FLASHPOINT

Summer 2022

Winds of change in renewable energy

Hazardous substance regulations updates

NZ INSTITUTE OF HAZARDOUS SUBSTANCES MANAGEMENT

USEFUL ORGANISATIONAL CONTACTS

NZ Institute of Hazardous Substances Management

www.nzihsm.org.nz

The official home of professionals committed to the safe management of hazardous substances and dangerous goods. The NZIHSM is a 'not for profit' industry association specialising in improving safety, health and (site) environmental performance, particularly the safe management of hazardous substances in the community.

Responsible Care NZ

Box 5557 Wellington 6145

Responsible Care NZ works with industry partners to implement the hazardous substances legislation.

WorkSafe (MBIE)

www.worksafe.govt.nz

Government agency formed to provide compliance and enforcement of hazardous substances. Responsible for hazardous substances certificates.

EPA

www.epa.govt.nz

The EPA administers the HSNO Act and supplies extensive information on working with hazardous substances.

Ministry for the Environment

www.mfe.govt.nz

The Ministry administers the HSNO Act, and provides policy, publications, technical reports and consultation documents.

HAZANZ

www.hazanz.org.nz

An association of the safety organisations in New Zealand.

Institution of Chemical Engineers

Since 1922 the multi-national IChemE has advanced chemical engineering's contribution for the benefit of society. Its offices include UK, Australia and New Zealand.

Local Government NZ

www.lgnz.co.nz/lg-sector/maps/

Local Authorities have responsibility for policing building controls. Some local authorities are contracted to Department of Labour to provide enforcement of the Hazardous Substances legislation.

President's column

Another year of fortitude!

Our world is never boring although the excitement of continually fighting a bug is wearing a bit thin for many!

Still, science is assisting our rescue and vaccines are continually being developed to assist us and boost our internal defences against a plague of mutant bugs.

Most of us have been lucky to date; but even so many are weary of worry and looking backwards to a life of freedom, where we could fly where we wished, sit in crowds with the masses and just enjoy the moment. These days may look gone but not forgotten, and indeed will be back provided that we learn to use our science to solve the tests that nature can throw in our way.

In this Summer edition of *Flashpoint,* our NZIHSM team continue to have a positive feel towards our collective future. One reflection of this is the surprising luck that we have had to date, with some of these detailed in the articles in this magazine such as:

(i) Power for the people through lithium batteries
(ii) Metamorphosis for Marsden Point - a move from carbon power
(iii) How are we faring in our quest for renewable energies?
(iv) Updates to the Hazardous Substance regulations
(v) Massey helping in the preparations for future Hazardous Substance Certifiers
(vi) Cleaning the waste of systems past (phosphorus, herbicides, and others)
(vii) Covid comment
(viii) Compliance updates and Archie's ramblings
(ix) Sorting the forest from the trees.
(x) The explosive power of dust

Of course we and our Summer are positive !
Then on the first day of Autumn, a 'Blatant Bully' invaded Ukraine, the IPCC report stated that we are still facing significant Climate change and the NZ Covid numbers rose rapidly as our MIQ gates were thrown open.
A reminder 'Winter is Coming' !
We at the New Zealand Institute of Hazardous Substance Management extend our best wishes to the Ukranian people and that YOU and ALL yours to continue to keep well over this interesting planetary period!

Current president
John Hickey

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Flashpoint

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Lithium batteries:

Holy Grail or an unholy hazard?

by Dave Lascelles

Lithium-ion batteries are the backbone of most of today's electronic devices, from e-cigarettes, smart phones and computers, to electric vehicles. The lithium battery is the battery of choice because of its high capacity and energy density. It was also seen as having a more environmentally acceptable composition than traditional NiCad battery, which also has poor recharge characteristics.

But lithium-ion batteries have some serious technical limitations and safety concerns. The current generation does not meet the technical requirements of quick-charging and long-lasting crucial to expand the electric vehicle sector.

They are currently costly, bulky, and take a considerable amount of time to charge. The end goal for EVs has to be a stable, high current density, quickly re-chargeable battery with a lifetime matching that of the gasoline car, without the need to replace the battery.

