Havelock quotes 101

Improvements are urgently required to the regulatory system and changes need to be made by drinking water suppliers and others engaged in the delivery of safe drinking water to the public.

In addition to sickness and suffering on a large scale, an outbreak of waterborne illness also causes substantial financial consequences and disruptions to schools, hospitals, and other workplaces and public facilities generally.

Very high standards of care are required for providers of services that can make people sick or injure or kill them (for example, surgeons, pilots or operators of dangerous machinery and food processing equipment). The supply of drinking water is no different.

The Inquiry has accepted that the risks to drinking water can be sporadic and poorly understood and thus provide fertile ground in which complacency can grow among drinking water suppliers, local body politicians whose councils in many cases own the water infrastructure, as well as health professionals, including DWAs and officials within the Ministry of Health responsible for drinking water.

This is because no single barrier is effective against all sources of contamination and any barrier can fail at any time. Barriers with appropriate capabilities are needed at each of the following levels: source protection; effective treatment; secure distribution; effective monitoring; and effective responses to adverse signals. A “source to tap” approach is required.

Contamination is almost always preceded by some kind of change and change must never be ignored.

Failures can occur at any time, may occur slowly over time without red flags being raised, and cannot necessarily be detected in a timely manner to prevent consumer exposure to contamination. For this reason, the safety of a supply or security of a

source can never be assumed to remain static even where, at one point in time, reasonable confidence exists.

This links to the reality that aquifers tend to be accessed by a large number of known and unknown bores in addition to the drinking water bores. The more holes drilled in the layer of protection of a secure aquifer, the more likely it is that there will be a failure, and therefore a contamination event. It is difficult for the water supplier to manage risks around bores it does not control.

The Inquiry received evidence from Dr Hrudey that a common theme across all of the international outbreaks is one of complacency. Outbreaks are comparatively rare and have a tendency not to be front of mind for public health officials, suppliers or consumers.

This exemplifies the need for a water supplier to understand fully its water supply system and to respond quickly and effectively once there is an indication that something is not right.

Another risk to drinking water arises from deteriorating infrastructure assets.

It will be vital that Council learns from this experience, embeds the lesson in its institutional memory, and establishes a system to protect against the inevitability of human error.

Each time a risk eventuates, a hole is created in the multiple barriers of defence, but a serious event will only occur when holes in each of the necessary multiple barriers align.

Intensification of farming is likely to increase the risks from faecal sources of pathogens, fertiliser run-off, contamination from nitrates and competition for water. The problem in New Zealand is that there currently exist such widespread “holes” in the limited barriers of defence that their alignment is occurring regularly and making people ill.

Thus even though the probability of a particular risk may be low, if the consequence is high, the risk must be either eliminated or mitigated and monitored.

In the drinking water context, in the past consumers would obtain their water by using a bucket drawn from a private or public well. Engineering and technology advances now enable source to tap delivery of drinking water via a cost effective and efficient distribution system. But it is this very infrastructure that is also the means by which waterborne disease may spread widely and rapidly.

“not all costs are amenable to quantification and monetisation.” In particular, “public faith in the quality of water is extremely difficult to measure” as is the stress and “scarring” effect of the outbreak on residents.

The greatest risk of supplying unsafe water tend to be small suppliers responsible for tourist towns.

Waterborne disease burden often arises not from significant outbreak events, but from underlying, sporadic waterborne illness that is never linked to a particular outbreak.

To manage the risks to their supply, water suppliers must apply a high standard of care in the establishment, maintenance and development (when required) of infrastructure assets. Networks must be properly designed, constructed, maintained and extended by competent professionals at all stages.

Elected officials, particularly at the local level, must be familiar with the risks in order to make informed decisions on these issues.

The costs to communities of implementing further barriers to treatment, and any community opposition to disinfection, cannot be properly weighed in the absence of a better understanding of the significant health and other impacts (often borne by the most vulnerable members of society) that come from maintaining the status quo.

