

# TEN YEAR'S IN: EXPERIENCES OF A LANDFILL AUDITOR'S EXPERT ASSISTANT

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# First up

## A confession

- It's more like 11 years – but 10 sounded punchier
- Apologies to non-Victorians much of the examples are largely Victoria based but relevant everywhere.
- This being said we've seen a reasonable amount of bogus things done in both NSW and WA, both from consultants and local councils
- Based around Victoria, due to lesser to no requirements for auditor involvement at sites in other states or territories

## Some background on me

- 25 years' in landfill industry
- 11+ years' in industry in variety of technical roles
- Mainly environmental focussed around landfill
- Designed and built multiple LFG extraction systems
  - Power generation
  - LFG mitigation/ management
- Designed and built multiple leachate extraction systems
- Ran a soil disposal and remediation site - remediated soil used for capping of landfill alongside ongoing landfill aftercare
- 5 years running LFG to energy systems with 100% liability for migration/ emissions
- Expert landfill; LFG and gas/vapour support to 10 auditors across all states/ territories

## Operations/ aftercare audits Are not licence compliance audits

The EMP is the document for collecting data to demonstrate compliance and only operator or EPA can determine licence compliance:

- EPA publication 1323.3 states:

*The audit report must also conclude whether the monitoring program is sufficient to enable the licence holder to demonstrate compliance or needs revision. The auditor must also review and confirm whether the licence holders' risk assessment used to design the monitoring program is sufficient and make conclusions and recommendations accordingly*

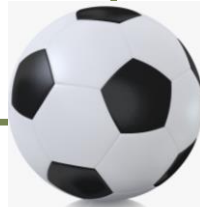
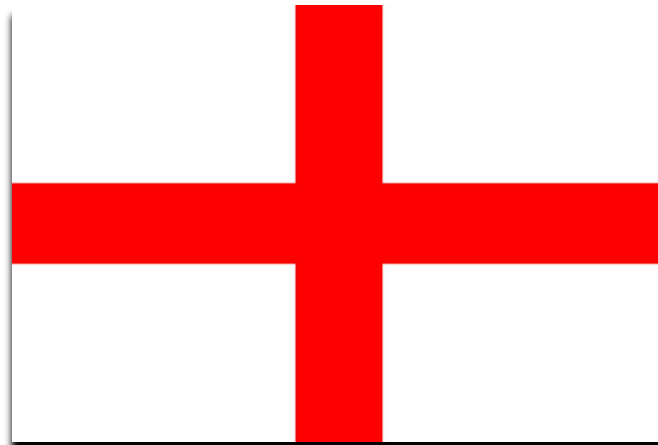
## So how do audits help me comply with my licence?

- The audit has to review the data collected and undertake a risk assessment.
- One of key requirements is verification of an EMP
  - The EMP **must** include suitable monitoring requirements such that if completed licence compliance can be demonstrated by the licence holder – obviously if an action level is exceeded as part of the monitoring it doesn't comply.
- The recommendations are intended to be for improvements to infrastructure, monitoring, practises to aid licence compliance



## This isn't England, you know?

- No Australia isn't, but the laws of physics and chemistry are still the same – methane is still explosive at 5-15%
- Don't reinvent the wheel if you don't need to
- There's loads of really good guidance from Europe (including England), USA etc.
- If there is no Australian specific guidance don't be afraid of using overseas guidance



## Auditors: choose wisely – engage early

- Not all auditors regularly work in landfill
- Some will only work on construction or operations audits – depending on their experience and knowledge
- Seek recommendations
- As with consultants cheap price isn't always good
- Engage them early and throughout the audit period not at the end
- Inform the auditor of any issues/ action level exceedances as they happen – EPA seem to have greater comfort when the auditor is involved in this way.
- Use them and their experts knowledge –ask questions/ learn from them – they see lots of different landfills
- Get them to review key reports and provide comments

