

16 June 2015

Project No. 1531085-002-L-Rev0

Felicity Boyd
Upper Hutt City Council
Private Bag 907
Upper Hutt 5140

RE: CONTAMINATED LAND REPORTS SUPPORTING WALLACEVILLE PLAN CHANGE

Dear Felicity

Upper Hutt City Council (UHCC) contracted Golder Associates (NZ) Ltd (Golder) to review contaminated land reports and letters supporting a private plan change application relating to land at Wallaceville, Upper Hutt, formerly an animal research centre ('the site'). Our letter of 19 May 2015, reference 1531085-001-L, presented findings and recommendations relating to a number of reports by Tonkin and Taylor Ltd (T&T) and Engeo. Subsequently Engeo has responded to that review by way of a letter to UHCC dated 3 June 2015, and has also supplied UHCC with a copy of a letter report 'Radioactivity desk study for former Wallaceville Animal Research Station at Ward Street, Upper Hutt'. Engeo has also supplied further information direct to Golder by email (attached). We now comment on those responses¹.

Microbiological contamination

Engeo advised that it has interviewed one Allen Heath, a former AgResearch employee who worked at the Wallaceville site from 1965 until recently. According to Engeo, Heath stated that

"...zoonosis (risk of transfer of disease from animals to humans) was not applicable for many of the diseases studied at the centre. A large part of the research was devoted to nutrient disorders and similar. Only a limited amount of research was carried out which presented a potential human health risk... Slaughtered animals were not buried at any point during [Heath's] employment at the site; all carcasses were cremated in the on-site incinerator, or the meat from the animals was sold to employees for personal consumption"

On prompting by Golder, Engeo obtained additional information from Heath, and we quote selected points directly from the Engeo email (King to Bull, 10 June 2015):

"The focus of research was on diseases that naturally occurred in the NZ livestock population, so 'exotic' diseases such as anthrax were not researched..."

A key area of research was bovine TB. Although this can transmit to human this was not applied to the land and instead was handled under very strict controlled lab conditions with workers being regularly health-checked..."

...Allen has no recollection of animals grazing in the paddocks becoming ill at any point in his time working at Wallaceville..."

¹ This letter is provided subject to the document limitations statement attached.



Engeo further notes that there has been an incinerator on-site since the research station opened in the early 1900s. Fifteen identified waste dumps were excavated by T&T in 2008, but no carcasses or offal were reported². Other Engeo findings confirm that nutrient disorders were a key focus of site research. These observations support Heath's statements.

Engeo states that the research station employed over 100 staff in its heyday, and some of those staff lived on site; Engeo has discovered no evidence of any human health incidents. Based on this evidence of good practice (for the time) and no adverse events, Engeo infers that the health risk posed by any microbiological contamination is low. We suggest that a lack of health impacts on staff could be because they were trained scientists and specialists who adopted good practices in handling infectious substances, and did not live in the same quarters as the animals they studied (though the practice of eating some slaughtered animals may challenge this view). In our view, the apparent absence of disease outbreaks among animals kept at the site over many decades is stronger evidence against there being significant residual pathogenic microorganisms in site soils.

Radiological contamination

The Engeo radiological desk study presents detailed information on the use and probable fate of radionuclides in research undertaken at the site. We are aware that radiochemistry was popular at other New Zealand research facilities during the 1970s, for example the University of Canterbury's Department of Chemistry, so the situation described by Engeo is not unexpected.

Engeo developed a risk model based on the radionuclides and activities identified at the site, and concluded that redevelopment of the site was unlikely to result in elevated human health risks from residual radioactivity. The model is conservative at a number of points, not least in that Engeo uses a risk threshold of a one-in-a-million additional lifetime cancer risk, which is 10-fold more stringent than the 10^{-5} target usually adopted in contaminated land assessment in New Zealand. This finding is further supported by radiological measurements from disposal areas identified as receiving low-level radiological wastes (T&T 2004³), which reported no results significantly above natural background. Moreover, wastes from these disposal areas have been removed from site (T&T 2008).

