



TULLAMARINE LANDFILL COMMUNITY CONSULTATION GROUP MEETING

25 March, 2015

6:30pm for 7:00 – 8:30 pm

Hume Global Learning Centre – 1093 Pascoe Vale Road, Broadmeadows

Seminar Room 4

Attendees

Community: Cr Helen Patsikatheodoru, Kim Westcombe, Julie Law, Helen van den Berg, Jos van den Berg, Graeme Hodgson, Russell Nilsson, Ovi Clements, Frank Rivoli, Harry van Moorst, Sam Cetrola, Prue Hicks, Peter Barbetti, Lolita Gunning

EPA: Jeremy Settle (Senior Environment Protection Officer, EPA Victoria), Alistair Nairn (Advisor - Community & Environmental Partners)

Transpacific: Clete Elms (Regional Manager Vic Post Collections), Kieren McDermott (Environment Specialist), Olga Ghiri (Stakeholder and Community Relations Manager), Alan O'Brien (Environment and Technical Manager), Penny Creswell (Lawyer)

Guests:

Henry Kerfoot, Randal Bodnar (Civil and Environmental Consultants Inc – from the U.S.)
Alex Schiavoni, Kevin Simpson, (EHS support),
Anthony Lane, Colin Stapleton (Cardno Lane Piper)
Nial Finegan (Chief Executive Officer – EPA)

Apologies received: Mick Colaci, Kaylene Wilson

Facilitator: Jen Lilburn

Note taker: Sally Chandler-Ford

About these notes

Notes were taken and produced by Sally Chandler-Ford. Presenters were given the opportunity to review the notes relating to their item to ensure the discussion was accurately summarised, and that it details best available knowledge at the time of the meeting. Additional comments received after the meeting have been highlighted as such.

A 'Meeting Snapshots' document has been produced to provide a plain English summary of what transpired at the meeting. (see <http://www.transpacific.com.au/content/tullamarine.aspx>)

These notes will be posted on the Tullamarine Community Information page on Transpacific's website <http://www.transpacific.com.au/content/tullamarine.aspx> and will be available to the general public. Meeting participants should advise Andrea Mason or Jen Lilburn if they would like their name removed from this public document.

<p>The intent of these meeting notes is to promote open communication between Transpacific, local government, community and the EPA. They are not to be used in a manner that compromises this objective.</p>

Meeting Purpose:

- To provide in-depth, technical discussion of the Final LNAPL Extraction Practicability Assessment Report.

Agenda Items and Actions from meeting

Arrival, Catch up, Light Refreshments
1. Welcome, Jen Lilburn Apologies, Confirm meeting purpose and agenda, confirm meeting conduct
2. Review of process and stages, Kieren McDermott <i>Action 250315_1: TLCCG members to provide any further questions on the LNAPL Trial Practicability Assessment Report to Olga by Friday 17 April.</i> <i>Action 250315_2: Kieren to clarify contingencies contained in past plans.</i>
3. Questions and discussion, Kieren McDermott, Alex Schiavoni, Anthony Lane, Henry Kerfoot <i>Action 250315_3: Kieren to revisit data outlined in previous reports and respond to Harry on the issue of PCB migration.</i>
4. Any additional information not yet covered, Alex Schiavoni
5. Review Panel update, Anthony Lane <i>Action 250315_4: Alistair to prepare a letter outlining all the Pollution Abatement Notices and other statutory conditions that EPA has on the site and the EPA's expectations of TPI. This letter will be sent to Jen to distribute to the TLCCG.</i>
6. Wrap & Close, Jen Lilburn

Item 1. Welcome, Jen Lilburn

Jen Lilburn (Convenor) welcomed everyone to the forum. Given the presence of some new people to the meeting for the first time, everyone briefly introduced themselves.

Jen made particular reference to the presence of EPA Victoria's Chief Executive Officer Nial Finegan and Cr Helen Patsikatheodoru. Clete Elms welcomed Henry Kerfoot and Randal Bodnar from Civic and Environmental Consultants Inc, recently appointed to advise TPI on post-closure and after-care management of landfills as well as operating landfills to best practice. Henry and Randal also have specific knowledge and experience in dealing with LNAPL in the U.S. A brief outline of their experience and credentials was provided after the meeting and is contained in Attachment A.

In response to Jen's question about why the Cleanaway logo was used on some of the information materials, Clete explained that Transpacific has two business units, one of which focuses largely on industrial waste, such as grease trap waste, liquid waste, clean up jobs. This business is branded as Transpacific.

