



8 May 2013

Paul Sheldon
Tasman District Council
Private Bag 4
RICHMOND 7050

Dear Paul

MAPUA FCC SITE GOUNDWATER – REVIEW OF RECOMMENDATION FOR FUTURE MONITORING – DRAFT

1.0 Introduction

You have requested me to review the most recent groundwater monitoring report for the Mapua Fruitgrowers Chemical Company (FCC) site, Mapua. The report (PDP, 2013) recommends that groundwater sampling be scaled back from the current six-monthly frequency to once per year. The purpose of this review is to obtain an independent view before Tasman District Council (TDC) makes changes to the current sampling programme.

In carrying out this review we have both acknowledged that the monitoring report was prepared by staff from the Christchurch office of Pattle Delamore Partners Limited (PDP) based on monitoring carried out by TDC. Prior to your calling me on 11 April 2013, I was not conscious that PDP's Christchurch office was still involved in Mapua and I have not had any involvement in the groundwater monitoring or reporting. Given this, we agreed that any potential for conflict in carrying out this review is outweighed by my past role as the Ministry for the Environment's independent auditor of the Remediation Validation Report, and subsequent reviewer of the monitoring and other follow-up work recommended in my audit. We agreed that I would have no contact with the Christchurch office with respect to this review, and I confirm that to be the case.

In performing this review I have drawn on my earlier audit (PDP, 2009) and my review of post-remediation monitoring (PDP, 2011a) for MfE.

In summary, I concur with the recommendations contained in the most recent monitoring report (PDP, 2013), but also suggest that the number of wells routinely monitored be reviewed and possibly reduced.

2.0 Background

The former Fruitgrowers Chemical Company site at Mapua was remediated between 2004 and 2008. The results of validation sampling of the remediation were reported in SKM (2008). As a result of auditing that report, I made a number of recommendations for follow-up monitoring. These included more groundwater monitoring wells to address uncertainties regarding groundwater flow directions, seasonal variations of flow direction and water level, and groundwater contaminant concentrations within the main body of the site. These and the existing wells were to be

monitored quarterly for a year, after which time the hydrogeological model and future monitoring was to be reviewed. The detail of the recommendations may be found in PDP (2008).

Thirteen additional monitoring wells were installed in November 2009 and after the first year of monitoring (five monitoring events) a report (PDP, 2011b) was prepared giving the results of the monitoring, a revised hydrogeological model and recommendations for on-going monitoring. I reviewed that report in PDP (2011a) for MfE.

I largely concurred with the recommendation for on-going monitoring, which was to continue annual monitoring for all but six of the on-site and off-site wells, quarterly monitoring of eight wells, and a reduced set of analytes, except I suggested six-monthly monitoring could be appropriate instead of quarterly, as it was long-term trends rather than the detailed fluctuations (potentially just “noise”) which were most important to assessing changes of groundwater quality under the site and to discharges to the marine environment. Part of the then background to this suggestion was that monitoring of the marine environment, as part of the follow-up work, was showing a largely satisfactory situation, information that was not available to the authors of PDP (2011b). Some other recommendations not relevant to this review were also made, two of which I disagreed with.

In the event, quarterly monitoring of the eight wells continued for a further year, until November 2012, and six-monthly monitoring thereafter, with annual monitoring on the recommended reduced set of wells. This means a three-year dataset for some wells and a much longer dataset for other wells. All the monitoring to date is summarised for a small set of wells in PDP (2013) as time-series plots, while a “traffic light” summary of all wells is provided for November 2012.

3.0 Review

The monitoring report concentrates on trends in five wells, all with long records, but these wells represent only a small proportion of the annually monitored wells, and only three of the eight wells monitored every six months. It would be useful if all eight of the regularly monitored wells were plotted over time to get a better feel for the trends. Nevertheless, I assume trends in more than those presented in the report have been examined. If the reported wells are representative, the concentrations of the various analytes seem to be reasonably consistent over time, as reported in PDP (2013). In addition, the spatial pattern of groundwater contamination with the various compounds has not shown any great change with time. This is as expected, given the persistence of the organochlorine contaminants and the large mass of reagents used in the mechano-chemical dehalogenation (MCD) remediation process (nitrogen and phosphorus compounds, copper and iron), all of which are still present in considerable quantities within the “treated fines” that are variously below or intermittently below the watertable at various locations around the site.

I would expect fluctuations from monitoring occasion to monitoring occasion, as is shown in the report, but this will be a combination of random “noise” generated by a variety of things and real change from normal variations in rainfall and consequent variations in water level and groundwater throughflow. Given the lag between changes in groundwater conditions and measuring the response in some well, it will always be difficult, if not impossible, to conclusively relate cause and effect unless the changes are large and widespread. For example, the increases during the remediation, and the general decreases following the end of remediation are clear, but then the cause is clear. So while it might be interesting to examine variations from one time to another, in the overall scheme they are of no great consequence unless a large change occurs at several locations and/or some effect is apparent in the adjacent marine environment. In my view the current variations are of no consequence and therefore do not require watching closely.

In a general sense, a monitoring programme should reflect the likelihood of large change, the likely rapidity of any change, the adverse consequences of any change and the ability to make any difference if there is an adverse change. As noted above there will not be a rapid change, other than “blips” from seasonal and other climatic variations, and the consequences of the variations currently seen do not appear to be great. Also, as pointed out in the remediation

audit report (PDP, 2009), to meet guideline values for the organochlorine compounds at the points of discharge to the marine environment would require orders of magnitude improvement in the groundwater. This will not be achieved without groundwater treatment. Such treatment would be expensive, of uncertain effectiveness – many such remediation attempts fail – and be required for an extended period of time, probably decades. Nutrients are more likely to slowly decline of their own accord, however, and there is some evidence that this may be occurring for nitrate.

