Document tendered by
Andrew Helps
Received by
Stewart Smith
Date: 13/10/2014
Resolved to publish (Yes) / No

Non Commissioned Report

For: Natalie O'Brien
Senior Reporter
The Sun-Herald Newspaper

From : Dr. Ir. Ron McDowall OBE.
International Consultant Scientist/Engineer for UN-FAO
Mission Specialist Toxic, Hazardous, Dangerous Chemical and Nuclear Wastes

Preamble

I have reviewed the various test and sampling performed on the Orica Botany Bay site you have described to me in your email of 11 July 2014. I have specifically reviewed those results labelled Sample 01 to 06 as they relate to those areas that are frequented by public, in particular children.

Sample results

The sample test results show some levels of the following chemicals in all samples.

PCB, HCB, DDT, Lead, Mercury, Dieldrin and various others at lower levels. In other words several organics, metals etc. exist at this site. The levels in themselves are generally on the low side but when I calculate the Hazard Index (HI) for these chemicals there is cause for concern. The HI's in some cases e.g. PCB and DDT are very high, and the precautionary principle therefore must be applied.

Hazard Index

The hazard index (HI) is the sum of the hazard quotients (HQ), i.e. the ratios between exposure and the reference value (RV) for each chemical sampled. When the RV of a certain compound is based on an effect that is not the group effect (common toxic effect), or the applied assessment factor includes adjustments not related to the endpoint of concern, then the HQ can be refined by identifying the RV for the group effect and adjusting the hazard quotient, accordingly. In this situation an adjusted HI (aHI) is then calculated. When the HI is less than 1.0 the combined risk is considered acceptable; values higher than 1.0 would indicate potential health concern to be considered. The aHI's I have calculated from the EPA sampling results for PCB is 90, for HCB its aHI is 1.6, Dieldrin aHI is 28, DDT greater than 80. Clearly these HI levels are of great concern. The lead (pB) levels are "normal" in the sense that Lead is found everywhere and the level here is not excessive but when combined with other toxic chemicals the synergistic effects can't be ignored.

Conclusion

Generally when we look at toxic chemicals in the environment we normally are interested in the toxicity of only one or two chemicals. In this case there are many dangerous chemicals and we just don't know the combined effect of a group of toxic chemicals. It's likely that the chemical group may be synergistic and thus the group may have a higher HI than the individual chemicals. In other words if a child were to lick their hands after playing in the soil at this site, not only would they consume PCB but also Lead and perhaps DDT and other heavy metals. We don't really know what the compound effect is when several toxic chemicals are ingested at once.

I note that the samples 1-6 were taken at the "green" area edges, none were taken at the centre or even at the old tankage foundations that can be seen on the satellite photo. It's clear from the sampling that for many years (the DDT has degraded to DEE and DDD indicating some decades have passed) various chemicals were dumped (and perhaps PCB transformers stored) or placed in open storage at the site. It is clearly grossly contaminated land and should be treated as such. Children and public in general should not play on this land and it should be remediated if the plan is to use it for play or sports areas etc.

Applying the precautionary principle the land area should be fenced off until further extensive site sampling is complete (I would expect at least 100 samples over the entire site be taken at various depths). The samples taken so far are inadequate and normalising or averaging samples from across the street is inappropriate should not be performed for this area. If remediation is to be contemplated then this should involve removal and landfilling of the soil down to a metre, removing old tank bases, new testing performed and then new soils placed back and the area grassed.

Dr. Ron McDowall