The other business unit is Cleanaway, the largest division within Transpacific, which focuses on solid waste eg. landfills, transfer stations, and organics facilities. Within Cleanaway there are two main areas:

- 'Collections,' responsible for the kerbside collection of waste and management of the trucks and bins and

- 'Post-Collections,' for which Clete is responsible. Post Collections manages waste after it has been collected, and includes transfer stations and both active and closed landfill facilities.

The strategy moving forward will be to brand both active and closed facilities as Cleanaway.

Jen also explained that, while presentations had been distributed, the purpose of the evening was to discuss the report with community members, and respond to their questions. She thanked Helen Vandenberg for the reminder.

Item 2. Review of Process and Stages, Kieren McDermott (TPI)

Kieren gave an overview of the process from here regarding the LNAPL Trial Practicability Assessment Report.

LNAPL Trial Practicability Assessment Report Timeline

- > The purpose of tonight's TLCCG meeting is to allow questions to be put to Transpacific Cleanaway and the technical team who produced the Practicability Assessment report (EHS Support and Cardno Lane Piper) before submission to the EPA. The key date for delivery of the Practicability Assessment to the EPA is 8th July and so the timeline outlined (below) was developed to allow this deadline to be achieved.
- > Further questions beyond tonight can be put to EHS for a further 3 weeks by 15 April (now 17 April because distribution of minutes was delayed)
- > Consideration of questions/answers will be incorporated into Final Report (late April).
- > Consideration and verification of the Report by the Independent Review Panel (by mid May)
- > Submission of Report and Verification letter to Community and EPA (late May)

Action 250315_1: *TLCCG members to provide any further questions on the LNAPL Trial Practicability Assessment Report to Olga Ghiri by 17 April.*

Kieren also explained that the LNAPL trial is one of many pieces of work being undertaken at the landfill and that there is a lot of work still to be done, particularly in terms of establishing a monitoring regime that addresses community concerns, such as contamination of ground water at the site. TPI will invite the community to assist in determining an appropriate monitoring schedule for twelve months after June 2015.

A request was made by the community to get access to both the Final Report and the Independent Panel's review, after their submission to the EPA, to allow the community the opportunity to put forward any additional concerns that they don't feel have been addressed adequately in the Report.

Nial stressed the desire for the community and TPI to work together on addressing concerns now so that the Final Report is as comprehensive as it can be and has been subject to extensive community consideration and consultation. It is the EPA's expectation that the Final Report will have addressed the community concerns and expectations. If that means that submission of the Final Report needs to be delayed slightly, there are legal mechanisms to allow that to occur. Once the Final Report has been submitted, the EPA has 28 days to determine whether to accept the report or not.

Statement added by TPI after the meeting: TPI will work closely with the community to address the questions in relation to the LNAPL trial before submission of the report to the EPA. Any recommendations made in the Practicability Assessment report, such as a requirement for extra monitoring on the buffer land, will be captured in the other work streams being completed at the site namely the Groundwater Quality Post Closure Management Plan.

Note that the Groundwater Quality Post Closure Management Plan is currently being reviewed and updated by Kleinfelder and Anthony Lane and the new version will be ready by June 2015 and will be made available to the community for discussion and so there is an opportunity for any concerns raised by the community to be addressed in this document (which outlines the tasks and requirements for monitoring at Tullamarine for the next 3 years).

Item 3. Questions and Discussion, Kieren McDermott, Alex Schiavoni, Anthony Lane, Henry Kerfoot

Question: Much of the reference literature provided deals with 'clean' hydrocarbons, not chlorinated hydrocarbon-based LNAPL. How do you translate petrol station experiences to this toxic dump where, prime facie, the conditions are vastly different?

Response (Alex, EHS): LNAPL is a separate phase liquid, and a lot of the physical properties of PCBs, chlorinated hydrocarbons, benzene etc are quite similar. It is the constituents within the LNAPL that determine whether they have the ability to dissolve or volatilise.

When we were looking at the mass depletion estimates, we considered the most volatile and the most soluble components of the NAPL which are, typically, the key drivers to risk eg benzene. The experiences from service station sites etc relate to the separate phase liquid and its physical behaviour, which is quite different to water.

Question: Did you consider the least volatile state because that is where it's not going to evaporate (vaporise), but will be dissolved in the groundwater and sit there for hundreds of years in the hope that some little microbe might eat it?

Response (Alex, EHS): Typically the more volatile components are also the more soluble components. Over time the more volatile and soluble components are degraded through different processes and the risk profile from the LNAPL reduces.

Jen: Henry, is that your experience too?

Response (Henry, CEC): In order to have an actual risk, you need to have transport of the constituent and you need to have exposure and I believe you are implying that PCBs are not adequately water soluble to be transported a significant distance in one hundred years.

