The Environmental Protection Agency's Upgrades of the Health Risks for Trichloroethylene and Perchloroethylene

by Donald P. Gallo, Esq., Reinhart Boerner Van Deuren s.c.

Some polyurethane processes use trichloroethylene ("TCE") or perchloroethylene ("PERC") to degrease and clean metal parts prior to applying a polyurethane coating. The EPA has re-evaluated the toxicity and risks associated with TCE and PERC and upgraded the cancer designations for TCE and PERC. TCE was also recently classified by the EPA as having a link to Parkinson's disease. PERC was also shown to be linked to Parkinson's disease by a scientific study (Annals of Neurology).

In September 2011, EPA issued a report titled Toxicological Review of Trichloroethylene (U.S. EPA, 2011). A summary of findings is provided in EPA's Integrated Risk Information System (IRIS) database. The findings conclude TCE is a "human carcinogen."

In the IRIS toxicological review, TCE was described as having a mutagenic mode of action for cancer notably kidney cancer. TCE also was determined to pose a risk for developing non-Hodgkin's lymphoma ("NHL") and liver cancer. Evidence also included an association between TCE exposure and other types of cancer, including bladder, esophageal, prostate, cervical, breast and childhood leukemia.

On February 10, 2012, PERC was designated by EPA as a "likely human carcinogen." EPA's assessment is now part of the IRIS database. PERC is a chemical with widespread use including as a metal cleaning solvent in the dry cleaning industry, in textile processing (drycleaning) and as a make-up chemical in chemical formulations. Because of its widespread use, PERC has been detected in the surface water, groundwater, air, soil, waste sites, food and breast milk.

EPA's last assessment of PERC occurred in 1988. In 2008, EPA released a draft assessment of PERC and concluded PERC was a likely human carcinogen. Available studies have linked PERC with bladder cancer, NHL and multiple myeloma. PERC can also cause non-cancer neurological, kidney and immune system related effects.

From the non-carcinogenic perspective, EPA recalculated the chronic oral exposure reference dose ("RfD") for PERC as 0.006 mg/kg-day, which is less than the previous RfD of 0.01 mg/kg-day. The RfD is an estimate of daily oral exposure to the human population that is likely to be without an appreciable risk of deleterious effects during a lifetime. The new RfD (0.006 mg/kg-day) is equivalent to a drinking water concentration of 0.21 mg/L., assuming a body weight of 70 kg (approximately 155 pounds) and a daily water consumption of two liters.

Reference concentrations ("RfCs") can also be derived for the non-carcinogenic health effects of substances.[1] The RfC is an estimate of a continuous inhalation exposure to the human population that is likely to be without appreciable risk of deleterious effects during a lifetime. The non-carcinogenic RfC for PERC for chronic inhalation exposure was calculated to be 0.04 mg/m^3. The previous RfC was 0.27 $mglm^3$. The new RfC for PERC will result in a significant increase of the Hazard Quotient ("HQ") (non-carcinogenic health effect) for PERC.[2]

Additionally, EPA has revised the quantitative estimate of carcinogenic risk for PERC from inhalation exposure (or the Inhalation Unit Risk – "IUR") to be $2.6x10^{-7}$ ug/m^3.[3] Utilizing the new IUR for PERC of $2.6x10^{-7}$ ug/m^3 vs. the old IUR of $5.6x10^{-6}$ ug/m^3 results in a decreased estimated excess lifetime cancer risk for PERC.[4]

Thus, the carcinogenic risk of PERC has slightly decreased and the non-carcinogenic risk has increased. Still, EPA has designated PERC as a likely human carcinogen.

The September 2011 EPA assessment that TCE is a human carcinogen and the February 2012 EPA assessment that PERC is a likely human carcinogen will enable the EPA and states to move forward and set more health protective TCE and PERC standards for drinking water, air emissions, soil contamination and vapor intrusion. There may also be an uptick in litigation involving communities and citizens impacted by exposure to TCE and PERC in various media including through vapor intrusion, to the sources of the TCE and PERC. Finally, EPA's designation may spur development of non-hazardous or less hazardous substitutes for TCE and PERC.