Almost 10 years after the 2007 amendments, there are still 20 per cent of the serviced population who are supplied water that is not demonstrably safe to drink. There is therefore no evidence that the statutory requirement to comply with the DWSNZ has significantly improved compliance rates in New Zealand. The lack of improvement over time was concerning and the Ministry needed to “re-examine [its] approach around trying to support the drinking water suppliers in terms of reaching compliance” and address “why some of them are not making the progress that we would like”.

There is therefore no evidence that the statutory requirement to comply with the DWSNZ has significantly improved compliance rates in New Zealand.

The levels of non-compliance for smaller suppliers were “woeful and worrying”, and that the data showed that “the smaller the suppliers, the greater the difficulty they have achieving of compliance”.

The community response to Napier City Council’s decision to chlorinate the supply, conveyed in the media, has been one of outrage, with the implementation of treatment by chlorination being labelled a “travesty” by one politician.

The Inquiry is satisfied that a good track record is not a reliable indicator of future risk.

The Inquiry rejects the notion that diligent testing for E.coli can be a justification for declining to treat.

HDC advised that it did intend to revise the WSP by including critical control points, but this seemed to the Inquiry to be a distinctly leisurely approach in all the circumstances.

One of the experts giving evidence at the August hearing expressed a view that there was “an enormous vacuum of leadership”. In 2017, the Ministry discharged few of its 64
responsibilities well, and many not at all.

The Inquiry has been unable to discern any leadership activity by the Ministry, at any time, in relation to those continuing breaches.

They referred to a “softly, softly” enforcement approach under which DWAs were enjoined by the Ministry to take a lenient, cajoling and cooperative approach on all occasions, rather than to escalate matters into the realm of enforcement steps.

“Speak softly and carry a big stick; you will go far”.

The attempt by the Ministry following the hearing to communicate an effective enforcement policy was equally inept.

The “all practicable steps” test which, in effect, makes compliance discretionary in many cases.
s 69ZZS provides that it shall be a defence to prosecutions for offences that the defendant took all practical steps to prevent the commission of the offence, and also that the defendant did not intend to commit the offence.

The Ministry of Health, on 18 August 2017, wrote a six page letter to all PHU managers setting out its views on enforcement and compliance.74 This letter was prolix and convoluted and contained much background information.

The Inquiry has concluded that the Ministry continues to demonstrate a marked reluctance (or inability) to provide clear or pithy advice to the DHB on the practical application of its enforcement and compliance policy.

The opportunity for improvement has not been grasped in any useful way by the Ministry.

Mr Thew referred to a fundamental error the laboratory made which invalidated 1,318 results from an important post-outbreak period.

Drinking Water Online has limited functionality and remains difficult for DWAs to use.

The Ministry has produced a lengthy 23 page WSP framework but it contains no templates, is too complex, and is of no practical use to its intended audience.

Ministry's enforcement policy and implementation is inept. The Ministry submitted, inter alia, (as it had earlier) that its resources were adequate, that there was no plain evidence of systemic problems in the drinking water industry, and that there had been no deficiencies in leadership. It would be regrettable if the Ministry's only reaction was a defensive one.

The Ministry's drinking water team is under-resourced and structured ineffectively. It is too small and is spread over too many officials who individually and collectively lack the skills and expertise needed to administer effectively and enforce properly the current regulatory regime.

The first, and most serious, weakness is the lack of any absolute obligation by suppliers to comply with the DWSNZ. Section 69V of the Health Act requires only that a supplier take "all practicable steps" to ensure that the drinking water supplied complies with the DWSNZ.

DWAs had been advised that simply including reference to water safety improvements in a Long Term Plan was considered to meet the "all practicable steps" requirement.

If a drinking water supplier becomes aware that its water is not meeting the DWSNZ, its obligation is only to take "all practicable steps" to carry out appropriate remedial action or to correct the problem.

The obligation in that section is to take "all reasonable steps", a term which is not defined but which is, on its face, less onerous than "all practicable steps". This test also provides suppliers with a wide spectrum of discretion.

The hedged and discretionary nature of the above duties has inevitably led to weak compliance.