It is the mobility of LNAPL constituents that is of concern. This can happen in three ways - LNAPL can float/ migrate as a separate phase on top of the water table; constituents can dissolve and move in the groundwater; or constituents can volatilise and move in the gas phase.

Currently in the landfill there is a system that collects all the gas produced. All of these constituents are destroyed due to the temperature achieved and the resident time in the flare. The constituents that are dissolved in the groundwater will be consumed by microbes.

In the 1980s a study was done by Lawrence Livermore Laboratories in the US where there had been a huge spate of leaking fuel tanks all over the country. They collected data from all the sites they could and concluded that these hydrocarbons only move a couple of hundred feet because of biodegradation of the hydrocarbons. Hydrocarbons are a very good source of energy.

So the process of biodegradation takes care of the constituents in the groundwater, and the gas collection system takes care of things that volatilise.

These tests have shown that LNAPL mobility is not a potential exposure problem.

Question: Is there evidence of LNAPL in the groundwater? If it is picked up in the future, what will be done?

Response (Kieren, TPI): The groundwater contamination seems to have come from oil recovery activity that was operating at the site in the 1980s. It doesn't appear to have come from the LNAPL itself.

All the risk assessments relating to the groundwater contamination are showing that the risks are low and not harmful to people or the environment.

We have been monitoring for a number of years, and we are not seeing evidence of contamination from LNAPL moving out to the buffer land.

If there are changes, the normal process is do further investigation in that area. Studies in the US have shown, and we are seeing in our monitoring results, that the contamination does not move great distances, and there is evidence of either stabilised or downward trends in the groundwater.

In fact the LNAPL Trial and Practicability Assessment are indicating the LNAPL is immobile and being depleted. If we did see an anomaly that the trend is going up we would do further investigation and, if it met a predetermined trigger level, then we would take action that was guided by the experts.

Question, Nial: Just on those studies where the travel of the pollutant is said to taper out, is that based on a known level of pollutant in the first place?

Response (Kieren, TPI): Yes

Question, Nial: So do you know the volume of the pollutant and the size of the plume? And is the volume in the dump here the same as in those studies or indeed known?

Response (Alex, TPI): We've made estimates of the volume in the solids but the risk profile at the site is more about the composition of the LNAPL (given that the LNAPL is immobile and not migrating). The mass or volume really doesn't affect the risk profile- it's the concentrations.

As we move outside of the capped landfill cells, a lot of the logistical constraints that are limiting the extraction potential within the landfill cells are no longer there.

Comment Jeremy (EPA): All closed landfills across Victoria will have ongoing monitoring at a frequency to be determined on the basis of the results. An auditor will determine ongoing monitoring to check environmental impacts and reassess the assumptions made in the risk assessment. If monitoring does show an increase in contaminants to an unacceptable risk, the EPA will require action to be undertaken through a notice.

Comment: We have concerns about past practices and, whilst it would be great to be able to believe that current monitoring will be comprehensive and have the checks and balances in place to, ultimately, ensure resident safety and comfort, we have no confidence that this will be the case.

Response Anthony (Cardno Lane Piper): In my 2007 Environmental Audit Report, I made a number of recommendations, a key one being a Groundwater Quality Management Plan. It's a management

plan, not just monitoring. There are a number of triggers in there and if the monitoring program shows up any of these, contingency actions must be taken and EPA gets in the loop.

In the extreme, it could mean there is an active remediation required of the groundwater outside the landfill cell. That process would then morph into the post-closure process that Jeremy is talking about, which is more highly regulated and has the same management process in it with the same sorts of triggers, contingencies and feedback. This would trigger the EPA to take further action.

Comment: Past contingency plans have just stated that more monitoring would be done. If it did contain the sorts of things mentioned above, residents would feel much better as it would demonstrate that people are thinking seriously about what we need to do if things really go wrong. Contingency plans have to be directed at particular contingencies and, with regard to LNAPL management, they have to have a contingency plan which does the sort of things that are being said and, at the moment, we haven't seen one as yet.

Jen: It appears there is a need to clarify the contingencies as there are differences of opinion as to what the contingency plans actually contain.

Action 250315_2: *Kieren to clarify contingencies contained in past plans.*

Response Kieren (TPI): An updated groundwater management plan will form part of the Groundwater Technical Review workstream that Kleinfelder is working on. It will include contingency plans for the site. The draft groundwater management plan will be issued in the next couple of months and we will give the community the opportunity to have input before it is completed.

Comment: The 2007 Golder Report states that the current rate of LNAPL leakage is estimated at 8-32 metres per year. The risk assessment stated that LNAPL is migrating eastwards and is almost certain to go further. There are comments in various Auditors' reports. It's almost reached the edge of the buffer zone. It is clear that we don't know the volume of LNAPL in there.

