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June 28, 2010

Office of Pesticide Programs (OPP)
Regulatory Public Docket (7502P)
U.S. Environmental Protection Agency (U.S. EPA)
1200 Pennsylvania Ave., NW.
Washington, DC 20460–0001

RE: Nanosilver Antimicrobial Pesticide Products; Registration Application (Docket Number EPA–HQ–OPP–2010-0325)

The purpose of this letter is to comment on the application to register nanosilver as an antimicrobial and preservative additive. We are pleased to have the opportunity to provide U.S. EPA information from our experience and scientific literature, with the goal of helping U.S. EPA ensure the environmental risk assessments for nanosilver are complete and accurate and informing U.S EPA's risk management decision. Our comments focus specifically on the environmental risks of silver discharges to publicly-owned wastewater treatment plants (POTWs).

Tri-TAC is a technical advisory committee representing the League of California Cities, California Association of Sanitation Agencies, and California Water Environment Association. We seek to improve the effectiveness and accountability of environmental programs that affect publicly owned treatment works in California by working with regulatory agencies and interest groups on treatment plant-related issues.

Tri-TAC members are very concerned about the water quality impacts from the discharge of silver and nanosilver in particular into our municipal wastewater systems. These concerns have been expressed in our previous letters to U.S. EPA and in letters from our colleagues at the Bay Area Clean Water Agencies (BACWA) and the National Association of Clean Water Agencies (NACWA). We appreciated U.S. EPA's decision to regulate silver ion-generating products like the Samsung "Silver Wash" washing machine. This decision recognized our concerns about the potential water quality impacts of residential pesticide uses—and affirmed U.S. EPA's responsibility to regulate releases of pesticidal silver into the environment.

Tri-TAC's Interest in Silver-Based Pesticides

Silver is highly toxic to aquatic life at low concentrations, is persistent, and can bioaccumulate in some aquatic organisms, such as clams. Due to concerns about

bioaccumulation and the placing of strict silver effluent limits in discharge permits, POTWs have implemented pollution prevention programs to identify and reduce silver discharges to sanitary sewer systems. These programs have been very successful in reducing POTW influent and effluent silver concentrations. These programs have also reduced silver concentrations in biosolids (sewage sludge), ensuring that silver will not limit options for biosolids reuse.

As discussed at length in the enclosed BACWA letter, the enclosed report by the Woodrow Wilson International Center for Scholars (Luoma 2008), and in enclosed scientific papers, ordinary use of silver-containing pesticides releases silver to municipal wastewater treatment systems. Widespread use of household products that release silver particles into sanitary sewer systems could increase silver concentrations in POTW influents, effluents, and biosolids. If silver pesticide product use becomes common, wastewater silver discharges could reach levels not seen in the last two decades—and could have adverse impacts on our wastewater treatment process as well as on the quality of our effluent and biosolids.

POTWs are subject to National Pollutant Discharge Elimination System (NPDES) permits under the Clean Water Act. These permits include toxicity limits and may also include quantitative effluent limitations for silver. Exceeding these limitations has serious consequences, including monetary fines and penalties and the risk of citizen lawsuits. Under California law, our members are liable for daily Mandatory Minimum Penalties should violations of their discharge permits occur.

Nanosilver and POTWs

Available scientific information indicates that it will be important for the POTW discharge assessment to include a special assessment of the wastewater discharges from nanosilver products. Silver particle size and form (e.g., zeolite) may significantly alter the way silver-containing products affect POTWs. For example:

- The quantity and/or nature of silver discharged to POTWs may be affected by the small particle size and large surface area of nanosilver products as compared to other silver biocides. For example, Benn and Westerhoff (2008) found that for certain products, silver losses during washing were so large that most of the silver in these products would be washed into the municipal wastewater system during the products' lifetimes. (A copy of this paper is enclosed.) Where small particles occur in products, the entire particle could be washed down the drain.

- Nanosilver particle may have extraordinary effects on POTW treatment processes. In two related studies, Choi and Hu (2008) and Choi et al. (2008) found that silver particles less than 5 nanometers in diameter are uniquely toxic to nitrifying bacteria, which are critical to biological nutrient removal at POTWs. (Copies of both papers are enclosed).

- Differing removal efficiencies. POTWs tend to be most efficient at removing larger particles from wastewater. Tiny particles and zeolites may have different potential to pass through POTWs than other forms of silver.

- Particle size is known to modify silver's aquatic toxicity. For example, see Griffitt et al. 2008, enclosed.