However, Engeo has advised Golder by email (King to Bull, 12 June 2015) that T&T confirms it did not carry out a general radiological survey of paddocks where radionuclides were applied to land. Thus, although the risk model reasonably predicts that residual radiological contamination should be close to background levels, that prediction has not been verified.

Golder considers this Engeo letter report to be a well-designed and credible contribution to the body of knowledge on the site. Nonetheless, because the general public may perceive the risk associated with radiological materials to be great despite calculations to the contrary, we suggest that UHCC and the applicant may wish to consider field assessment of selected paddocks where cobalt-60 is thought to have been applied, to prove that residual levels are uniformly as low as predicted.

Other contaminated land issues

Engeo proposes that further investigation and/or remediation will be undertaken on development of land where elevated arsenic has previously been reported, and at one location where carbon tetrachloride has been detected. Buildings will be surveyed for asbestos-containing materials before demolition. Ground-penetrating radar survey may be used to check for WWII-era munitions disposal. Golder supports this approach and concurs that these matters do not have to be addressed for the plan change to proceed.

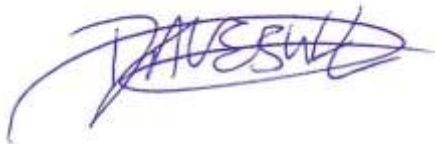
² T&T 2008. Site validation report: Wallaceville Animal Research Centre, Upper Hutt. Report 84352 for AgResearch Ltd. Tonkin and Taylor Ltd. Wellington.

³ T&T 2004. Wallaceville Research Station ground contamination assessment. Report for AgResearch Ltd. Tonkin and Taylor Ltd. Wellington.

Engeo drew our attention to selenium concentrations in paddock soil samples reported by T&T (2004). Seven composite samples were collected from relevant paddocks, and no selenium was reported (detection limit 20 mg/kg). There is no New Zealand soil contaminant standard for selenium, but Golder notes that the United Kingdom Soil Guideline Value for selenium in residential use is 350 mg/kg⁴, therefore 20 mg/kg would be highly unlikely to pose a significant risk to human health. Engeo also clarified that, contrary to their 2014 desk study, fuel storage at the Wellington Racing Club is not within the area of the proposed plan change. Accordingly, these two issues do not need to be considered further.

Yours sincerely

GOLDER ASSOCIATES (NZ) LIMITED



Dr. Dave Bull
Senior Consultant



Stephen Thomson
Senior Consultant

DB/ST/la

Attachments: Golder's document limitations statement.
Email: King to Bull, 12 June 2015
Email: King to Bull, 10 June 2015

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⁴ UKEA 2009. Soil guideline values for selenium in soil. Science report SC050021. Environment Agency. Bristol, United Kingdom.

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Andersen, Lisa

From: Nick King <NKing@Engeo.co.nz>
Sent: Friday, 12 June 2015 5:18 p.m.
To: Bull, David
Subject: FW: Request for Confirmation

David,

Further to my email from a short while ago, please see the response from T&T. Unfortunately this undermines the resolution we'd come to so a rethink of our way forward will be necessary. I have been in contact with Harrison Grierson to let them know the situation, and we'll be in contact Monday to discuss further.

Thanks,

Nick King
Project Environmental Consultant

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From: Penny Kneebone [<mailto:PKneebone@tonkin.co.nz>]
Sent: Friday, June 12, 2015 4:49 PM
To: Nick King
Subject: RE: Request for Confirmation

Hi Nick

I've tracked down the person who did some of the Geiger counter work. He doesn't recall testing samples from the fields, just the waste pits and parking lot area as described on p20 of the December 2004 report. Sorry I can't shed any light on that last entry in Table 1.

Penny Kneebone
Mobile: 64-21 926 757

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From: Nick King [<mailto:NKing@Engeo.co.nz>]
Sent: Thursday, 11 June 2015 1:49 p.m.
To: Penny Kneebone
Cc: Bull, David
Subject: Request for Confirmation

Penny,

Good afternoon, I'm contacting you as a follow up the conversations we had earlier today concerning the 2004 Tonkin and Taylor report 'Wallaceville Research Station, Ground Contamination Assessment'. I have liaised with the

peer reviewer and they are happy with the interpretation of the report that the paddocks were screened for ⁶⁰Co and other radionuclides by undertaking Geiger counter measurements at the sampling locations in the “other fields”, as stated in the final row in Table 1 of that report.