Manufacture of batteries is a classic trade-off between safety and performance. Battery size needs to be minimized, while accommodating all chemicals and electrical components, and providing room for heat expansion during its charging.

In use, if charged/ discharged, damaged or abused, a lithium ion battery, due to its chemical composition and structure, can overheat, leading to leakage of flammable gases, fire and explosion. A number of garage fires and explosions during battery recharging have been reported globally, including in New Zealand.

A spate of fires in the Li-ion batteries in aircraft auxiliary power units grounded Boeing's entire 787 Dreamliner fleet in 2013.

Researchers are developing a lithium-metal battery made of a solid-state metal material rather than lithium-ion, which potentially offers a more structural stable battery.

The proposed structure is a less-stable electrolyte encapsulated between more-stable solid electrolytes, which prevents the leakage of the type experienced with lithium-ion batteries. While the design is still at the proof-of-concept stage, indications are that lithium-metal solid-state batteries could be competitive with commercial lithium-ion batteries.

Another alternative to the lithium-ion battery is the ZPower silver-zinc rechargeable micro-battery. Originally silver-zinc batteries were used by NASA and the military for mission-critical applications. While the compound in these batteries provided a high energy density, they had poor recharge characteristics. Recent research has solved this problem. Silver-zinc micro-batteries offer greater energy density than equivalently sized lithium-ion batteries and use a water-based chemistry that's stable, non-flammable, and non-toxic so eliminating the risk of explosion. Also the batteries are fully recyclable and mercury free.

Of real concern is public unawareness of the dangers inherent in lithium-ion batteries, their safe usage and disposal. Battery charging in home garages will be risky, e.g. alongside lawnmower petrol containers or other combustible items. High battery replacement costs will provide a ready market for cheap inferior batteries. There will also be a temptation for end-of-life EV batteries to be re-purposed in stationary applications, for example as solar energy storage units. As they become degraded the chances of them developing a fault increases.

The waste industry also has its problems with batteries, these being disposed of in ignorance by the public into the kerbside recycling collection system. If a waste management loader bucket hits a Li-ion battery on a concrete floor a fire can result, which can spread quickly into nearby waste paper. This has been the cause of at least one very big fire in a recycling yard in New Zealand.

Separate waste disposal outlets for batteries are now available in most places around the country. Disposal of batteries into landfills risks leaching chemicals into the environment. Plants in New Zealand and overseas can now 'disaggregate' batteries and recover elements including cobalt, nickel, lithium, zinc and magnesium.

Public programmes are needed to raise awareness of the hazards of lithium batteries, safe use procedures, and correct disposal choices.

Buried phosphorous flares during earthworks

A century-old match factory is the likely source of a phosphorus dump that caused the evacuation of residents after it was discovered at a Caversham (Dunedin) development.

The Wax Vesta matchworks was founded in 1895 and shifted to Caversham in 1901. It made strike-anywhere matches, which were banned in 1911 due to the danger they posed to workers and consumers.

Construction crews exposed an old sump when a digger scraped back the concrete covering it, and the phosphorous ignited when exposed to the air. A neighbour said mayhem ensued.

Another resident said it was not the first time emergency services had been called to reports of smoke at the development.

The Wax Vesta factory in its heyday. Photo: *Dunedin City Council.*

Hydrogen cyanide ban wanted

First Union wants hydrogen cyanamide banned immediately, rather than waiting for an EPA reassessment or phase out.

The EPA is reassessing the use of the chemical, a restricted spray ingredient used in commercial orchards. It has received 199 submissions, which will now be reviewed before a public hearing is held. The kiwifruit industry says some orchards would be uneconomic without the spray.

First Union co-ordinator Anita Rosenteter said hydrogen cyanamide has been banned in Europe and the US is reconsidering its use so New Zealand needs to take action now.

"It's a harmful chemical for the workers who apply it, as well as potentially the surrounding communities and the environment as well. Studies from the European Food Safety Authority say that it's a possible carcinogen, and that operator exposure is 6433% of the acceptable level, even if PPE is used."