References

[1] These substances may also be carcinogens. It is essential to refer to other sources of information concerning the carcinogenicity of a chemical substance.

[2] The calculation of HQ is: HQ: Exposure concentration/RFC x 1000.

[3] The EPA defines an IUR in the Integrated Risk Information System glossary as "the upper-bound excess lifetime cancer risk estimated to result from continuous exposure to an agent at a concentration of 1 ug/m^3 in air."

[4] Since risk is calculated as: Risk = IUR x exposure concentration x (apportion risk from number of years of exposure).

One of Eighty-Three Chemicals Identified by EPA for Risk Assesment Study

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On March 1, 2012, the Environmental Protection Agency ("EPA") released a work plan that listed 83 chemicals or groups of chemicals for which it will conduct risk assessments. EPA said it selected the 83 chemicals using criteria it announced in 2011. These criteria include chemicals deemed to be persistent, bioaccumulative, and toxic; chemicals used in children's or consumers products; and chemicals detected in humans. If warranted, EPA will take risk management actions for these chemicals, including regulating some of them.

EPA already has begun assessing the risks of seven chemicals or groups of chemicals of the 83 chemicals. Nearly all of the seven chemicals which will be evaluated by EPA during 2012 are used in consumer products and several of the chemicals have been identified by EPA as probable human carcinogens. These include:

- Antimony and related compounds;
- 1,3, 4, 6, 7, 8-hexahydro-4, 6, 6, 7, 8, 8,-hexamethylcyclopenta [g]-2 benzopyran (HHCB);
- Long-chain chlorinated paraffins;
- Medium-chain chlorinated paraffins;
- Methylene chloride;
- N-methylpyrrolidone; and
- Trichloroethylene ("TCE").

Some of the assessments are to be completed by the end of 2012. If the risk assessment indicates significant risk, EPA will evaluate and pursue appropriate risk reduction actions. If an assessment indicates no significant risk, EPA will conclude its current work on that chemical.

It should be noted that TCE was recently designated in September 2011 as a human carcinogen by the EPA. TCE is sometimes used in polyurethane processes to clean metal parts prior to applying a polyurethane coating. Additionally, perchloroethylene, another frequently used solvent, was designated by EPA as a likely human carcinogen in February 2012.

4,4' – Methylenebis (2-chloroaniline) ("MOCA") is included in the list of 83 chemicals and is noted as a known human carcinogen. MOCA was given a hazard score of "3", the highest score given by EPA for a chemical or group of chemicals, likely because of its carcinogenicity. EPA also states MOCA is widely used in consumer products and is present in ambient air. However, there have been relatively small reported releases of MOCA to the environment. Thus, EPA gave MOCA an exposure score of "2" out of "3". Additionally, MOCA is noted to have a moderate environmental persistence and low bioaccumulation potential. For those two categories, EPA has given MOCA a combined score of "2" out of "3".

EPA's newly finalized Chemical Data Reporting Rule under the Toxic Substance Control Act will provide chemical reporting that will allow EPA to obtain updates on chemicals manufactured or imported in quantities greater than the 25,000 pound reporting threshold and this may result in increased risk evaluations for those chemicals by the EPA.

Member Services Committee Update

by Joe Bell,
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The PMA Member Services Committee is revising our current PMA website using new and improved software. This will allow us to make changes and update the site internally, which will save the association money and allow for much more timely changes. The new software is very user-friendly.

The new website will become an improved tool to gain new members and will make it much easier to join the PMA. We also intend to make this site a better tool for all members.

The Committee is also working to improve the visibility of the site and keep PMA visible on search engines.

Now is a great time for any member to let us know of any additions or functions that you would like to see. Please forward any suggestions to joe.bell@anddev.com.