application types (broadcast shank injection, raised bed shank injection and raised bed drip irrigation), environmental factors at five different sites in California, Arizona, and Florida, tarping options and job descriptions (driver, operator, shoveler, etc.). Overall, the MOEs estimated for bystander exposure indicated that dimethyl disulfide exposures did not exceed U.S. EPA's level of concern at certain buffer zone distances, which are required to be maintained from the start of the application until 48 hours following the end of the application. Occupational exposures and risks did not exceed the U.S. EPA's level of concern with the addition of an organic vapor respirator, except for tarp cutters for broadcast shank injection five days after application. However, according to the product labels tarps are not to be removed until twelve days after application. Although the U.S. EPA did not quantify how this label change will impact risks to tarp cutters, they stated that "it is likely that it will result in less worker risk than the currently available studies show." These MOEs were estimated assuming workers wore the extensive personal protective equipment (PPE) required on the labels including loose fitting or well ventilated long-sleeved shirt and long pants, chemical resistant gloves and footwear, socks, full face shield and a half face or full face air purifying respirator. A five-day restricted entry interval after application was estimated to be adequate to not exceed the U.S. EPA's level of concern, except for tarp cutters as previously discussed. For this risk assessment, the U.S. EPA considered a target MOE of 30-fold or greater to provide adequate bystander and worker protection. The 30-fold value is comprised of a 10-fold uncertainty

factor to account for intra-species differences and a 3-fold uncertainty factor to account for pharmacodynamic differences between species (pharmacokinetic differences were accounted for in the HEC derivation).

Although dimethyl disulfide is labeled for use on a number of food crops, the U.S. EPA did not establish any tolerances for this active ingredient. The U.S. EPA considers dimethyl disulfide to be a “non-food use” pesticide because it is labeled for pre-plant use only and is quickly degraded or metabolized in the soil. In addition, dimethyl disulfide is toxic to plants and residues must dissipate in the soil prior to planting. Accordingly, since neither dimethyl disulfide nor its degradates make direct contact with the plant, tolerances are not required.

There are no chemical specific federal or New York State drinking water/groundwater standards for dimethyl disulfide. Based on its chemical structure, this compound falls under the 50 microgram per liter New York State drinking water standard for “unspecified organic contaminants” (10 NYCRR Part 5, Public Water Systems).

The available information on dimethyl disulfide and the Paladin end products indicates that they caused some toxicity following acute exposures in laboratory animals and are considered eye irritants, but not skin irritants. Dimethyl disulfide was shown to cause port-of-entry toxicity (nasal irritation and lesions) which appears to increase in severity with increasing concentration of the active ingredient. Systemic toxicity characterized by decreased body weights, body weight gains and food consumption occurred only at the highest doses in subchronic and reproductive/developmental toxicity studies. This active ingredient also had some neurotoxic effects characterized by decreased motor activity. Dimethyl disulfide has an odor threshold (0.007 to 0.012 ppm) well below the HEC estimated for nasal effects (1.65 ppm) which may serve as a “warning” to bystanders and workers of its presence. Based on their modeled air impacts and estimated HEC, the U.S. EPA determined that the proposed uses of these products should not pose significant risks to workers or the general public when used according to the provisions of the product labels.

In the initial registration review letter, the DOH indicated that the risks to workers and bystanders associated with the use of dimethyl disulfide in the New York State could outweigh the possible benefits. Workers are required to handle a large volume of an extremely volatile chemical when using these products. Yet the product labels do not require the use of a respirator except when the distinct odor of dimethyl disulfide is detected. Adding to this concern is that workers could potentially become desensitized to this odor. The DOH additionally had concerns for exposure to bystanders and nearby residents from both routine applications and potential mishaps associated with the application of the Paladin products. While the label directions state that the products are not to be used within a quarter of a mile of any occupied sensitive site (e.g., schools, daycare centers, nursing homes), the labels do not require such a restriction for residential properties. Lastly, the DOH questioned the benefit and need for the Paladin products’ use in the state to balance the risks identified above and encouraged the Department to confer with Cornell University, the Department of Agriculture and Markets or other agricultural experts concerning this benefit and need. The DOH stated that they did not support the registration of Paladin and Paladin EC at that time, but would not object to their registration if the Department determines that there is a benefit and need for these products or if the registrant submits additional information indicating that dimethyl disulfide poses lesser risks than the alternative products registered for similar use in the state.

In response to the concerns presented by the DOH, the registrant submitted additional data and supporting arguments regarding the risk to workers and bystanders, as well as a comparative analysis of dimethyl disulfide to methyl bromide. The registrant asserts that risks to workers from exposure to dimethyl disulfide would be minimal because of its low odor threshold, 7–12 parts per billion (ppb) and label directions requiring the use of a respirator when this odor is detected. The odor threshold for dimethyl disulfide is several orders of magnitude lower than the level that caused nasal irritation, nine parts per million (ppm) in laboratory animals, the most sensitive endpoint. The registrant has not had any experience with workers becoming desensitized to dimethyl disulfide; however, the disagreeable odor diminishes the likelihood that workers would remain in the area of treatment without the use of a respirator. With regards to bystander or local resident exposure, the registrant states that potential exposures would be limited because application of dimethyl sulfide is restricted to an approximate preplanting timeframe of two weeks (once per growing season) and the soil being treated is covered in tarps immediately after application. In addition, the product labels have been recently updated to increase fumigant safety and were approved by the U.S. EPA on December 21, 2011. These changes include additional handler requirements and use restrictions near “difficult to evacuate sites” (schools, daycare centers, nursing homes, etc.), as well as updates to the fumigant site monitoring and emergency response plans.