Response Kieren (TPI): Back in 2007, we hadn't done these LNAPL trials. The LNAPL trial has shown that it isn't moving at all, in fact it has stabilised and there is evidence that the dissolved phase is contracting.

Question Nial (EPA): So if it's not moving, how does it shrink?

Response Alex (EHS): It is degrading over time and we saw direct evidence that it is not migrating. The practicability assessment provides evidence that the LNAPL will deplete over time.

We re-did the volume estimates a number of years back. Regardless of the estimates, we re-looked at the earlier modelling and some of the fundamental assumptions made by the consultants at the time. Our understanding changes over time as we gather more data.

The key change that we looked at was that the LNAPL thickness in the well doesn't represent the LNAPL thickness that's in the formations. The LNAPL may be sitting above the water table, and if the water table rises and no more LNAPL can move into the well, the thickness disappears.

On the contrary, if the water levels fall, it provides a pathway for the LNAPL to go into the well and then you start to get some exaggerated thicknesses. We saw significant evidence of that during our trials which married up with the assumptions made in the URS estimates which ultimately indicated up to 18 million litres of LNAPL present, of which 4-7 million litres was potentially recoverable. That recoverable volume is what we targeted in our trials.

As we conducted the trials, we were able to measure the potential for that LNAPL to migrate so this idea that the migration is eastward doesn't marry up with the findings in our trial. Another thing to

consider with mobility is that there is a mound of LNAPL which has stayed exactly the same for 15 years so we are seeing direct evidence that is not moving.

The estimate of leakage rates doesn't match up to the LNAPL rate. I'm assuming that it is a potentially a groundwater seepage rate or something along those lines.

Further response by Kieren following the meeting: The 2007 estimate was an LNAPL migration rate and was very conservatively based on groundwater flow estimates rather than the transmissivity of the LNAPL. The LNAPL trial completed by EHS Support last year was able to obtain transmissivity values in 12 wells where LNAPL was present and demonstrated the LNAPL is not migrating. The mass balance calculations in the Practicability Assessment indicate the LNAPL is reducing in mass.

Comment: The management process and contingency plans need to be robust and measurable and we will be expecting the EPA to ensure that they are. There is a lot of variability and it is difficult to know what is true and what isn't true but I do know that if you don't keep an eye on things and let them go, we find ourselves in trouble.

Question: There are several reports which supersede and contradict each other, so how can TPI be looking at getting buffer land rezoned when we have different reports every couple of years?

Response Nial (EPA): When I see reports that have different figures, I wonder what has happened between the two reports. There has been further testing and further modelling, so the more recent report is based on a better understanding of the variabilities than the original report.

The issue about changing from one use to another use will trigger an independent audit process. The land might not be fit for building a house on but may be able to have a carpark built on it for example. If I was a community member, I'd be wanting to ensure that the person with the site wasn't getting away with anything that they shouldn't. On the other hand, the landowner has a right to use that land. Commercially, the best thing you can do is get the land cleaned up to the best extent possible so that the land around it becomes more commercially viable.

Comment: Reports mention site sensitivity, analysis, community, financial benefit, financial terms but they are all for TPI, but not for residents who might be looking at decreased property values because of traffic, factories etc.

Question: We are talking about estimates of what has gone into the land. Why don't we know? There should have been records kept.

Response Clete (TPI): We don't know exactly what went into that site. It happened under a different regulatory regime where we didn't have to know. The key issue though, is that here we have monitoring data which was looking for specific analytes (chemicals, PCBs etc) which we know are in there, and which is showing us certain things and help us to understand the risk to the community.

Response Alex (EHS): In terms of the estimates of LNAPL mass within the landfill cell itself, we didn't take much consideration of the records of what was put in there. We used the evidence available to us to work out our best estimate. There were a lot of monitoring wells, we observed the behaviour of the LNAPL and then we were able to infer the estimated volume of what is there. While it may sound like guesswork, quite a lot of science went into it and I don't think anyone else could make a closer estimate.

Comment: They don't have enough wells to make those sorts of total assumptions, they are estimates.

Response Alex (EHS): They are estimates and, while it would be nice to have more wells, in the absence of having more wells, we have taken a very conservative approach. We have overestimated what we think is there. We haven't tried to tone that number down.

Question: Are you saying that the LNAPL is moving in a different direction?

Response Alex (EHS): No, we are seeing no evidence of LNAPL moving at all.

Question: But there is LNAPL in the groundwater moving eastward, west and even south. Why?

Response Alex (EHS): No, there is no evidence of LNAPL moving in any direction other than within the cells.

Response Henry (CEC): There is an issue of terminology here. When we are talking about LNAPL, we mean a separate layer floating on top of the water so when you are talking about a groundwater plume, that's not LNAPL.

