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March 19, 2025

Re: The Hudson National Golf Course – Proposed Pesticide Use Update to the Environmental Management Plan

Dear Dan:

Brett Scales submitted a list of seven pesticide products (11 active ingredients) that are not currently approved for use on the Hudson National golf course (Table 1), and requested that ETS provide an evaluation of the new products. All of the pesticides evaluated in this task are approved for use in the State of New York. Thus, we completed the qualitative risk evaluation described in this letter report in order to update the list of approved pesticides. In addition, five previously approved products will be removed from the approved list.

We updated the Environmental Management Plan (EMP) for pesticides in 2003, 2011, and 2021. New and better products are continually added to the industry. Thus, it is prudent to update the pesticides used at The Hudson National Golf Course to keep up with industry and ensure a better surrounding environment. Pests develop resistance to pesticides and it is important to rotate products in order to keep that from happening.

The EIQ calculator was used to evaluate the proposed pesticides. It is a Tier 1 model - Field Use Environmental Impact Quotient (FEIQ) calculator - that was initially developed by the New York State's Integrated Pest Management Program (NYSIPM) in 1992 (Kovach et al., 1992). We selected the EIQ because it is easy to use, it was developed at Cornell, it provides results for a wide range of pesticides, and it is a Tier 1 model. We provide below the details of the EIQ calculator and the process used to evaluate the proposed pesticides for approval.

THE EIQ CALCULATOR EXPLAINED

The Environmental Impact Quotient (EIQ) calculator is a web-based decision support tool that is used to summarize the potential pesticide risk to farm workers, consumers, and non-target organisms. The online calculator is widely used by growers and companies to help select pesticides with less hazardous active ingredients. The EIQ is continuously maintained by the NYSIPM. The most recent update to the online calculator was July 2024.

The results of the calculator are intended to identify pesticide impacts to both the environment and human health. The calculator requires two types of user-provided information:

percent active ingredient (% a.i.) and the application rate (e.g., lb/1000 ft²). The original (Kovach et al., 1992) EIQ equation is listed below with the added component. The equation was updated in 2024 to include earthworms and shows the many factors that go into producing the EIQ ratings; however, this formula cannot be used directly to make individual pesticide calculations because the variables are not readily available to the public in a quantitative manner. We accessed the website February 14, 2025 to update the EIQ equation below (Eshenaur et al. 1992-2020).

$$\text{EIQ} =$$

$$[\text{Applicator Farm Worker}] + [\text{Consumer}] + [\text{Ecological (fish, birds, bees, earthworms)}]$$

$$[C((DT*5)+(DT*P))]+[(C*((S+P)/2)*SY)+(L)]+[(F*R)+(D*((S+P)/2)*3)+(Z*P*3)+(B*P*5)+(E*S*3)]/3$$

Where DT = dermal toxicity, C = chronic toxicity, SY = systemicity, F = fish toxicity, L = leaching potential, R = surface loss potential, D = bird toxicity, S = soil half-life, Z = bee toxicity, B = beneficial arthropod toxicity, P = plant surface residue half-life, E = earthworms, S = soil residue half-life.

The EIQ method for calculating pesticide impacts takes into account three components: farm worker risk, consumer risk, and ecological fate and risk. Farm worker risk includes the assessment of both applicator and picker exposure (i.e., farmer), which is equivalent to a golfer or athlete, as well as chronic toxicity. The consumer component includes exposure of the consumer to the pesticide, as well as any ground water effects (i.e., a leaching component). Lastly, ecological risk (which includes a runoff component) is assessed by examining the aquatic and terrestrial effects to fish, birds, bees, arthropods, and earthworms (a new component added in 2024 to the calculator).

The percent active ingredient and the rate of application are input into the EIQ calculator for a particular pesticide selected from the dropdown list on the website one at a time (Grant, J. A., 2010-2020). The results provide an EIQ value and an overall field use rating value (i.e., FEIQ) for the pesticide, as well as risk ratings for the worker, consumer, and ecological components. The values for each component can then be compared quantitatively. The lower the value the lower the risk, e.g., a rating <25 = very low risk and a rating >200 = very high risk. See Table 3.