Widespread Use of Silver-Based Pesticides Is Not Sustainable

It is distressing to POTWs to observe the increasing prevalence of household products that use silver and other toxic chemicals for general antimicrobial purposes. POTWs are proud of our history of taking effective actions that reduce discharges of toxic pollutants to the environment. While POTWs have the authority to regulate industrial and commercial sources of silver and other toxic pollutants, we have little or no control over the discharge of pollutants from the thousands of households we serve. Silver is a toxic metal that cannot degrade in the environment and is registered for use as a pesticide in numerous products. To allow the unrestricted usage of products that intentionally release silver into the environment would be an irresponsible neglect of the principles of environmental sustainability that should strongly influence U.S. EPA's decisions.

Thank you for your consideration of our comments on the application to register nanosilver as an antimicrobial and preservative additive. If you have any questions, please contact Gail Chesler, at (925) 229-7294 or chesler.gail@gmail.com.

Sincerely,

Ben Horenstein

Ben Horenstein
Tri-TAC Chair

Enclosures:

1. Pla, M. Bay Area Clean Water Agencies (2009). Comment letter – petition for Rulemaking Requesting U.S. EPA Regulate Nanoscale Silver Products as Pesticides. Letter to Nathanael R. Martin, U.S. EPA. March 19.
2. Luoma, S. N. (2008). *Silver Nanotechnologies and the Environment: Old Problems or New Challenges?* Woodrow Wilson International Center for Scholars, Project on Emerging Nanotechnologies. Publication PEN 15. September.
3. Benn, T. M. and P. Westerhoff (2008). "Nanoparticle silver released into water from commercially available sock fabrics." *Environmental Science & Technology* **42**(11): 4133-9 (published correction is included).
4. Blaser, S. A., M. Scheringer, et al. (2008). "Estimation of cumulative aquatic exposure and risk due to silver: Contribution of nano-functionalized plastics and textiles." *Science of the Total Environment* **390** (2-3): 396-409.

5. Choi, O. and Z. Hu (2008). "Size dependent and reactive oxygen species related nanosilver toxicity to nitrifying bacteria." *Environmental Science & Technology* **42**(12): 4583-8.
6. Choi, O., K. K. Deng, et al. (2008). "The inhibitory effects of silver nanoparticles, silver ions, and silver chloride colloids on microbial growth." *Water Research* **42**: 2066-2074.
7. Griffitt, R. J., J. Luo, et al. (2008). "Effects of particle composition and species on toxicity of metallic nanomaterials in aquatic organisms." *Environmental Toxicology & Chemistry* **27**(9): 1972-8.
8. Pesticide Transport to POTWs – conceptual model diagram and diagram of examples of direct and indirect pathways between pesticide uses and POTWs

Note: Enclosures 3 through 7 are copyrighted materials that cannot be posted in the public docket. These have been submitted via email to Heather Garvie. We request that U.S. EPA provide these materials to all staff that are reviewing these comments.

cc: Steve Owens, Assistant Administrator, Office of Preventing, Pesticides, and Toxic Substances
Steven Bradbury, Acting Director, U.S. EPA Office of Pesticide Programs
William R. Diamond, Director, Field and External Affairs Division
Jack Housenger, Director, Biological and Economic Analysis Division
Lois Rossi, Director, Registration Division
Joan Harrigan-Farrelly, Director, Antimicrobials Division
Betty Shackleford, Associate Director, Antimicrobials Division
Norm Cook, Branch Chief, Antimicrobials Division
Demson Fuller, U.S. EPA Office of Pesticide Programs
Peter Silva, Assistant Administrator, U.S. EPA Office of Water
Ephraim King, Director, U.S. EPA Office of Water, Office of Science and Technology
James A. Hanlon, Director, U.S. EPA Office of Water, Office of Wastewater Management
Jared Blumenfeld, Administrator, U.S. EPA Region 9
Alexis Strauss, Director, Water Division, U.S. EPA Region 9
Patti TenBrook, Life Scientist, U.S. EPA Region 9
Syed Ali, California State Water Resources Control Board
Nan Singhasemanon, California Department of Pesticide Regulation
Jeff Wong, Chief Scientist, California Department of Toxic Substances Control
Kelly D. Moran, Urban Pesticides Pollution Prevention Project
Chris Hornback, Senior Director, Regulatory Affairs, National Association of Clean Water Agencies
Preeti Ghuman, Los Angeles County Sanitation District
Gail Chesler, Central Contra Costa Sanitary District
Lorien Fono, Carollo Engineers