Rosentreter said workers have told First Union it causes skin and eye irritations when they're exposed to it. She said the effects the chemical had on people's health outweighed the benefits it provided to the horticulture industry.

"Another point we have made in our submission is that the chemical is used as a labour management tool, enabling the kiwifruit industry to operate a regime based around casual employment."

Plan for underground mess

A plan to deal with South Dunedin's underground toxic mess should be in place by the middle of the year.

The city council has set aside more than $2 million for next year to deal with what could be a million litres of tar held in a well at the former Dunedin Gasworks site in Hillside Rd (pictured at right). The former city-owned gasworks stopped operating in 1987.

The underground tar well contains potentially cancer-causing chemicals and other toxic waste. Management of the site includes pumping out contaminated rainwater and taking it to Christchurch for disposal.

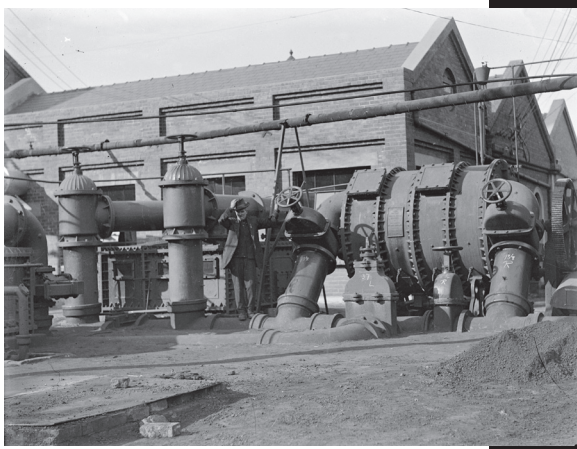


Photo: Otago Daily Times. ***Dunedin gasworks about 1938.***

Ponsonby clean-up under way

Excavation of contaminated soil at a Ponsonby school follows a fire a year ago that spread asbestos around the neighbourhood and is just the latest instalment in what neighbours say has been a terribly-handled public health emergency.

The soil already had asbestos in it before the fire (pictured). A year on, the soil beneath the two classrooms destroyed is being dug up in order to rebuild.

Barrister John Walton lives across from the school. His family could not return to their home for six weeks, and asbestos decontaminators ripped out their entire garden.

A letter from the Ministry of Education's contractor to neighbours says a licensed asbestos removal company will monitor the air throughout and for an undefined 'set period' afterwards. "All steps have been taken to ensure that there is no risk to you." Walton said this struck him as "being a very kind of a bold statement".

"We tried to garner some public health response or management of this whole thing a year ago, and basically just failed. Their approach seems to have been that this is a private property issue. The more general problem [is] that when we have these public health emergencies, people seem to run for cover."

Radio NZ submitted OIA questions. Answers indicate what will be dug up is low-level historic asbestos contamination already there before the fire. As for new contamination from the fire, tests showed 11 sampling sites out of 190 within school grounds, with asbestos at excessive levels. This was cleaned up in the six weeks after the fire.

The roof of the gym had to be repainted when it failed swab tests even after being washed. Footpaths were vacuumed. In some areas, soil with asbestos fibres in it was scraped up to 10cm deep and sent to a licensed landfill. Workers got rid of 99 tonnes like this, and brought in 42,000 tonnes of hardfill. Areas with asbestos material in it from previous years were concreted over.

Auckland public health said it reviewed the Ponsonby fire alongside FENZ, WorkSafe and Auckland Council, and it will set up a means to co-ordinate better, a 'liaison protocol' that will spell out which agency should take the lead, set up formal co-operation and communication processes, and provide "a mechanism for consistent information and advice" for the public.

Education Ministry Scott Evans said: "We accept that as the situation unfolded, our communications with affected neighbours was simply not good enough and this is something we will significantly improve on should another similar situation arise." For the rebuild, the historic contamination by asbestos had been safely encapsulated, he said.

The ministry is setting up a national asbestos management working group to look at identification and management in school buildings and develop a programme to help schools and kura.