The Field EIQ is determined by multiplying the EIQ by the percent active ingredient (as a decimal) and the application rate (lb/A). Thus, the Field Use EIQ (FEIQ) can be used to determine different management strategies.

$$\text{EIQ Field Use Rating} = \text{EIQ} \times \% \text{ active ingredient} \times \text{Rate (lb/ac)}$$

OUR APPROACH AND RESULTS

The Superintendent, Brett Scales, provided the percent active ingredient, the application rate, the number of applications, the areas of applications, and the target organisms (Table 1) for each of the seven proposed pesticides containing 11 active ingredients. The recent (2023)

regrassing of greens, approaches, tees, and fairways will allow the Superintendent to spray less fungicide as the new grass is much more disease resistant.

Many of the added herbicides are specialty products to help prevent or remove bentgrass and poa annua from growing in undesirable playing areas. In most cases products will be spot sprayed and only where and when needed.

SurePower[®] is a herbicide that contains four active ingredients (2,4-D, triclopyr, fluroxypyr, and flumioxazin), which are mixed at lower percent active ingredients than stand alone active ingredients. One of the four herbicides is already on the list of approved products: 2,4-D. However, we evaluated it as well because the product's active ingredients are added together for the result (Table 3).

Velocity PM[®] (a.i. bispyribac sodium) was previously on the list of approved products but was inadvertently left off of the 'current list' in our 2021 report (ETS, 2021).

As stated above, the calculator is simple to use and only requires two input parameters, although at least a dozen input parameters are already built into the calculator's ranking scheme (see EIQ equation above). If a Tier 2 evaluation is needed, we would conduct a more detailed evaluation of the pesticide's mobility, persistence, and toxicity for those pesticides that raise a concern in Tier 1 (the FEIQ). We found it unnecessary to perform a Tier 2 evaluation for the proposed pesticides at this time.

Presented in Table 1 are the seven proposed products and their active ingredients: two fungicides (two active ingredients) and five herbicides (nine active ingredients). Three of the proposed products are on EPA's reduced risk pesticide list¹. One product (the herbicide methiozolin) was recently registered in New York State in 2021 with restricted use. One additional proposed pesticide is not in the calculator: pyrimisulfan. However, we were able to obtain the results for the two missing pesticides directly from the NYSIPM (Table 3).

Table 2 provides a list of the pesticides that are currently available for use, and those that will be removed or discontinued. We evaluated one of the pesticides (bispyribac sodium) that had already been approved since it was inadvertently left off the approved list in 2021. There is no need to evaluate those that will be discontinued. This list is provided for completeness of products that can be used at the HNGC.

Table 3 provides the results of the EIQ's three components for the proposed pesticides. The individual components are also listed for all proposed pesticides. Each of the three components' values is compared with the risk rating (e.g., v. low, low, etc.) to show those pesticides with a potential risk and the component that is responsible for any elevated rating. It is recommended by the NYSIPM program that if a product contains more than one active ingredient the components should be calculated individually and then added together for the final result of each component. The NYSIPM program states that when actives are mixed they can present synergies or antagonisms that increase or reduce the hazard (Obregon, 2024).

¹ The Office of Pesticide Program's Conventional Reduced Risk Pesticide Program expedites the review and regulatory decision-making process of conventional pesticides that pose less risk to human health and the environment than existing conventional alternatives.

All but three of the proposed pesticides' active ingredients show very low to low FEIQ ratings (Table 3). The Sure Power product has four active ingredients and the components were added together as recommended. Sure Power has a total FEIQ of 41 (low, i.e., <50); however, the worker component shows a moderate rating of 61.9 due to 2,4-D, which suggests a moderate risk to the applicator/golfer. In any case, this product still has a low risk for the total FEIQ. The FEIQ for methiozolin (PoaCure) is low (34.3); however, the worker (i.e., applicator/golfer) has a moderate rating of 64. Pyrimisulfan (Akron) has a very low FEIQ rating of 2.23; however, the ecological component has a rating of moderate of 56. See Table 3 for these results.

CONCLUSIONS AND RECOMMENDATIONS

We recommend that all seven of the proposed products containing 11 active ingredients be approved for use as requested. In addition, we recommend that the labels be strictly followed for the three products whose results had a component with a moderate rating: Sure Power, PoaCure, and Akron. If the products are used according to the label, the risks can be minimized.

We provide a complete list of pesticides that can be used at the Hudson National Golf Club in Table 4 (i.e., current and proposed), assuming that the new products evaluated in this letter report are approved.

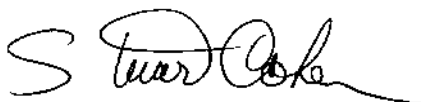
If you have any questions, please let us know.