The Inquiry found the assessment of Havelock North as compliant with the DWSNZ when 5,500 people became ill from consuming water in the reticulation to be an outrageous example of the inadequacies of the Ministry's reporting.

It follows that actions by water suppliers in failing to comply with the obligations under the DWSNZ go unpunished year after year.

A more enlightened approach to safety may be seen in the recent legislation governing safety in the workplace, the Health and Safety at Work Act 2015. The provisions of this legislation provide a remarkable contrast to those in the Health Act and yet naturally there are many more consumers of drinking water than working persons.

They are too important, and too vulnerable to slippage and dwindling commitment, to leave as a voluntary measure.

Of the 17 countries surveyed, New Zealand had the second highest number of central government authorities involved in the provision (14) and regulation (7) of water.

It identified that competence was fundamental to the safe delivery of drinking water, that critical mass was an important element of ensuring competence and that this could only be achieved by some level of consolidation for many water suppliers.

This comes back to the fifth principle of drinking water safety set out in Part 2: "Suppliers must own the Safety of Drinking Water".

Good retention of institutional memory.

Public health and safety should not be compromised for financial reasons. If a supplier cannot meet required standards because of financial constraints, then it should aggregate with other suppliers to form a financially viable unit.

A lack of accountability underlies the current poor compliance levels prevalent throughout New Zealand.

A water manager who determined that he could not be assured of the safety of some 80,000 citizens drinking untreated water and recommended to his council that it be chlorinated. However, the councillors, despite being told of the risks, overrode that recommendation and decided that it would not be treated. A company director and senior company managers simply cannot ignore advice and take risks in that way. Nor would they be easily subject to local political pressure.

In terms of regulation, oversight and compliance, the DWAs occupy a frontline position. They interact with drinking water suppliers and have the most direct role in overseeing the safety of drinking water and compliance with the law.

The DWAs responses to such non-compliance were inappropriate and ineffectual. One problem raised by submitters concerned the fact that DWAs serve two masters.

This would be a significant change in the workforce and would shift DWAs from being health professionals, with science degrees and expertise and experience in public health risk assessment, to being water technicians with experience in the operation of a water supply.

It is simply not possible to perform DWA duties without a good level of understanding of water treatment.

A number contended that accreditation was an unnecessary burden, that it had not removed inconsistencies and variable quality among DWAs, that it had not prevented the matters criticised by the Inquiry in its Stage 1 Report, and that it did little to ensure competence and acceptable standards.

Another pair of eyes that could look at things from a different point of view. He saw it as a safeguard against undesirable habits.

Effective collaboration between different agencies has been identified by the Inquiry as a feature which is fundamental to safe supply.

It was a common complaint by DWAs and DHBs that their ability to carry out effective enforcement was undermined and in most cases negated by the Ministry of Health's enforcement policy, which has been described as a "softly, softly" approach.

Under this system, DWAs have, they say, been left with the Ministry's required "cajoling and co-operating" approach which has proved ineffectual.

New Zealand's record of compliance, compared with overseas supplies, remains woeful. A much stronger and more aggressive enforcement approach is urgently needed.

Drinking water must compete with any number of unrelated health issues within a DHB's region. The estimate of a typical allocation being 10 per cent on drinking water has been mentioned.

The "rubber then hits the road" through permitted activities or activities requiring resource consent.

The intention was to remove the "no responsibility" mindset and bring the issue of drinking water source protection "front and centre" for regional and district council decision makers.

The Inquiry considers that mere "tinkering" will not suffice to address the issues and concerns raised.

Dr Mitchell explained at the August hearing that this was another example of the NES Regulations applying naturally to surface water sources, but not addressing the significant risks posed to groundwater sources by land use activities.
The existing limitation on the scope of the NES Regulations has clearly reduced their effectiveness.

The expert panel and submitters were adamant that the size of a drinking water supply should not determine the level of first barrier protection. Moreover, some suppliers with only small recorded numbers of serviced population in fact are used by much greater numbers, for example in areas heavily visited by tourists or holidaymakers.