Metamorphosis for Marsden Pt

Refining NZ will be changing its operations to cease refining crude oil from 1 April.

The Marsden Point site has established infrastructure including a natural deep-water port, electricity and gas connection and as the company makes its transition to Channel Infrastructure, more than half of land at the site will no longer be required.

The company is looking at a number of site re-purposing opportunities that hold significant business and sustainability potential for the local Northland region and New Zealand. These include a private fuel storage agreement with Refining NZ's customers to utilise the sizeable tank assets of the site, as well as opportunities to support New Zealand's move towards lower-carbon fuel options.

Refining NZ told *Flashpoint* that over the course of the transition, the business will be undertaking decommissioning of facilities no longer be required to run the import terminal. This work, which will continue for two years, means making the facilities safe, and includes the flushing out of hydrocarbons, de-energising and shutting down facilities to leave them in a safe state.

The business was recently granted a 35-year resource consent to continue operating its heavy-industrial site at Marsden Point. The conditions of the consent include strict protections to maintain high environmental standards and to ensure that it is operating in an environmentally responsible way, with strict environmental protections in place, now and with any future operations that take place on the site.

Refining NZ had to undertake an extensive assessment of the environmental impacts associated with continued operations at Marsden Point. This included a detailed assessment of the effects of activities and existing land contamination on the harbour, land, air quality and the surrounding community.

The site has a current Hazardous Substances Location Compliance Certificate and as the site transitions to a terminal operation, the company will work with its site certifier to ensure it will be updated to reflect site changes as transition occurs.

The company says that the impact of its operations on the environment will decrease over time once it ceases operating the processing plant and refinery from 1 April; and environmental management measures will continue under terminal operation.

CEO Naomi James said, "For many of our team, based up at Marsden Point, this is their community too, so we have a strong personal commitment to preserving and protecting the natural environment around us."

Post Marsden Point:

Serious attention needed on local renewables

With New Zealand depending on oil for 32% of its overall energy requirements, many people are waiting to see what the authorities will be doing to substitute for that once the Marsden Point refinery changes its output.

A good energy source must be readily available, easily stored and obtainable and transportable, which, by our good luck, humans have found through hydrocarbon oils and fuels over the last few hundred years. But like all good things the long-term energy sources need to be 'sustainable.'

New Zealand likes to pride itself on its use of renewable hydro-electricity, which surely puts us on towards the front of non-carbon energy use on the planet, but how good are we actually compared to he United Kingdom?

Fossil fuel use on the UK's power grid dropped to an all-time low in the week of 23 December 2021, in a sign analysts say is further evidence of the possible 'renewables revolution' underway on the British electricity generation – in that mid-winter week, coal and gas were providing just 6% of electricity, according to Inews reporting of Drax Electric insights results.

"Renewables generated 24.19 GW– 65% of the country's entire electricity needs – while fossil fuels were at a new record low," of only 35% in the place of coal and gas, wind was generating 55% of total electricity to the grid, with nuclear providing 24%, and biomass 8%.

This is a dramatic shift in renewables, as on the 29 December 2011, the same time a decade ago, fossil fuels were providing almost 59% of electricity to the grid.
The record also caps off a Christmas period that has seen green power dominate the grid mix. Over the last seven days of 2021 the average carbon intensity of the power grid in the UK dropped to just 125g of CO_2 per KWh, less than half the current average and 75% lower than the same period in 2012.

By the end of the decade the UK's climate advisor, the Climate Change Committee, says the carbon intensity of UK electricity must fall to 50g of CO_2 per kWh, and reach just 2g of CO_2 per kWh by 2050, if the UK is to stay on track to reach net zero. That will mean a further major expansion in renewable power across the UK.

In addition, earlier in December 2021 Boris Johnson and other UK ministers opened an auction for a new fleet of offshore wind farms capable of powering eight million homes in time for their hosting of the COP26 energy summit.

New Zealand has some distance to travel in matching the UK's progress. According to the 2020 NZ Energy survey, oil still accounts for 32% of our overall energy vs 33.5% in the 2017 usage, so while the search for alternative energy technologies is gaining traction such as wind, hydro, solar and hydrogen it is a slow process.