Thank you,

LaJan Barnes, P.G., NY State (#000915-01)



Stuart Cohen, Ph.D.



cc: Brett Scales, HNGC

REFERENCES

Eshenaur, B., Grant, J., Kovach, J., Petzoldt, C., Degni, J., and Tette, J. www.nysipm.cornell.edu/publications/EIQ. Environmental Impact Quotient: “A Method to Measure the Environmental Impact of Pesticides.” New York State Integrated Pest Management Program, Cornell Cooperative Extension, Cornell University. 1992 – 2020.

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Obregon, Diana. 2024 EIQ User Guide (July 2024). New York State Integrated Pet Management Program. Cornell University.

New York State IPM Program. 2025. Field Use EIQ Calculator version 1.0. Accessed 14 February 2025. <https://eq.nysipm.org/calculator>.

Table 1. Proposed Pesticides and Use Information

Fungicides							
Product Name	Active Ingredient (a.i.)	EQ list?	% a.i.	Use Rate (e.g., oz/M)	# of Applications	Application Locations (G, T, A, F, R)	Use Needed/Target Pest
Densicor [®]	Prothioconazole	Y	41	8.5 oz/A	2	G,A,T,F,R	Take All Patch
Serata [™]	Picarbutrazox [‡]	Y	20.28	34.8 oz/A	2	G,A,T	Pythium
Herbicides							
Velocity [®]	Bispyribac Sodium [‡]	Y	76.1	0.75 oz/A	5	F,T (spot spray)	Poa Annua Removal
PoaCure [®]	Methiozolin	N*	25	1.2 oz/M	2	G, T, F (spot spray)	Poa Annua Removal
Arkon [™]	Pyrimisulfan	N*	1.24	1.7 oz/M	2	R, F (spot spray)	Nutsedge Removal
Sure Power ^{®**}	Fluroxypyr [‡]	Y	3.63	1 oz/M	2	R (spot spray)	Broadleaf Weed Control/ Poa Control
	Flumioxazin	Y	0.22				
	2,4-D	Y	36.33				
	Triclopyr	Y	3.63				
Dimension 2EW [®]	Dithiopyr	Y	24	16 oz/A	1	A, T, F, R	Crabgrass Control

Definitions: a.i. = active ingredient(s); oz/M = ounces per 1000 sq.ft.; G = greens, T = tees, A = approaches, F = fairways, R = roughs

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[‡] These three pesticides are on EPA's reduced risk pesticide list.

* These two products were evaluated by the NYSIPM program.

Table 2. Current Pesticide and Pesticides Requested for Removal (2025)

Trade Name	Active Ingredients		Trade Name	Active Ingredients
10 Current Use Fungicides			Nine Current Use Herbicides	
Pro Star	Flutolanil		Prograss	Ethofumesate
Emerald	Boscalid		Trimmit	Paclobutrazol
Fore	Mancozeb		MCP	MCP
Chipco 26GT	Iprodione		Barrage	2,4-D
Banner MAXX	Propiconazole		Banvel	Dicamba
Torque	Tebuconazole		Pendulum	Pendimethalin
3336 [®]	Thiophanate methyl		Treflon	Trifluralin
Chipco Signature	Fosetyl-Al		Lontrel	Clopyralid
Subdue MAXX	Metalaxyl		Velocity	Bispyribac-Sodium
Heritage	Azoxystrobin		Three Current Use Insecticides	
Three Fungicides for Removal			Dylox	Trichlorfon
Spotrete	Thiram		Merit	Imidacloprid
Terrazole	Etridiazole		Acelepryn	Chlorantraniliprole
Endorse	Polyoxin Zinc Salt			
Approved for Use Growth Regulator			Two Insecticides for Removal	
Trimmit	Paclobutrazol*		Sevin	Carbaryl
Primo	Cimectacarb*(Trinexapac-ethyl)		Scimitar	Lambda Cyhalothrin

Pesticides shown in grey shading are requested to be removed from the current use list.

* Paclobutrazol and trinexapac-ethyl (also known as cimectacarb) are also used as herbicides.