While Regulation 12 is intended to a certain extent to cover external events, or “acts of God”, the Inquiry considers that there would be much benefit in re-framing the regulation to take a more proactive and preventative approach to potential emergency events.

The Inquiry received submissions and evidence that were critical of the fact that the Ministry’s NES Draft Users’ Guide, which was produced in May 2009, is still in draft form more than eight years later. The fact the NES Regulations need a 90 page document (the Draft Users’ Guide) to tell people how to implement them means they are, quite frankly, “not fit for purpose”. The lack of fulsome uptake by the industry would suggest that even greater efforts would be justified this time.

The Inquiry identified a number of problems with the relevant DWSNZ provisions including ambiguity, complexity, poor organisation, being difficult to follow, and omissions.

To imply zero or very low risk for something as uncertain as the geological subsurface is “absolutely unwarranted”. The secure classification conveys a clear message that the relevant bore water is subject to no appreciable level of risk and that it may be regarded as highly unlikely to be contaminated by pathogens, to the extent that treatment is not required. The Inquiry views this as erroneous and misleading.

Although commissioned from an engineering consultancy, the report was not competently prepared and its conclusions were incorrect.

Although water treatment systems work well most of the time, when they fail or malfunction, it is vital to have people who are properly trained and qualified to the right levels, to identify and correct the problems.

It is anomalous that society requires licences in myriad fields where public safety and welfare are involved but not in the case of drinking water suppliers, even though they can cause harm on a scale well beyond many other licensed suppliers and operators in society.

The current qualification system operates primarily at water operator level and the Inquiry sees a need for managers and supervisors to be qualified as well.

But the evidence before the Inquiry has established that WSPs are largely treated as an exercise in compliance with the current regime (in other words, box-ticking), rather than as an important tool for a water supplier's management and operational staff to actively understand and manage public health risks.

WSPs being prepared and then "left on the shelf", rather than being part of everyday operations and the subject of constant feedback.

Preparation of WSPs being largely outsourced to consultants without appropriate contribution and ownership by the water supplier.

Failure to have appropriate personnel across the various levels of a water supplier involved in the development, implementation, and ongoing review of WSPs.

A WSP needs to be a "living document". This requires the water supplier to have the technical expertise and organisational capacity to develop it, use it, keep it under review, and amend it.

A critical control point is simply a specific point, procedure, or step in a process at which control can be exercised to reduce, eliminate, or prevent the possibility of a hazard or risk.

WSPs are largely treated an exercise in compliance and insufficient resource is applied to ensure they are an effective tool for addressing public health risks.

It is not appropriate for key steps and key communications to be dependent on the particular personnel available at any time. This will inevitably mean that important matters will be overlooked or delayed.

The DWSNZ should provide an approach which addresses the fluctuating risk of contamination at different times of the year. The DWSNZ currently allow for a reduced frequency of monitoring for faecal contamination in groundwater sources deemed to be secure. The Inquiry has found this to be counterintuitive. Where a source has secure classification and is not treated, frequency of monitoring should in fact be increased.

The Inquiry heard that there is no mechanism in the DWSNZ, or elsewhere, for ensuring that the persons undertaking sampling are appropriately trained, assessed, certified and overseen. The Inquiry thus identified a gaping hole in the system, which poses significant risks to the effectiveness of the whole monitoring and testing regime. A defect at the sampling stage will invalidate all downstream processes.

There is no single point of reference or code or required technical specifications for any of the activities associated with bores, casings and headworks. Requirements exist in a number of places. These multifarious sources give rise to much variation and inconsistency, and a lack of clarity and certainty for those responsible for bores and casings.

The key concept underpinning the current regime is that a water supplier has a duty which is limited to taking “all practicable steps” to comply with the DWSNZ (Health Act, s 69V(1) and s 69ZF). That is, there is no absolute duty to comply with the DWSNZ.

The evidence before the Inquiry has shown that this approach has led to highly variable standards and practices across the country with respect to compliance with the DWSNZ.

The Inquiry recommends that the current drinking water regime should be recast with the starting point being the prescription of mandatory minimum standards for drinking water.