If we consider the 2020 vs 2017 NZ Energy surveys:

Actual Energy Use in New Zealand 2019 vs 2017

Gross petajoules (PJ)								
	2017	**% total**	**2017**	**2017**	**2020**	**% total**	**2020**	**2020**
Primary Energy Supply			***Renewable***	***Non-Renewable***			***Renewable***	***Non-Renewable***
Coal	*51.39*	5.5%		51.39	*53.76*	6.4%		53.76
Oil	312.52	33.5%		312.52	275.07	32.8%		275.07
Gas	197.61	21.2%		197.61	164.92	19.7%		164.92
Hydro	90.66	9.7%	90.66		92.07	11.0%	92.07	
Geothermal	204.48	21.9%	204.48		195.8	23.3%	195.8	
Other Renewables	73.92	7.9%	73.92		55.91	6.7%	55.91	
Electricity			*see above*			0.0%	*see above*	
Waste Heat	1.19	0.1%	1.19		1.19	0.1%	1.19	
Totals	**931.77**	**100.0%**	**370.25**	**561.52**	**838.72**	**100.0%**	**344.97**	**493.75**
Indigenous Production	712.05	76.4%			634.89	75.7%		
Imports	368.47	39.5%			358.73	42.8%		
Exports	108.66	11.7%			98.28	11.7%		
Stock Change	-26.05	-2.8%			-8.27	-1.0%		
International Transport	66.14	7.1%			65.29	7.8%		
	931.77	**100.0%**			**838.32**	**100.0%**		
Total Percentages	**100%**		**40%**	**60%**	**100%**		**41%**	**59%**

Source: MBIE Energy in New Zealand Report 2020

This summary shows that many think of hydro and wind as the big alternatives, but hydro actually only accounts for 11% of our overall energy and in the 2020 energy survey, its quieter cousin geothermal actually accounted for 23.3% of total energy or over 55% of electricity production.

It is interesting to note that in spite of the ongoing discussion about the need for renewable energies in our quest to limit the carbon effects towards global warming, there has only been a marginal 1% movement towards renewables over the past two years. Part of this was due to the very dry conditions over our summer and also a significant reduction of 1.5% in the availability of gas for electricity production which was not able to be replaced by renewables and actually meant a significant increase in imported coal for the production of electricity.

While about 21% of NZ's electricity came from geothermal now, with as much electricity generated from geothermal as from fossil fuel in 2018, there is still some work to go if we are to get NZ to the Government's target of 100% renewable electricity by 2035, and net-zero greenhouse gas emissions by 2050,

Comparison NZ vs UK

The reported value for renewables in electricity for NZ is around 84% that is within the top four in the OECD and does compare favourably with the UK renewable electricity percentage of about 65%. Overall UK renewables energy (mainly wind, solar, biomass, hydro) accounted for 43% of the UK's 312 TWh of domestic power generation in 2020. The above figures would indicate that in 2020 the overall renewables rate in New Zealand was 41% and the S&P UK renewables percentage was 43% of total energy.

This would indicate similar percentages of renewables in both countries although it is noted that the S&P Global Platts Analytics UK forecasts renewables plus nuclear will account for 56% of UK power demand in 2026, with wind output set to double from current levels to 131 TWh/year.

Looking at the sources of energy in the New Zealand annual energy usage, and a goal of mainly electric motor vehicles by 2030, and the corresponding need for an increase in renewable electricity, it is hard to see where this increase is going to be easily achieved. But given the UK's wind farms are contributing ~55% of the required electricity, and compared with the 2.6% of NZ energy which comes from solar and wind sources we are behind the development in renewable resources.

In addition due to recent decisions, with Marsden Point no longer able to process local crude oil, we will be totally reliant on offshore suppliers for most of our transport fuels! Given the above, an increase in New Zealand solar and wind capability for renewable production should receive some serious attention.