The reviewer has requested that it is recorded in writing that this is your interpretation of the contents of the report – would you please be able to email me back with a statement to this effect?

Many thanks again for your assistance with this, and please let me know if you have any questions.

Best regards,

Nick King
Project Environmental Consultant



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Andersen, Lisa

From: Nick King <NKing@Engeo.co.nz>
Sent: Wednesday, 10 June 2015 3:04 p.m.
To: Bull, David
Cc: David Robotham
Subject: RE: Wallaceville Plan Change
Attachments: Summary of Survey Areas.pdf

Dave,

Afternoon, please see below for responses to the queries you sent to Dave Robotham yesterday. Please let me know if you find these responses satisfactory and if so I will implement the changes to the documents accordingly.

Microbiological Issues

I spoke with Allen Heath again and he was able to supply the following further information which should strengthen our arguments considerably:

- The focus of research was on diseases that naturally occurred in the NZ livestock population so 'exotic' diseases such as anthrax were not researched in any big way at Wallaceville. This is backed up by the types of animal disease described in Tenquist (1991) which also backs up the key point that the purpose of the facility was largely economic i.e. to support the NZ agricultural industry, not as a purely academic institute, so effort wouldn't have been spent on things not important to NZ agriculture.
- A large part of the research was focused on nematode diseases of sheep, but these organisms are ubiquitous in soil and their presence in the land cannot be attributed to Wallaceville.
- Another key area of research was bovine TB. Although this can transmit to human this was not applied to the land and instead was handled under very strict, controlled lab conditions with workers being regularly health-checked, and as highlighted previously all the animal carcasses were incinerated after research was complete.
- Allen has no recollection of animals grazing in the paddocks becoming ill at any point in his time working at Wallaceville. He also said that informal lines of communications were very open there, so word of mouth would likely have made it widely known if any animals had been affected by disease organisms present in the soil, whether natural or not.
- In summary, firstly the research was quite focused so there's very little potential for diseases such as anthrax to have been handled at Wallaceville. Secondly, there were strict controls on dangerous microbes and they weren't applied to the land. Lastly, Allen has no recollection of animals becoming ill from grazing the land.

If you agree these points strengthen the arguments I will add them to the appropriate section of the document. Regarding your valid point about the sentence "Only a limited amount of research was carried out which presented a potential human health risk.", I am planning to reword this to "research was focused on animal diseases so human health risk vectors are likely to be limited, especially in light of the control of biohazards and the policy of incineration of carcasses". Please let me know if you still have concerns.

We are seeking to avoid going down the route of soil testing because many microbial organisms such as tetanus bacilli are naturally ubiquitous in soils so it'd be difficult to link any findings to Wallaceville, and additionally it's difficult to culture many micro-organisms so the costs of any such testing could start getting high. If we can make robust arguments there should be no need to go down this route.

Radiological Issues

This provides a more detailed breakdown of the information found in 'Tonkin and Taylor (2004) Wallaceville Research Station, Ground Contamination Assessment' relating to ⁶⁰Co tracer having potentially been spread over a large surface area of paddock:

The following table is a summary of where T&T state they carried out surface Geiger surveys:

Location	Statement
Table 1 / Page 12	Figure 3A No 8, Carpark by National Chemical Residue Lab, Previously paddock. Geiger measurements in grid across site
Table 1 / Page 14	Figure 3B No 20, Northwest of woolshed, Surface Geiger measurements
Table 1 / Page 15	Figure 313 No 22, Former paddock number 41 May be under Alexander Road, Surface Geiger measurements in 5 m grid across paddock
Table 1 / Page 19	Figure 3C, Paddocks 13-29 and 'other fields', Metal residues from topdressing/ weed control, Surface Geiger measurements

This is summarised in the attached diagram, and as can be seen the area that underwent gamma surveys is quite limited. However the entry on Page 19 states that the survey included 'other fields' – so in fact a much larger part of the site may have been surveyed but that cannot be said with certainty.