Offences to be repealed:
Create new offence of supplying water unfit for human consumption and provide for recovery of costs if convicted of any offence.

Defences to be repealed:
Repeal subsection (2). Remove the defences of taking “all practicable steps” and that the defendant did not intend to commit the offence to make it a strict liability offence.

Based on the expert evidence and submissions received, the following two further parts of the DWSNZ relating to boil water notices and treatment of plumbosolvent water require early review and change.

*Definition: **Plumbosolvency** is the ability of a solvent, notably water, to dissolve lead. In the public supply of water this is an undesirable property. In (usually older) consumers' premises plumbosolvent water can attack lead pipes and any lead in solder used to join copper.*

Plumbosolvency of water can be countered by achieving a pH of 7.5 by increasing the pH with lime or sodium hydroxide (lye), or by providing a protective coating to the inside of lead pipes by the addition of phosphate at the water treatment works.

While optimal pH for prevention of plumbosolvency is 7.5, performance remains very good in the range pH 7.2-7.6. Achieving this pH has been shown to decrease population blood lead concentrations.(3, 4)

Chlorinating water also reduces dissolved lead. It causes the interiors of lead pipes to become coated with lead chloride, which is very insoluble in cold water. However, lead chloride is fairly soluble in hot water. For this reason, water that is to be used for drinking or the preparation of food should never be taken from a hot-water tap, if the water may have been in contact with lead. Water should be taken from a cold-water tap, and heated in a pan or kettle that does not contain lead or lead solder.

The DWSNZ do not currently require treatment of plumbosolvent water or address the quality of plumbing fittings. The Inquiry is aware that significant water quality issues

have arisen in Flint, Michigan in relation to elevated levels of lead leaching from plumbing fittings. Much of the potable water in New Zealand is regarded as plumbosolvent and yet no treatment is required.

Given the public health exposure, and the risks outlined in Part 3 above, it is important that the recommended review and changes to the DWSNZ take place without delay. The Ministry of Health has indicated that any substantive amendment to the DWSNZ would result in amended standards coming into effect in 2024. This length of time is simply unacceptable. Many of the recommended changes to the DWSNZ are based on international best practice which does not currently occur in New Zealand.

The Ministry of Health's current disaggregated drinking water resources do not possess the necessary skills and attributes and should not be used for this purpose.

The Health Act should be amended to remove the "all practicable steps" test in, at least, ss 69H, 69S, 69V, 69Z and 69ZF, thereby making all duties on water suppliers mandatory. The defences in s 69ZZS, and all other references to all practicable steps, should be removed so as to make compliance mandatory and to create strict liability offences.

These findings point to a widespread systemic failure among water suppliers to meet the high standards required for the supply of safe drinking water to the public. The industry has demonstrated that it is not capable of itself improving when the standards are not met.

Neither has the Ministry of Health, the government body charged with administering the provisions of the Health Act governing drinking water, shown an ability to call the industry to account.

In short, the administration of the present system of regulation does not ensure that water suppliers comply with the law and the DWSNZ. The Ministry of Health is incapable of doing so, for the reasons explained in this report.

The Inquiry has found that the drinking water industry has over at least a five year period experienced problems on multiple levels. These include source protection, drinking water suppliers, difficulties attracting qualified and experienced staff, the Ministry of Health drinking water team, lack of leadership, and the regulatory environment. All of these problems have combined to produce a lack of public awareness of the changes over recent years to the risks resulting from unsafe water.

The Inquiry has demonstrated that there is good reason to be sceptical about the concept of secure groundwater, particularly when this classification is made based upon mean water age and minimal microbiological monitoring. Within New Zealand in recent months, several groundwater sources that were classified under the DWSNZ as "secure" have been shown to contain the faecal indicator E.coli.

Savings for some of the smaller ones might not be easily realised "*as they appear to be run on the*
smell of an oily rag".

There are overseas examples of drinking-water suppliers who ask laboratories not to report some results that may require the water supplier to take action. There is no evidence of this practice in New Zealand but it would be important to ensure it does not occur.