Actual Energy Use and Renewables in New Zealand 2020 vs United Kingdom 2021

Gross petajoules (PJ)		NZ			UK	UK	UK
	2020	% total	2020	2020	% total	Dec-21	Dec-21
Primary Energy Supply		2020	*Renewable*	*Non-Renewable*	Dec-21	*Renewable Electricity*	*Non-Renew Electricity*
Coal	*53.76*	6.4%		53.76	0.0%		
Oil	275.07	32.8%		275.07	0.0%		
Gas	164.92	19.7%		164.92	0.0%		
Hydro	92.07	11.0%	92.07		0.0%	0	
Geothermal	195.8	23.3%	195.8		0.0%	0	
Wind/Other Renewables	55.91	6.7%	55.91		55.0%	0	
Electricity		0.0%	*see above*		0.0%	*see above*	
Nuclear					24.0%		
Waste Heat/Biomass	1.19	0.1%	1.19		8.0%	0	
Totals	**838.72**	**100.0%**	**344.97**	**493.75**	**87.0%**	**8829**	**4754**
Indigenous Production	634.89	75.7%					
Imports	358.73	42.8%					
Exports	98.28	11.7%					
Stock Change	-8.27	-1.0%					
International Transport	65.29	7.8%					
	838.32	**100.0%**					
Total Percentages	**100%**		**41%**	**59%**		**65%**	**35%**

Source: (i) NZ MBIE Energy in New Zealand Report 2020

(ii) iNews UK 30 Dec 21

Recent updates to HS Regs

It has been 25 years since the first Hazardous Substance and New Organisms Act combined most of New Zealand's chemical regulations into one piece of legislation, the HSNO Act 1996, as a direct result of number of incidents, in particular, the ICI Fire of 1984.

Then following the Pike River Mine explosion in 19 Nov, 2010, the chemical regulations were again revised under the Health Safety and Employment Regulations 2015 and the Hazardous Substance Regulations 2017 (HS Regs).

While the HS Regs did have an advantage of a good index, as often occurs there were still issues between what the Regulations required and the actual chemical market practice, and in some cases the latter was preferable.

To address and co-ordinate these differences some updates to the HS Regs. 2017 have recently been introduced under the Health and Safety at Work Act (Hazardous

Summary

Substance) Amendments 2021. This has addressed some of the anomalies in the HS Regs with a summary of main changes as follows:

- The Amendment Regulations correct a number of technical issues and errors in the Health and Safety at Work (Hazardous Substances) Regulations 2017 (the Hazardous Substances Regulations).
- The Hazardous Substances Regulations establish requirements for the manufacture, use, storage and handling of explosive, flammable, toxic and corrosive substances at work. These 2017 regulations consolidated requirements found across 15 sets of regulations, nine transfer notices and more than 1700 substance approvals. Since the Hazardous Substances Regulations commenced in 2017, the Ministry of Business, Innovation & Employment and WorkSafe have become aware of a number of unintended effects making compliance difficult for some businesses.
- The Amendment Regulations make minor and technical changes to approximately 70 provisions of the Hazardous Substances Regulations.
- The majority of these changes are minor, such as correcting typographical errors, incorrect references to New Zealand or international standards, and clarifying wording to make the intent of specific regulations more clear.

Other changes

Other changes address issues that are creating unintended and disproportionate compliance costs for some businesses. These include:

- Providing more flexibility in how far stores of toxic and corrosive substances must be separated from protected places (like on-site offices), where WorkSafe is satisfied the site has appropriate safety measures in place (see Amendment Regulations regs 36, 38 and 39)
- Adding transitional arrangements to ensure that LPG tanks and cylinders installed to meet requirements that were in place before 2010 can continue to be used, provided base safety standards are met (reg 68)
- Correcting an error that meant certain rooms designed for industrial mixing of paint were only permitted to hold up to 450 litres of flammable liquids (reg 26).

Overall the full changes to the HS Regs can be found on the Health and Safety at Work Act (Hazardous Substance) Amendments 2021 at the Government legislation website with a general address as follows: https://www.legislation.govt.nz/regulation/public/2021/0372/latest/whole.html

Overall, these changes do in general represent useful additions to the Hazardous Substance Regulations 2017.