# Audits – what are auditors looking for

- Continual improvement from previous audit
- Recommendations being undertaken as far as practicable
- Nothing frustrates an auditor more than having the same recommendations audit after audit – this also flags with EPA and is a waste of everyone's time and money
- Engage with them - make them part of the team
- Not randomly changing EMP or other plans such as rehab plan without engaging with an auditor or EPA, the auditor can't simply ok a change
- Auditor's are expected by regulators to default to a conservative position – so if data gaps exist a risk will be assessed as higher due to lack of data



# Audits – what are auditors looking for

- Put simply and in one word

**PROGRESS**

## Assessors: choose wisely

- All too often in lean economic times contaminated land consultants bid low to win work
- There is massive difference between contaminated land where onus is generally on remediation of the source.
- In landfill we have an ongoing source which we need to manage and we can't generally remediate our source
  - Don't forget! Contaminated land clean up is very often still dig and dump – where do they dump? Our landfills
- Anyone that has BTEX or TPH in groundwater and not ammonia, iron, manganese etc - question them we rarely see excessive BTEX or TPH
- Make sure you are provided your data in a useable format
- Make sure they review and update your CSM

# Site inspections

- ✓ While uncomfortable and not fun we actually like to see our sites especially closed ones in the rain/ adverse weather
- ✓ We can see how stormwater management works and report accordingly



# Data validation

## LFG instrument drift

- ✓ Most hire companies cannot “calibrate” instruments, all they effectively can do is bump test with known calibration gases
- ✓ Instruments should be subject to routine onsite bump testing and zeroing
  - ✓ Oxygen doesn’t and cannot exist in a natural environment at greater than 21% v/v.
  - ✓ Persistent 0.1/ 0.2/ 0.3 % v/v methane/ carbon dioxide across all bores (similarly flow at 0.1 L/hr and differential pressure 0.1mB)
- ✓ All these persistent errors show is that one of the person doing the monitoring isn’t suitably trained/ experienced and adds questions to the QA/ QC of results

# Monitoring techniques

## LFG monitoring

- Purging LFG bores – DON'T – Just don't
- Sequencing of parameters – we still see flow/ differential pressure done after gases
- PID's aren't for surface emissions
  - Neither are LFG analysers
- Monitoring events done over multiple days
- Surface emissions grids one direction only/ no diversions
- Provide all the data – non detects/ below criteria are just as valuable as detects
- Follow the published methods e.g. EPA Vic 1684

# LFG management

## LFG extraction/ power gen systems

- Many LFG to energy contracts have no or minimal requirements for the LFG to energy company to:
  - Manage/ mitigate off site migration/ surface emissions
  - Provide all LFG data in useable format
  - Tell you how the system works
  - Tell you what bits aren't working
- Make sure that all of these are covered in the agreement the vast majority of sites we see these aren't and when issues occur site operators are stuck unable to comply or assess what is going wrong
- Many LFG fields need frequent monitoring and balancing especially those with issues – this can be up to daily