Question: The trial was not sufficient to convince the community that we are going to be safe into the future. How come that's enough of a trial?

Response Alex (EHS): The purpose of the trial was to look at the LNAPL within Mounds 1 and 2. We tested all of the available wells that had enough LNAPL to extract. With regards to LNAPL that may be outside the cells, there may be multiple sources. When we look at the LNAPL within Mounds 1 and 2, we are very comfortable that it is not migrating.

However, there are potentially other sources associated with other activities outside the landfill cells which would be the subject of different studies. This study goes back to the LNAPL within Mounds 1 and 2.

Question: We asked that the LNAPL investigation and extraction be done before capping because the capping would give reason not to go to all the wells. You only tested the wells you could, and some of the reasons you gave was you didn't want to fracture the cap. Why wasn't this done before the capping so that you could test everything?

Response Alex (EHS): With all the wells that were available to be tested, we had enough coverage across Mounds 1 and 2 to be comfortable that we had a good idea as to what was there and how the LNAPL was behaving.

Question Nial (EPA): Do you think having more wells to test would have enhanced or changed your final results?

Response Alex (EHS): Whenever you have more data, you can draw stronger conclusions. However, we also considered the coverage and location of the wells, as the LNAPL is behaving differently in different pockets. If there was a well that had LNAPL and sufficient thickness to extract, we tested the location. Only one well didn't qualify because we couldn't detect LNAPL.

Question Nial (EPA): Were any wells drilled specifically for the trial?

Response Alex (EHS): No, because of the inability to penetrate the cap and that is one of the limitations we have for extracting LNAPL at the site. This is because penetration of the cap could create a vapour pathway and actually compromise the integrity of the landfill gas extraction system which is capturing the vapours from the LNAPL.

Comment Nial: At the moment we are talking about the PAN for the LNAPL extraction trial, we are not talking about the whole management of the site.

Response Kieren (TPI): Correct. We have a post-closure Pollution Abatement Notice (PAN) and a number of post-closure management plans which cover off the broader management for the site in relation to groundwater, surface water, landfill gas and LNAPL management. One of the tasks in the LNAPL management plan was to complete an LNAPL trial and this was regulated by a second PAN (LNAPL PAN). Tonight, we are talking about the second PAN which is regulating the LNAPL trial.

After the meeting, a community member provided comment on the 'snapshots' document, which summarises these notes:

I disagree with the statement that the cap cannot be penetrated (page 2). I do not believe the statement accurately reflects TPI position. The cap can be penetrated but TPI state there are risks involved. Should EPA insist on additional wells then the cap will be penetrated and the appropriate technologies employed to manage that risk. TPI is reluctant to penetrate the cap for a number of reasons, one of which, in their view, is the inherent risks involved. I think the statement should read "New wells will not be drilled unless absolutely necessary because of the risks to the cap integrity."

Revised wording for the snapshot was subsequently discussed with the community member.

Question: There is contradictory information across several reports as to whether bugs eat 'fresh' or 'stale/contaminated' LNAPL. There are no examples of specific Superfund sites where stale LNAPL that is also contaminated by other constituents/PCBs has been eaten by bugs to the satisfaction of the US EPA and the local community. Please explain this contradiction.

Response Henry (CEC): I can't name a specific example and say that it is going to follow exactly the same as somewhere else as each site is very specific.

Question: The Plan states that it will revert to carbon black which is benign. Where is the evidence for that? How does that happen?

Response Alex (EHS): Carbon black is not discussed in the Practicability Assessment. As far as our reports are concerned, carbon black is not even considered. The reports specifically state that evidence of degradation of the LNAPL in conditions similar to Tullamarine couldn't be found.

Whilst we were trying to quantify mass losses, we didn't explore the direct degradation of the LNAPL and the estimation we had of biodegradation that was provided was for the dissolved phase only. When we looked at the overall mass estimates, the key mass loss mechanism is volatilisation, of which we are seeing direct evidence in the landfill gas extraction system. So, as we did our study, it all fell back to the volatilisation process which appears to be quite significant and we can get a rate that could far exceed what would be achieved by hydraulic extraction.

We've seen from the composition of the LNAPL through samples collected during the trials that some of the constituents that are present volatilise. We've also seen that some of the LNAPL is being captured through the landfill gas extraction system. By volatilising, we are seeing constituents which drive risk being depleted over time.

The soil vapour extraction system that we have operating at the site is the ideal scenario.

Response Kieren (TPI): The reference to a carbon black looking material is based on my experience in the U.K. where when you excavated soil in heavy industrial sites, you could see where there had been an historical presence of LNAPL and sometimes, you get this very black layer which may be the result of some sort of anaerobic process when the LNAPL was there. When you see it, it looks like it's

highly contaminated but we took many samples from this layer and the laboratory results did not identify any contamination.

