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## Memorandum

To whom it may concern,

**RE: Summary of Radioactivity Survey of former "Wallaceville Animal Research Station" at Ward Street, Upper Hutt**

Three ENGEO personnel undertook a surface survey at the former "Wallaceville Animal Research Station" ('the site') between 30 June and 02 July 2015. This survey used a systematic approach to monitor all areas of the site formerly used as 'paddocks' as the waste pits had already been remediated and surveyed with negative results for the presence of radiological impact. The survey was designed to identify the potential presence of residual quantities of radioactive cobalt-60 ( $^{60}\text{Co}$ ) in the shallow soil as this is the most likely radionuclide to still be remaining following the sites use.

The western and southern areas of the site that had formerly been used as paddocks were divided into 22 separate zones of varying sizes. Within each of the zones the personnel walked out a number of parallel 'transects' spaced 5m apart (covering an aggregate total of approximately 80 km walking distance) with a radiation monitor (Geiger counter) continuously held close to the ground surface. The monitor used was capable of detecting gamma radiation which is emitted from  $^{60}\text{Co}$  sources. Gamma radiation is more likely to be detected than alpha and beta radiation as it is not easily stopped by a covering of top soil or vegetation.

Prior to the survey, the performance of the radiation monitors was tested with a radioactive  $^{60}\text{Co}$  source at the National Isotope Centre prior to the survey, and they were found to be suitably responsive and slightly over-sensitive.

The 'counts per minute' (CPM) rate as displayed by the radiation monitors was first measured at five fixed locations outside the site boundary to establish the local background radiation levels, and was then monitored continuously during the course of walking out the transects. Statistical analysis of the background radiation levels allowed the definition of the 'significant reading' levels that the personnel were to note during the survey.

A total of 39 point-locations were identified as giving 'significant readings'; however at each of these locations it was found that the elevated count rate decreased to background levels, when held stationary at the location. This behaviour is inconsistent with there being a concentration of  $^{60}\text{Co}$  within the shallow soil, as this would produce a steady higher reading.

Overall, the evidence from this survey identified that it is highly unlikely that any significant residual quantities are present within the shallow soils in the paddocks at the site. The 'significant readings' that were detected were deemed to be within the natural statistical variation of the background radiation at the site – observation of the count rates during the survey indicated that the 50 background radiation data points gathered were insufficient to fully characterise the variability of the local background, and hence the 'significant reading' thresholds were set at inappropriate levels.