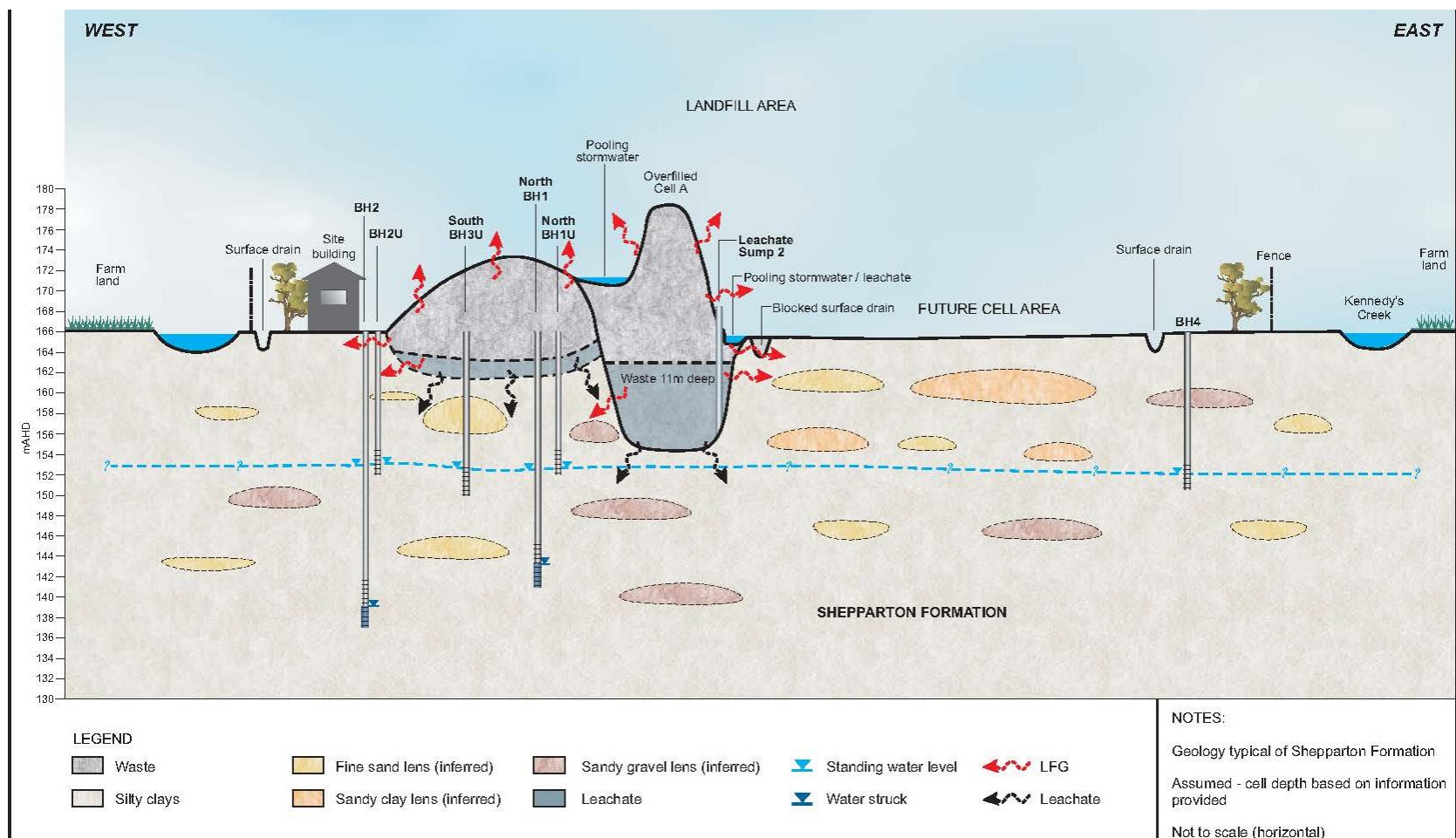
# Reporting

- Make sure you own your data in a useable format
- Several instances of landfill operators being held to ransom by consultant and not having their historical data in anything but pdf format
  - Get it in Excel and use it
- Compare not only to criteria/ action levels but historical trends.
  - Trending is key to understand if you have a problem
- Update the CSM
- Include recommendations and actions
  - Where possible suggest timeframes