The following table summarises the statements made relating to count rates being at or near background:

Page	Area Concerned	Statement
Page 24	"In areas where low-level radioactive wastes were reported to have been disposed, surface Geiger measurements were taken".	"The meter recorded background levels (comm.) the levels of disposal and do not
Page 24	"Surface Geiger measurements were taken at the car park next to Alexander Road, former waste disposal pit by the woolshed and adjacent to Alexander Road in the area of a suspected waste disposal site" (page 20) and "Excavation of the two trenches at the former Alexander Road laboratory waste disposal area confirmed the locations of the waste disposal area".	"Geiger counter a mR/h and < 2 cou

In relation to your specific concern relating to the paddocks being at background levels, the above information indicates that at least some of the paddocks underwent gamma surveys, and although the report does not explicitly state that the paddocks were near, at or below background count rates, it also does not state that any count rates significantly above background were detected as part of the surveys carried out there.

In short, the information available is only partially complete, but I took it that because they do not make comment on the paddock surveys, there was nothing of concern to report. As only some of the paddocks were definitely surveyed an inference regarding the remainder is required, but combined with the decay calcs I felt this was overall sufficiently robust.

Many thanks, please let me know if you have any questions.

Regards,

Nick King
Project Environmental Consultant

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From: David Robotham
Sent: Tuesday, June 09, 2015 3:38 PM
To: Nick King
Subject: FW: Wallaceville Plan Change

From: Bull, David [<mailto:DBull@golder.co.nz>]
Sent: Tuesday, 9 June 2015 3:21 p.m.
To: David Robotham
Subject: Wallaceville Plan Change

Dear Dave,

As discussed, before we advise UHCC in relation to your response to our peer review of your contaminated land reports... there are a couple of points where a little more information would enable us to shut issues down with confidence.

Firstly in relation to microbiological issues. In section 2.1 of your response letter, first bullet point, you quote Allen Heath "Only a limited amount of research was carried out which presented a potential human health risk."

I feel this wording begs the question as to what research *did* present a human health risk?

I wonder if you are able to clarify this point, possibly by further reference to Allen Heath.

I also wonder if you may be able to provide a further line of evidence that the risk is low. If, for argument's sake, paddock soils were riddled with tetanus bacilli from some study in the 1920s, I would imagine that stock subsequently grazed on those paddocks would occasionally have fallen ill. If this never happened, then that would help rule out the possibility that soils are microbiologically contaminated.

Otherwise you may be advised to consider the feasibility of some further soil testing, assuming that someone can identify something to test for.

Secondly in relation to radiological issues. At page 7 of your radiological desk study, you state that "the surface gamma surveys (using Geiger counters) undertaken by Tonkin and Taylor during 2003 could have readily detected any remaining inventory (approximately 90 MBq at the time – even spread over a large area this would produce a readily detectable count rate) of ⁶⁰Co in the upper part of the soil. The fact that no gamma count rates elevated above background were identified indicates that ⁶⁰Co was not present in detectable, much less hazardous, quantities in the soil."

I cannot locate the corresponding information within the Tonkin and Taylor reports and would appreciate your direction on this point. I have found the surveys of the disposal areas, but would really prefer evidence that the paddocks were at background levels.

I am satisfied with your modelling work but I expect that, with such a sensitive issue, it will be preferable to have multiple lines of evidence.

Can I ask you to give this issue high priority as UHCC are keen to get contaminated land issues settled, no doubt your client feels the same. I will however be out of the office tomorrow, so perhaps I could have your response Thursday morning?

Finally may I apologise again for picking out selenium as an unexplored issue – I did miss the relevant data in the T&T reports.

Much obliged, Dave

David Bull (PhD CChem CSci) | Senior Consultant, Site Investigation, Remediation and Auditing | Golder Associates (NZ) Limited

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