Comment wanted on course

NZIHSM, HSPNZ and HASANZ have been slowly working behind the scenes to promote an initial tertiary course for new Compliance certifiers. Massey University has offered to run the first two as part of their Health & Safety course programme. We have encouraged this over an alternate run by an individual certifier company, although following these courses online 'strand' courses run by the Institutes are to be finalised for Class 2- 5, Class 6-8 at first with the stationary container course being delayed while HASANZ applies for more funding for its crew.

The initial proposals as part of the Massey H&S programme for graduates at the beginning of the Massey academic year are:
(i) Unit 2: The role of the Compliance certifier and
(ii) Course 250.318 Hazardous Substance Compliance certifier
We would love to get feedback on Unit 2: The role of the Compliance certifier, so if you could make any comments or improvements on these initial offerings asap, it would be much appreciated if you could send these through Linda at office@nzihsm.org.nz

For further information, contact Dr Ian Laird, Massey University, Wellington.

Coping with Covid

Amazingly, we are now in our third year of the battle of the Covid bug. The statistics are somewhat large with recent statistics indicating that to late February 2022 there have been 423 million cases and 6 million deaths worldwide with a death/million of 746.

Here in New Zealand there have been 38 thousand cases and 53 deaths with a death/million of 10.

This would suggest that in New Zealand, in spite of recent protests, has performed well by following the science of isolation until vaccines or medicines are found. We will all need to face the virus which appears to now be always with us, but using science we have strengthened our immunity against it.

Many believe that our nation's political and science leaders deserve a great amount of credit for a good result so far as is shown in the diagram below.

Vaccine the virus

Fortunately the vaccine resistance is increasing throughout the planet with New Zealand joining a late start Pfizer, but quickly gaining over 90% of double jabs with boosters following.

Unfortunately, as humanity will consistently need over 90% vaccination rates to achieve the hoped for herd immunity, this bug along with the flu may be an unavoidable part of life.