Question: How did you extract LNAPL from the waste and continue arguing that this extraction wasn't worthwhile? Further tests should be undertaken every six months.

Response Alex (EHS): We estimated the volume that was within the well and the gravel pack surrounding the well outside of the screen, to make an estimate of our starting point. Our estimates as to what was derived from the waste as opposed to the well were based on whether we extracted more than our volume estimate, or less.

So, when we extracted more than we estimated, we understood that we were drawing LNAPL from the waste. It only really occurred at one location, L1 (>50L), which we tested twice and what we saw from the first test to the second test, is that our transmissivity value declined and we were less successful the second time despite pumping for twice as long.

We waited a month for the LNAPL to recover and then we sat on that well for as long as we could but even then, we still evacuated the well on that second attempt rather quickly. From memory, it was under 400 minutes that we were able to pump for over two events.

Being able to pump for such a short period of time doesn't lend itself to be sustainable over the longer term. Whether you wait six months or longer, you are not extracting much from the formation and that's where the arguments about practicability came to the fore.

Question: The statement that no LNAPL constituents were found in other wells and that there is no evidence of it, is not true. The suggestion that constituents of LNAPL are not moving and pose no risk is not supported by any of the previous reports. Either previous reports were very wrong or something substantial has happened between 2011 and now. Is there any evidence of that?

Response Kieren (TPI): I will have to check the 2011 data but would be surprised if there were PCBs, because they are so immobile, and could not move that great a distance. I will need to take that question on notice.

Action 250315_3: Kieren to revisit data outlined in previous reports and respond to TLCCG on the issue of PCB migration.

Response Anthony (Cardno Lane Piper): What you are talking about is LNAPL constituents moving away from landfill in greater concentrations. We need to be careful about terminology. It's not helpful to talk about LNAPL constituents because there is LNAPL, and there are the contaminants that are dissolved in the groundwater. They could come from LNAPL or they could come from the leachate sitting under it - we don't really know.

It can be confusing and a bit misleading to talk about LNAPL constituents moving offsite, because people think LNAPL is moving offsite, and they are completely different physical concepts.

Comment: Whilst that is true, the most logical source of the bulk of the constituents is the LNAPL and that is generally agreed to. It is also in the previous reports prior to this because, in 2005, we asked how to characterise the LNAPL. Studies were done based on exactly those dissolution aspects as much as anything else so the characteristics in what we are finding in our monitor bores moving further and further away are the same as the characteristics of LNAPL.

Response Anthony (Cardno Lane Piper): In any contaminated site assessment, when you observe it in one location and then later you drill further away and you find it there too, you can't jump to the conclusion that it has moved from one place to the other in that period of time.

The contaminants dissolved in the groundwater offsite would have been generated at the landfill decades ago and flowed out in the groundwater. We are now just characterising what's there now.

Comment: Yes, and it may be 100 metres further too but you don't know because you only know where the last bore went and every time we go and do another monitoring bore, we find it's there too. So don't jump to the conclusion that it has stopped where the last bore was.

Comment: It's also important to remember that an alternative technology we suggested was the dual pumping approach, used in the U.S. successfully, to enhance that. This is something we would ask the EPA to also consider.

Response Alex (EHS): Please clarify what you mean by dual pumping. Do you mean pumping total fluids and then recovery of LNAPL (ie two pumps) or dual phase, ie extracting both LNAPL and vapour (vapour extraction technique)?

Response Kieren (TPI): If it is a system where you need two wells to operate it, you get back to the issue of integrity of the cap.

Comment: It is important to maintain the integrity of the cap but there are technical ways around that as evidenced on Superfund sites in the U.S. where they have put extra wells and gas extraction in after its been capped. You make sure it is done within a contained environment and you seal it very effectively. While there is a risk in that, the risk of leaving LNAPL in there is a considerably higher risk.

Question: Does vibration affect the movement of the LNAPL?

Response Kieren (TPI): No

Comment: Just to clarify, when we asked for drilling in the south east corner, you drilled there and you found it.

Question: Is it correct that the vapours coming off the LNAPL is what is indicating how quickly the LNAPL gets neutralised? Are we relying on the gas extraction system for that? When that extraction system was first put on, TPI was concerned that there wasn't going to be enough gas coming out of the system to keep the flare going. What's the rate of gas coming into the flare now?

Response Kieren (TPI): It is constant at the moment but it's relatively low for a landfill. It's at 200m³/hour and typically municipal landfills generate approximately 1500m³/hour (noting that this landfill is an industrial waste landfill). Flares at other municipal waste landfills are dealing with rates of over 2,000 m³/hour. The expectation is that this rate will decrease and we will continue monitoring this.