Table 3. HNGC Environmental Impact Quotient (EIQ)

Active Ingredients	Rate (oz/M)**	EIQ	Field EIQ	FEIQ Rating††	Worker FEIQ*	Worker Rating††	Consumer FEIQ‡	Consumer Rating††	Ecological FEIQ†	Ecological Rating††
FUNGICIDES										
Prothioconazole	0.195	49.3	11.2	very low	18.2	very low	7.3	very low	8.2	very low
Picarbutrazox [↓]	0.799	43.0	19.0	very low	21.2	very low	4.9	very low	30.9	low
HERBICIDES										
Bispyribac Sodium [↓]	0.017	23	0.9	very low	1.2	very low	0.3	very low	1.1	Very low
Methiozolin [√]	1.2	42	34.3	low	64	moderate	14	very low	48	low
Pyrimisulfan [√]	1.7	39	2.23	very low	48	low	13	very low	56	moderate
Fluroxypyr ^{§↓}	1	42.7	4.4	very low	8.2	very low	1.4	very low	3.5	very low
Flumioxazin [§]		46.3	0.3	very low	0.5	very low	0.1	very low	0.3	very low
2,4-D [§]		30.3	31.3	low	61.9	moderate	9.3	very low	22.7	very low
triclopyr [§]		48.2	5.0	very low	9.3	very low	1.7	very low	3.9	very low
Total for Sure Power	--	--	41	low	79.9	moderate	12.5	very low	30.4	low
Dithiopyr	0.367	21.7	5.2	very low	7.0	very low	1.8	very low	7.5	very low

**All application units were converted to oz/M (ounces/1000 sq ft) for simplicity of this table. Table 1 above shows the label units.

†† “Rating” in this context, means qualitative risk. The ratings are based on the values: <25 = very low; <50 = low; 50-99 = moderate; 100-199 = high; and 200+ = very high

* The worker component is equivalent to the applicator or athlete/golfer

‡ The leaching component (i.e., likelihood of leaching to ground water) includes food residue, which is not applicable on a golf course.

† The ecological component includes fish, birds, bees, earthworms, and beneficial pests

↓ These pesticides are on the EPA’s reduced risk pesticide list.

√ The results for these two pesticides were provided by the NYSIPM.

§ Sure Power active ingredients

NOTE: The Field Use EIQ calculator provides **unitless** relative safety ratings, standardized to lbs/acre, based on product weight and application area provided by user. Conversions are based on active ingredient characteristics using the environmental impact quotient formula described in this article. [A method to measure the environmental impact of pesticides.](#)

Table 4. Complete Approved Pesticide Use List for the HNGC (2021) and Proposed* (2025)

Trade Names	Active Ingredients
Fungicides	
Pro Star	Flutolanil
Emerald	Boscalid
Fore	Mancozeb
Spotrete	Thiram
Chipco 26GT	Iprodione
Banner MAXX	Propiconazole
Torque	Tebuconazole
3336	Thiophanate methyl
Terrazole	Etridiazole
Chipco Signature	Fosetyl-Al
Subdue MAXX	Metalaxyl
Heritage	Azoxystrobin
Endorse	Polyoxin Zinc Salt
Secure	Fluazinam
Posterity	Pydiflumetofen
Maxtima	Mefentrifluconazole
Insignia	Pyraclostrobin
Segway	Cyazofamid
Exemplar	Fluxapyroxad
Tourney	Metconazole
Densicor*	Prothioconazole
Serata*	Picarbutrazox
Herbicides	
Prograss	Ethofumesate
Trimmit	Paclobutrazol
MCP	MCP
Barrage	2,4-D
Banvel	Dicamba
Pendulum	Pendimethalin
Treflon	Trifluralin
Lontrel	Clopyralid
Pylex	Topramezone
Acclaim	Fenoxoprop
Segment II	Sethoxydim
Tenacity	Mesotrione
Quick Silver	Carfentrazone-ethyl
Barricade	Prodiamine
Velocity*	Bispyribac-sodium
Poa-Cure*	Methiozolin
Arkon*	Pyrimisulfan
SurePower*	Fluroxypyr*, Triclopyr*, Flumioxazin*, 2,4-D
Dimension 2EW*	Dithiopyr

Table 4. (cont'd)	
Insecticides	
Sevin	Carbaryl
Dylox	Trichlorfon
Scimitar	Lambda Cyhalothrin
Merit	Imidacloprid
Acelepryn	Chlorantraniliprole
Talstar	Bifenthrin
Ferrence	Cyantraniliprole
Matchpoint	Spinosad
Growth Regulators	
Trimmit	Paclobutrazol
Primo	Cimectacarb (Trinexapac-ethyl)
Anuew	Prohexadione-Ca

* These seven products are proposed for use in 2025. One product is already on the approved list but is tagged here for completeness in this report.