

DECLARATION OF DR JOCHEN MÜLLER

I, Dr. Jochen Müller, state and declare as follows:

1. I along with Dr. Caroline Gaus of the National Research Centre for Environmental Toxicology, Mr Vincent Alberts, Queensland Health Scientific Services and Professor Michael Moore of Queensland Health Scientific Services was the author of the report entitled the "*Examination of the potential exposure of Royal Australian Navy (RAN) personnel to polychlorinated dibenzodioxins and polychlorinated dibenzofurans via drinking water*", prepared for the Australian Department of Veterans' Affairs.

3. I studied at the University of Hohenheim where I received a diploma and a Master of Science in Agriculture-Biology in 1992. I received my PHD at Griffith University, Nathan Queensland in 1997. My early research focused on transfer pathways of dioxin-like chemicals from contaminated sites into (food) plants. In 1997 I joined the National Research Centre for Environmental Toxicology where over the years I established a research focus on sources, fate and human exposure to persistent organic pollutants. I have lead various studies for Australia's National Dioxin Program and the Brominated Flame Retardant Programs. The focus of my research is on identifying pollutants and measuring their potential effects on people and the environment. I have published about 150 scientific publications that have received around 4000 citations (for detail see <http://www.researcherid.com/rid/C-6241-2008>).

4. This study was undertaken because representatives of the Australian Department of Veterans' Affairs noted a significant increase in cancer incidence among Royals Australian navy veterans who never set foot in Vietnam, higher even than the incidence rates among soldiers who fought in country. The study was accepted for presentation at the 21st International Symposium on Halogenated Environmental Organic Pollutants and POPs and is published in the associated peer reviewed conference proceedings: Müller, J.F., Gaus, C., Bundred, K., Alberts, V., Moore, M.R., Horsley, K., 2001. Co-distillation of TCDD and other POPs during distillation of water - a potential source for exposure. *Organohalogen Compounds* 52, 243-246. The results of the study were also accepted for presentation at the IXth International Congress of Toxicology; the abstract is published in: Mueller, J.F., Gaus, C., Bundred, K., Moore, M.R., Horsley, K., 2001. Water volatility of disowns - exposure through consumption of distilled water. *Toxicology* 164, 157-158. The study was also cited in "*The Third Australian Vietnam Veterans Mortality Study*" published in 2005 by the Australian Department of Veterans' Affairs and Australian Institute of Health and Welfare and resulted in the Department's consideration of Royal Australian Navy Vietnam Veterans as potentially exposed Vietnam Veterans. Shortly after the study's publication, the Australian government began to modify its "Statement of Principles" to grant the presumption of exposure and benefits to those who served afloat in the operational area, which is 185.2 kilometers from the former Republic of Vietnam.

5. I have been informed that the United States Department of Veterans Affairs claims that the study reviewed a "reverse osmosis" process rather than a steam operated evaporation process. That is not correct. The only reference to this process in the study was near the bottom of page 13 which described the methodology and parameters used in the testing. In this portion of the report we indicated that the pertinent chemicals were added to a one litre flask, then pure water,

that had been through the reverse osmosis process to remove any contaminants, was added. At that point the known quantities of sodium chloride and sediment were added to replicate the estuarine waters of the South China Sea.

6. The diagram on page 14 clearly shows an evaporation system rather than reverse osmosis system. The laboratory distillation unit adopted the key elements of the evaporation system to replicate the distillation process used on warships at the time. Consequently the statement that our study was based on the "reverse osmosis" process is categorically wrong.

7. Ships in the near shore marine waters collected waters that were contaminated with the runoff from areas sprayed with Agent Orange. The distilling plants aboard the ship, which converted the salt water into potable drinking water, actually enhanced the effect of the Agent Orange. The study noted that there was an elevation in cancer in veterans of the Royal Australian Navy which was higher than that of the Australian Army and Royal Australian Air Force. To my best knowledge this was confirmed by "*The Third Australian Vietnam Veterans Mortality Study.*"

8. The evaporator distillers – as far as I am aware - all work on similar principles to produce water (feed water) for the boilers and potable water for the ship's crew. Water is introduced from the sea and is passed through the distilling condenser and air ejector condenser where it acts as a coolant for the condensers. It is then sent through the vapor feed heater into the first effect chamber and into the second effect chamber where it is changed to water vapor. Vapor then is passed through a drain regulator into a flash chamber and passes through baffles and separators into the distilling condenser where it is condensed into water and pumped to the ship's water distribution system. Sea water not vaporized is pumped over the side by the brine pump. This is the same process discussed in our study.

9. Reverse osmosis is a completely different process using a semipermeable membrane. An applied pressure is used to overcome osmotic pressure. The membrane allows water to pass through while preventing the passage of solids such as the sodium chloride in sea water. A high pressure is exerted on the high concentration side of the membrane to overcome the natural osmotic pressure. The reverse osmosis process was not the basis of our study.

I declare under penalty of perjury under the laws of the United States of America, that the foregoing is true and correct to my best knowledge.

Executed this 4th day of February, 2014.


Jochen Müller