Question: What proof would you have that, once this rate drops down, that LNAPL isn't dangerous anymore?

Response Kieren (TPI): If there's no gas coming out of landfill, that would imply that there's no volatiles. That would be one line of evidence but you would need multiple lines of evidence to demonstrate that it's safe. Taking ongoing LNAPL samples may be one part of the monitoring plan for the site as well as groundwater monitoring.

Question: What happens to the physical space that the LNAPL mass has taken up after it has been munched away for 30 years?

Response Kieren (TPI): There is a solid residue that retains the space, the time frame is uncertain.

Response Alex (EHS): The inference is that we are going to get subsidence. I am assuming that in the post-closure management plan, the settlement of the landfill cap would be one of the monitoring requirements.

Follow up response after the meeting - Kieren (TPI): TPI monitors settlement at the landfill regularly. Settlement rates are very low when compared to other closed landfills.

Question: Why can't you pour concrete down and block it so there is more density for the bugs to eat and reduce the time taken to dissolve?

Response Alex (EHS): We did consider solidification as a process to make the product inert. The problem with this process is that we will have the opposite effect-we'll have expansion of mass and then the integrity of the cap will be compromised.

Question: Do the gases come out of the ground other than through the flare?

Response Anthony (Cardno Lane Piper): You have vapours generated from within the landfill that are captured by the landfill gas system, then outside of that you have volatile chemicals that are dissolved in the groundwater and they vaporise out of the groundwater and move up in the soil.

They are down near the water table and as you go up in the soil profile, they disperse to below detection in the surface soil. So, whether its dilution, biodegradation in the soil profile or whatever, they do dissipate. In some extreme examples, but not at this site, you'll get vapours under buildings and that's one of the things we check on in the audits. We did so in the buffer land audit to see if it was a risk to anyone occupying a building above. And it was concluded there was no risk.

Question: So does the EPA monitor the air at all now? They used to.

Response Alistair (EPA): Not currently, we have done in the past.

Comment: We haven't monitored enough, nobody is monitoring now, there have been disturbances with extractions, nobody is quite sure. There ought to be a consistent air monitoring regime around there as we don't have the full answers there.

Question: Can volatile compounds change to other gases and create volatile cocktails? There are conflicting arguments about volatile compounds.

Response Alex (EHS): I can't specifically answer that question. We looked at the gas that was emanating from the LNAPL and being captured by the landfill gas extraction system. The analytical suite was quite significant, so from my understanding from the data I've seen, there are no unexpected volatile gas cocktails.

Response Henry (CEC): The change in the landfill gas composition can be explained by the change in the amount of water that's present in the waste. The gas that gets produced can change over time due to the conditions in the landfill and remedial actions that take place.

TPI has a study underway on the biodegradation of the chlorinated compounds, looking at whether it's occurring, trying to see how well it is characterised, getting more data to understand it so that's being addressed in the groundwater. If the process happens within the waste, it will happen in the water because the microbes that do it live in the water. So it will be somewhat applicable to what happens in the waste. If you form different volatile organic compounds in the waste, they are going to be captured by the gas extraction system and combusted. I don't think there is a need for a sense of urgency in regards to the gas that's inside the waste.

Question: Information from the U.S. refers to recent developments taken from testing enzymes and vitamins extracted from microbes that showed PCB activity, especially promising seemed to be the use of Vitamin B12. Comment?

Response Henry (CEC): I have a chemist friend who has seen the de-chlorination process occur in PCBs. From what I have seen in the literature, when PCBs weather, they become less water soluble and less volatile because the way they weather is the same way that the LNAPL weathers, through dissolution or volatilisation.

Question: It doesn't look like a pretty picture from here for groundwater. How soon do we get Cleve's gas data? I want to see those dioxins gone.

Response Kieren (TPI): The flare has been tested and we are waiting for the results and advice to come back.

After the meeting, a community member correctly advised that the draft meeting notes omitted a point that had been raised in the meeting:

The deep aquifer is breached at Niddrie Lake (the old Niddrie quarry). That means that anything that leaks from the dump can get to surface waters before reaching Port Phillip Bay in at least one place.

If it is not regarded as relevant by the panel for the LNAPL issue it still needs to be kept in mind and should be included in the notes. I'd hate to mention it again later and have it treated as new information.

Where To From Here:

Kieren reiterated the process from here outlined earlier in the meeting and confirmed that the final report will be submitted to the EPA and released to the community at the same time. He also stressed, however that there are several other pieces of work to be done, particularly around groundwater monitoring, which will be discussed at the next meeting.

