

To: John Pawloski, Michigan Department of Environmental Quality

From: Richard R. Rediske, Ph.D. Professor of Water Resources. Grand Valley State University

Re: Scotchguard (PFOS) usage at the Wolverine Worldwide Rockford, MI Tannery.

I have reviewed historical records from the Wolverine World Wide (WWW) Rockford, MI Tannery concerning the use of Scotchguard in the production of Hush Puppy shoes. In the early 1950s, 3M developed a group of waterproofing chemical called perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS) that were incorporated into the commercial product called Scotchguard (Hekster et al. 2003). Due to environmental and human health concerns, Scotchguard waterproofing formulations containing PFOS and PFOA were discontinued in 2002 (Buck et al. 2011). In consideration of readily available information from the Wolverine Worldwide Web site, newspaper articles, and process patents and trade publications, it is well established that WWW used Scotchguard during the time it was known to contain PFOS.

1. "Availability of pigskin opened the door to a range of possibilities in shoemaking. The introduction of Scotchgard Protector for Leather, made the company's leather the first performance leather on the market. The year was 1958 and it was when the Hush Puppies brand was born. This leather featured the breathability, durability, water, oil and stain repellency, and easy care maintenance that is still the company's platform."
(<http://www.wolverineleathers.com/aboutus.php> Accessed 1/24/17)
2. "The company (WWW) was the first to add Scotchgard, water-resistant chemical to the suede, to make it easy to clean and maintain, according to the younger Krause, the grandson of Victor Krause." (http://blog.mlive.com/grpress/2008/03/hush_puppies_mark_50_starstudd.html. Accessed 1/24/2017)
3. <https://www.google.com/patents/US20060288493> (WWW Process For Producing Leather Footwear Lining)
4. <https://www.google.com/patents/US20060288494>. (WWW Process for producing leather)
5. Victor (Krause) designed a casual pair of men's shoes using the new material. He treated the pigskin with Scotchguard to protect the material.... Released in 1958, this was the first Hush Puppy. Feet and Footwear: A Cultural Encyclopedia 2009. M. DeMello. Greenwood Press ISBN-10: 0313357145.
6. The 1991 Spill Plan authored by Fishbeck, Thompson, Carr, and Huber lists Scotchguard related materials being stored on site.
7. Scotchguard was found to be listed on MSDS sheets reviewed by the Citizen's Group.

Based on this information, it is likely that the Wolverine World Wide Tannery in Rockford Michigan manufactured Hush Puppy shoes using PFOS containing Scotchguard from 1958 until it was banned in 2002. Moreover, industrial wastes, scrap leather, wastewater, and process streams produced in Rockford during this time all may have contained PFOS residuals for at least 44 years. Wastes disposed on site, residuals from spills, production wastes disposed of offsite in landfills, local groundwater, and scrap leather buried onsite all have the potential to contain PFOS. In a recent meeting on 8/22/16 at West Michigan Environmental Action Council, both Michael Robinson (attorney for WWW) and Mark Westra (consultant, Rose and Westra) stated that there was no evidence that PFOS was ever used at the Rockford Tannery site. This statement contradicts all the above information.

In 2013, the MDEQ completed a study of fish in the Rockford Impoundment downstream for the WWW Tannery and found elevated levels of PFOS in small mouth bass and white sucker. These levels were sufficient to result in the issuance of a fish consumption advisory for PFOS. Based on the presence of elevated levels of PFOS in area fish and the overwhelming likelihood of significant PFOS usage at the site, it is imperative that soils, groundwater and scrap leather deposits be analyzed for this chemical before closure plans move forward. There are many deposits of scrap leather that are exposed to overland runoff and that can easily enter Rum Creek and the Rogue River. If PFOS is found, offsite disposal areas need to be evaluated for soil and groundwater levels of PFOS. This potential problem will not go away with neglect and denial by WWW. An investigation of PFOS at the former WWW Rockford Tannery needs to be undertaken as a matter of environmental and public health.

Buck, R. C., Franklin, J., Berger, U., Conder, J. M., Cousins, I. T., De Voogt, P., & van Leeuwen, S. 2011. Perfluoroalkyl and polyfluoroalkyl substances in the environment: terminology, classification, and origins. *Integrated environmental assessment and management*. 7(4): 513-541.

Hekster, Floris M., Remi WPM Laane, and Pim de Voogt. 2003. Environmental and toxicity effects of perfluoroalkylated substances. *Reviews of Environmental Contamination and Toxicology*. 179: 9-121.