The registrant additionally submitted a comparison of dimethyl disulfide to methyl bromide. Dimethyl disulfide has a more favorable toxicological profile compared to methyl bromide as it is not as acutely toxic via inhalation, oral or dermal exposures nor as irritating to the skin and eyes. Dimethyl disulfide is not mutagenic whereas methyl bromide demonstrated both positive and negative results in mutagenicity studies. In addition, according to the registrant, methyl bromide caused reproductive toxicity in rats at a relatively low level (3 ppm), while dimethyl disulfide did not cause any reproductive toxicity at concentrations up to 80 ppm.

The registrant also submitted responses to several questions posed by the Department to further address our concerns. The registrant commented that most applications of the Paladin products would occur in Suffolk County and the Hudson Valley region to the crops listed on the label (cucumbers, other cucurbits, tomatoes, and strawberries). The registrant estimated that approximately 450,000 pounds of dimethyl disulfide may be applied annually in the state to 2,000 acres of the aforementioned crops. The registrant has not had any contact with Cornell Cooperative Extension or the Department of Agriculture and Markets about dimethyl disulfide and are not in possession of any letters of support that are specific to the needs/benefits of its use in New York State. Lastly, the registrant submitted three FIFRA 6(a)(2) adverse event reports involving dimethyl disulfide in 2008 and 2009 during the experimental use permit, but before federal registration in 2010. These reports concerned residents directly adjacent to treated fields complaining of an odor and mild symptoms such as headaches. Apparently, there have been no other FIFRA 6(a)(2) notices for applications of dimethyl disulfide since federal registration of the Paladin products.

Overall, the registrant addressed the DOH’s concerns with the use of the Paladin products in the state. Exposure of the general public, especially vulnerable populations, to dimethyl disulfide is expected to be minimal since it is used once per growing season in a limited time frame and fumigants in general are not widely used in the state. The low odor threshold for dimethyl disulfide (several orders

of magnitude below effects in laboratory animals) and a noted lack of desensitization to this odor should help mitigate concerns for worker exposure to this active ingredient. In addition, on a toxicological basis, dimethyl disulfide appears to pose less of a risk than methyl bromide. Given the above, the DOH does not object to the registration of Paladin and Paladin EC in New York State.

REGISTRATION DECISION:

The initial technical reviews of the proposed uses of dimethyl disulfide in the Paladin products resulted in concerns with respect to the health of workers and bystanders. The Department communicated these concerns to Arkema in a “technical issues” letter dated August 11, 2011. Arkema’s response to the letter has sufficiently mitigated these concerns. The Department concludes that the use of Paladin and Paladin EC should not have an adverse effect on the health of applicators or the general public, the fish and wildlife resources, or the ground and surface water of New York State when used as labeled. Therefore, the Department hereby registers **Paladin** (EPA Reg. No. 55050-4) and **Paladin EC** (EPA Reg. No. 55050-5) in New York State. Enclosed for your record are copies of the Certificate of Pesticide Registration and stamped “Accepted for Registration” labels.

Please note the yes under the “restriction” column on the enclosed Certificate of Pesticide Registration and the “Classified for Restricted Use in New York State” stamp on the enclosed product labels. As such, each product is restricted in its purchase, distribution, sale, use and possession in New York State. Furthermore, each product may only be purchased and used by a certified applicator in New York State.

The New York State Department of Environmental Conservation Regulations 6 NYCRR 326.3(a) state: “It shall be unlawful for any person to distribute, sell, offer for sale, purchase for the purpose of resale, or possess for the purpose of resale, any restricted pesticide unless said person shall have applied for, and been issued a commercial permit.” Should you require information to obtain a commercial permit, please contact the Pesticide Reporting and Certification Section, at (518) 402-8748.

The Pesticide Reporting Law within Environmental Conservation Law Article 33 Title 12 requires all certified commercial pesticide applicators to report information annually to the Department regarding each pesticide application they make. **Commercial pesticide retailers are required to report all sales of restricted pesticide products and sales of general use pesticide products to private applicators for use in agricultural crop production.** If no sales are made within New York State, a report must be filed with the Department indicating this is the case. If you need information relating to the Pesticide Reporting Law, or annual report forms, please visit the Department’s website at <http://www.dec.ny.gov/chemical/27506.html> or call (518) 402-8748.

Please note that a proposal by Arkema, Inc. or any other registrant to register a product that contains dimethyl disulfide, and/or whose labeled uses are likely to increase the potential for significant impact on humans, nontarget organisms, or the environment, would constitute a major change in labeling. Such an application must be accompanied by a new application fee and meet the requirements listed in Appendix 1.B. of “New York State Pesticide Product Registration Procedures” (April 2009). Such information, as well as forms, can be accessed at our website as listed in our letterhead.

Please contact Shaun Peterson, of the Product Registration and Pest Management Alternatives Section at (518) 402-8768, if you have any questions regarding this letter.

Sincerely,

Scott Menrath

Scott Menrath, P.E.
Director
Bureau of Pest Management

Enclosures