Overall, the nature of the residues in the ground, the nature of the groundwater regime, which is now well understood, and the monitoring results to date, justify a reduction in monitoring intensity. Any comfort that some may gain from more intense monitoring is misplaced.

There are four main recommendations in PDP (2013):

- ∴ The occurrence of elevated concentrations of several chemicals beneath the site means that regular groundwater sampling should continue.
- ∴ Due to the more stable patterns that are now being exhibited it would be reasonable for the sampling frequency to be reduced to once per year, if this was also considered acceptable from the perspective of TDC and MfE.
- ∴ Retaining at least some of, or if not possible, replacing some of the seven monitoring wells threatened by residential development on the western side of Tahi Street. The detail of suggested replacement wells is contained in PDP (2013) and need not be repeated here.
- ∴ Wells that cannot be retained should be properly decommissioned by grouting.

I agree that monitoring should continue. As noted above, the effects on groundwater are likely to continue without significant reduction for many of the analytes for an extended period of time. While this has no particular consequence for the use of the land, including residential use, effects of discharges of contaminants to the marine environment will continue for an extended period of time. On-going groundwater monitoring is helpful in understanding changes (including improvements) that occur over the years at the foreshore, including changes in the extent of algae on the foreshore and concentrations of contaminants in shellfish.

Given the need to continue monitoring, it is an obvious recommendation to retain or replace strategically placed wells within the residential area west of Tahi Street. I therefore also support that recommendation, although I leave it to TDC to decide which wells are worth retaining or replacing. It is clearly good practice to properly decommission disused wells.

I am also in agreement with the recommendation to dispense with the six-monthly monitoring in favour of annual monitoring. I base this, in so far as it is possible to tell from the limited number of wells for which long-term data is presented, on there being reasonably consistent results over the last two or three years and that, as I have noted previously, it is the long-term trends rather than short-term fluctuations that are important. However, in addition I suggest it is timely to determine whether all 32 wells currently monitored annually need to be monitored annually; particularly as it appears only five wells are being watched closely. Rather, perhaps a smaller number of wells could be chosen to represent a section or two through the site as best can be aligned with the groundwater flow, and a few wells representing discharge points to both foreshores and along the peninsula. Again, I leave this to TDC to review, as the data to allow this is not presented in the report.

Assuming the current trend more or less continues, consideration should be given to a further reduction in frequency in two or three years' time, but subject to nothing unusual occurring on the foreshores. As always, additional monitoring should be considered if multiple unusually high results are obtained during the scheduled monitoring, if unusual algal growth or other effects in the marine environment are observed, or if major disturbance of the ground is contemplated.

4.0 Conclusions

In so far as it is possible to tell with the limited temporal data presented, I concur with the report's conclusion that groundwater results are now relatively consistent from one monitoring event to the next. Given this, I concur that the frequency can reduce to yearly, but I also suggest that consideration could be given to reducing the numbers of wells routinely monitored. This is subject to unusual monitoring results or foreshore conditions not being observed. If unusual conditions are observed this should trigger additional monitoring.

I also support retention or replacement of sufficient of the monitoring wells threatened by residential development to ensure adequate coverage of the area west of Tahī Street.

5.0 Limitations

This report has been prepared on the basis of information provided by the Tasman District Council. The provided information has not been independently verified. It has been relied to be accurate and sufficient for use in preparing the report. PDP accepts no responsibility for errors or omissions in, or the currency or sufficiency of, the provided information.

The interpretations contained within this report where they relate to sample information apply to the dates of those samples. With time, the site conditions and environmental standards could change so that the reported assessment and conclusions are no longer valid. Accordingly, the report should not be used to refer to site conditions and environmental standards applying at a later date without first confirming the validity of the information at that time.

This report has been prepared by PDP on the specific instructions of the Tasman District Council for the limited purposes described in the report. PDP accepts no liability to any other person for their use of or reliance on this report, and any such use or reliance will be solely at their own risk.

I trust this review meets your purpose. Should you have any questions please do not hesitate to contact me.

Yours sincerely

PATTLE DELAMORE PARTNERS LIMITED



Graeme Proffitt

References

PDP (2009). *Audit of the Remediation of the former Fruitgrowers Chemical Company Site, Mapua*, Report prepared for the Ministry for the Environment, Pattle Delamore Partners Limited, Wellington, 30 June 2009.

PDP (2011a) *Mapua FCC Site Remediation – Review of Post-remediation Monitoring*, Report prepared for the Ministry for the Environment, Pattle Delamore Partners Limited, Wellington, 30 November 2011.

PDP (2011b). *Groundwater Monitoring Review Following Soil Remediation at the Mapua FCC Site*. Report to the Tasman District Council prepared by Pattle Delamore Partners Limited, Christchurch, March 2011

PDP (2013) *Groundwater Monitoring at Former FCC Site, Mapua – March 2013 Sampling Update*, Letter report to the Tasman District Council, Pattle Delamore Partners Limited, Christchurch, 11 March 2013.

SKM (2008). *Site Validation Report for the Former Fruitgrowers Chemical Company Site, Mapua*, Sinclair Knight Merz, Auckland, New Zealand, 11 December 2008.