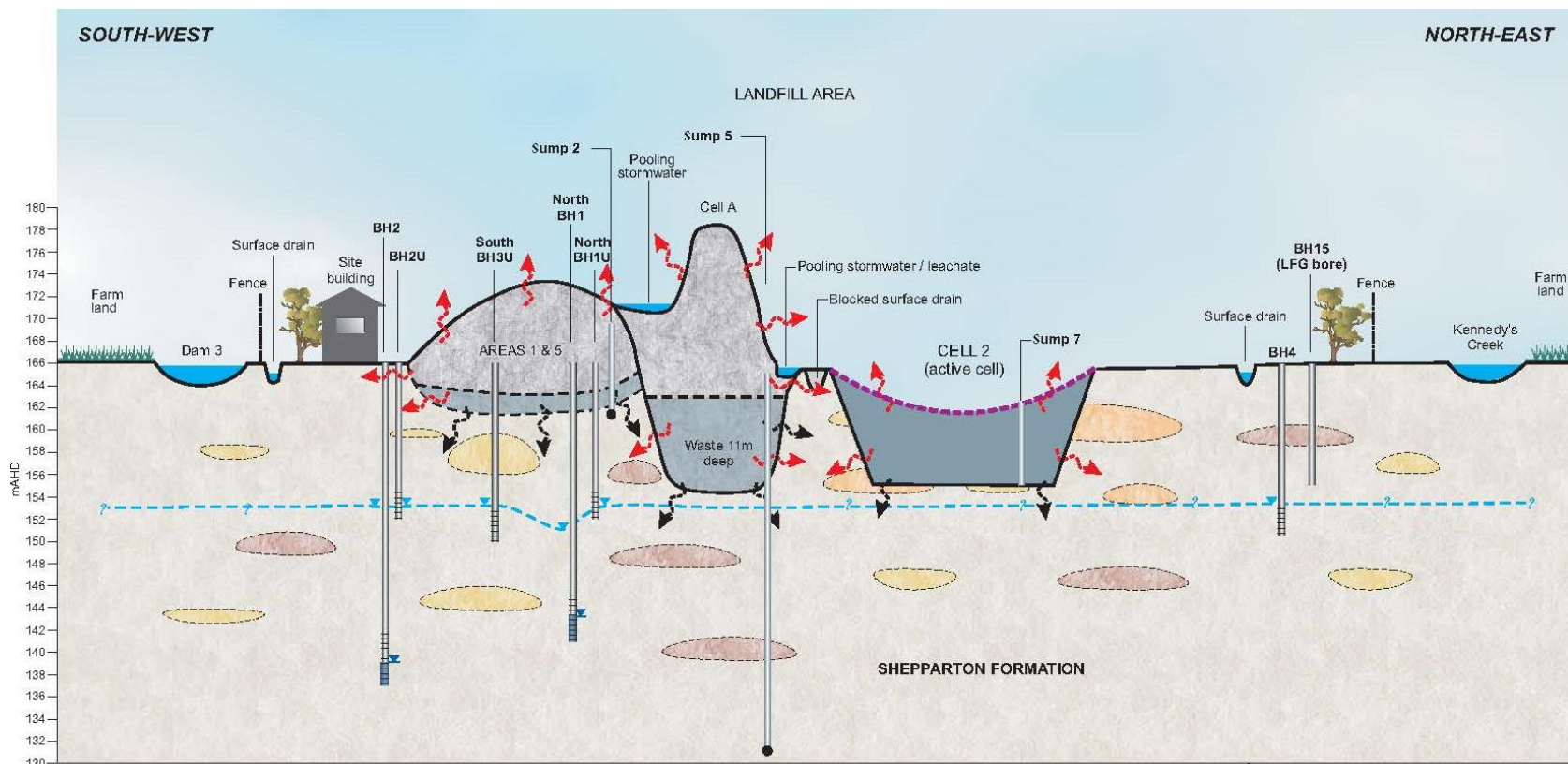
# Conceptual Site Model

- Wherever possible, get genuine background data pre-landfilling for both gas and groundwater
- Background doesn't mean what the average is. - Background is what is naturally there without the landfill, or pollution from another proven source.
- Make sure that whenever annual monitoring report is written that the CSM is revisited and evolved
- Close out data gaps as you go over time.
  - The audits should provide recommendations to do this

# Conceptual Site Model - 2015



# Conceptual Site Model -2020



## LEGEND

Waste	Fine sand lens (inferred)	Sandy gravel lens (inferred)	Standing water level	LFG	Standing leachate level
Silty clays	Sandy clay lens (inferred)	Leachate	Water struck	Leachate	Unknown waste height

## NOTES:

- Geology typical of Shepparton Formation
- Assumed - cell depth based on information provided
- Not to scale (horizontal)

# Audit recommendations

- These are intended for what can be done in next audit period
- Will be rated based on timeframe and risk
- Try to build on what we don't know
- Should help build on the CSM and close out data gaps – ergo increase understanding of risk and reduce risk assessment
- While they will consider financial constraints they wont be led by finance e.g. if a cell is complete rehab will always be a recommendation
- There's no reason a recommendation can't be to do reduce things e.g. analytes from groundwater is very common

# Questions?

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