In reviewing the last three years of groundwater monitoring at the site, TPI is hoping to go through a similar process in releasing a report to the TLCCG a couple of weeks before the next meeting to give members time to get some questions together.

One of the outcomes of this process will be the development of a monitoring regime. The community will be able to have input into the monitoring schedule over the next twelve months and beyond on the buffer land. The other aspect is the groundwater monitoring that will occur on the buffer land and the TLCCG will be invited to observe sampling activities.

Item 4. Any additional information not yet covered, Alex Schiavoni (EHS Support)

This item was not discussed.

Item 5. Review Panel Update, Anthony Lane

Anthony briefly outlined the process for the Review Panel, explaining that they have reviewed previous iterations of the report, provided lots of detailed comments to authors which have been taken into account in the current report. The Panel will consider the Q&A responses and the final report and undertake a further review. The Panel will prepare a concise letter giving its view as to whether they agree or disagree with the LNAPL Extraction Practicability Report by the due date.

Kieren confirmed that the only report required for submission to the EPA at this point will be the LNAPL Extraction Practicability Report. The report will be submitted with the Review Panel's verification letter.

The EPA acknowledged that this is a very complex process and the subject of discussion tonight is only one small element. The EPA will document all the Pollution Abatement Notices and other statutory conditions that it has on the site together with its expectations of TPI. TPI is currently working through those as they are required to do. The PANs can be used as a tool, and as our knowledge grows, additional PANs can be placed on the site if required.

Action 250315_4: *Alistair to prepare a letter outlining all the Pollution Abatement Notices and other statutory conditions that EPA has on the site and the EPA's expectations of TPI. This letter will be sent to Jen to distribute to the TLCCG.*

Nial outlined that the government's announcement of a public inquiry into the EPA and encouraged community members to participate in that review. It is anticipated that the review will commence shortly. The review is welcomed within the EPA, will be far reaching and hopefully lead to an enhanced EPA in which the community has a greater level of confidence.

Item 6. Wrap & Close, Jen Lilburn

Jen thanked the community members for their preparation, research and thoughtful questions. She also thanked also the Panel for their openness and thorough answers.

The next meeting is scheduled for 26 May 2015, 6.30pm for 7pm at the Hume Global Learning Centre.

Meeting closed: 9.30pm

Attachment 1. Henry Kerfoot and Randal Bodnar: Brief Outline of Experience and Credentials



Attachment 1. Henry Kerfoot and Randal Bodnar Brief Outline of Experience and Credentials

Henry Kerfoot

Mr. Kerfoot is a Principal in CEC's Phoenix Office and has over 30 years of experience in the environmental and solid waste work. He spent 7 years of his career performing research on monitoring, fate and transport of groundwater and soil contaminants for the US EPA at Superfund and hazardous waste sites, including co-disposal landfills and petrol stations. He spent 10 years as a specialist consultant consulting with landfill companies and private firms assessing contaminant migration and decomposition and fires and explosions as well as providing expert litigation support under CERCLA, RCRA, and state regulations. He was at a California consulting firm for 12 years working on landfill issues, in situ groundwater remediation of chlorinated solvents and metals, litigation support, and surface water contamination. He spent 2 years in Melbourne working on landfill gas issues and prepared a successful Site Conceptual Model, Risk Assessment, and Cleanup Plan for the Cranbourne site that took natural attenuation into account for the first time. At CEC, he has become a leader in dealing with hot (temperature) landfills in the US and provides advice to major landfill companies on hot landfill issues.

Randal Bodnar

Mr. Bodnar is a Vice President in CEC's Phoenix Office and has 25 years of experience in the environmental, civil and geotechnical fields. He spent 12 years of his career working for large and mid-size solid waste hauling and disposal companies as a site, regional and eventually director of engineering for a six billion dollar solid waste company. Given his experience, he has developed an expertise in directing complex environmental projects at solid waste facilities, including issues related to environmental monitoring and compliance systems, major and minor permit modifications, landfill development, landfill gas systems, leachate treatment plant development, wetland mitigation, and closure activities. He has extensive experience working on the permitting, development and construction of numerous existing and greenfield facilities. This includes the evaluation of state and federal location restrictions, siting criteria, hydrogeologic conditions, access roads, and haul distances. He has directed numerous conceptual and detailed designs of disposal facilities including grading plans, composite liner and cap systems, leachate collection systems (bottom liner and perimeter trench), leachate transfer and storage systems, surface water management systems, gas extraction systems, access roads, scales, and site buildings. Mr. Bodnar has significant experience with a diverse range of complex environmental issues at solid waste (landfills, transfer stations and hauling companies) facilities, CERCLA, RCRA, and voluntary action sites.