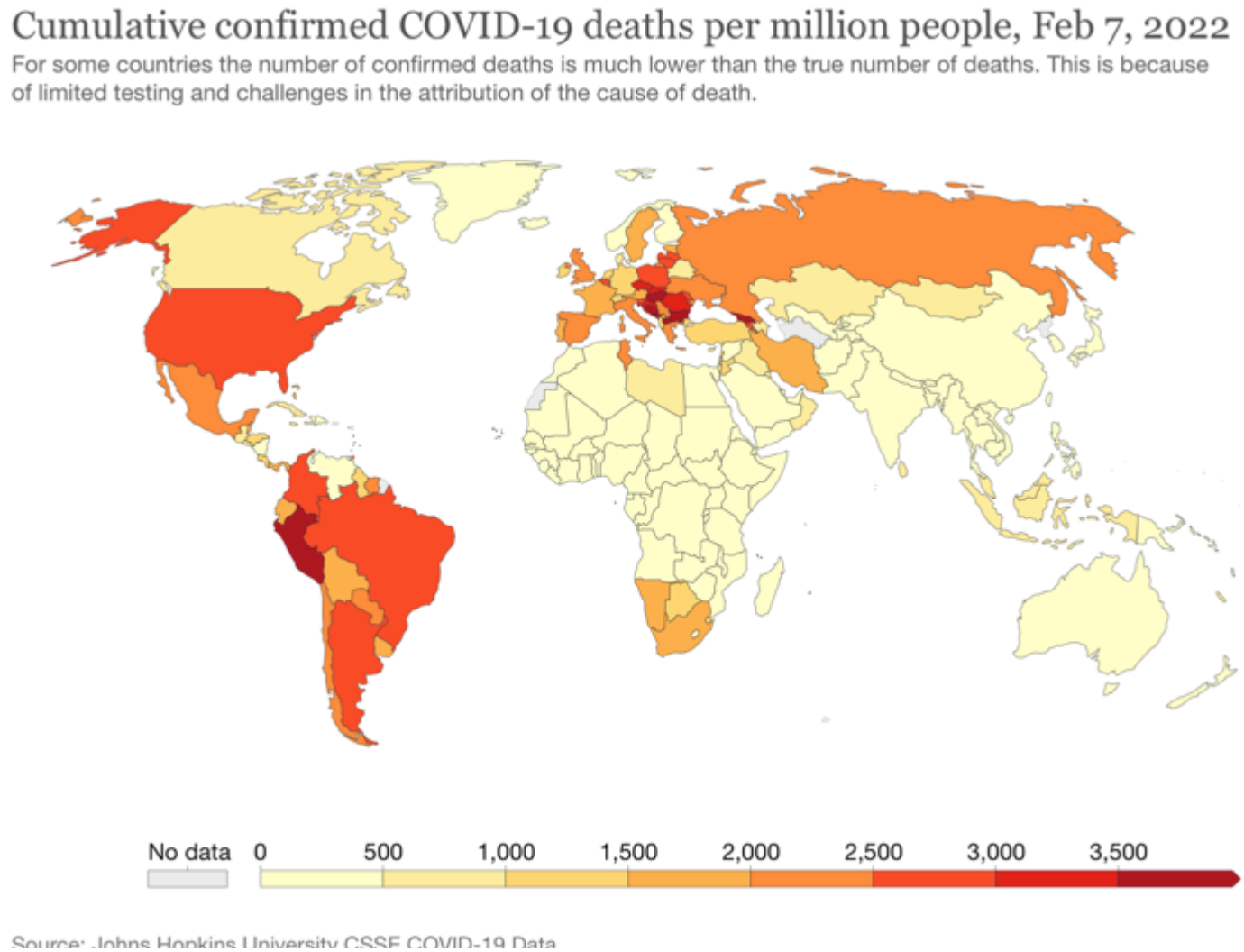
Politics versus science

Various protests have occurred around the planet recently crying that freedom is more important than using the science of isolation to control a virus pandemic. While there is some truth in the importance of freedom, and it is certainly a cornerstone of democracy, we just wish that they would follow the science and at least use the ablutions.

It is a sad science fact that freeing bugs too early before a suitable defense is in place can have a high price as shown in the above deaths/million diagram.

It is also a sad observation that some of the more authoritarian countries have had the best response to Covid deaths to date per capita. This may be because as Nature continues to show us, isolation against nasty bugs is the best solution until a cure is found.

In spite of our protestations, there is a price to democracy, in that if you want to have all of the freedoms, then a democratic price of vaccinations and a suitable air mask are required to keep the virus at bay.



Sorting the forest from the trees

by Dave Lascelles

In a response to the 2016 Paris Climate Agreement, New Zealand set some specific long-term emission reduction targets. To achieve these, the Emissions Trading Scheme was developed. Obligations set under the ETS apply to a broad range of sectors including forestry, energy generation, transport, industrial processes, agriculture, and waste.

While the initial focus is on carbon, other emissions, e.g. nitrous oxides, HCFs, and sulphur products are included in the intent of the ETS.

The ETS places a price on carbon – levied as one emission unit for each tonne of CO2 equivalent emissions for which an emitter is liable. This cost is designed as incentive for emitters to reduce their emissions, to stimulate the use of clean technology, and to promote the uptake of low-carbon technology.

Supply and demand has created a market for the direct trade of emission units between obligated emitters and those with surplus units. Surpluses can be accrued by reducing emissions; or activities, such as growing carbon forest 'banks'. Units are also traded in a Carbon Fund on the NZ stock exchange. The units (labelled NZUs) have become a currency.

The ETS has provided high country landowners with a major opportunity. Because trees absorb carbon dioxide, under the ETS forest owners can claim the amount of carbon dioxide absorbed by their forests in the currency of NZUs. They can then sell these NZUs to businesses looking to offset their carbon dioxide emissions.

Returns on sheep meat have flat-lined for many years, and shearing is a loss business. Carbon farming looks a real prospect, for better and faster returns. The idea also sits easily alongside our enthusiasm to plant swathes of trees to meet our international climate obligations. However, the proposition that we festoon the countryside with pine trees, under the cloak of ecological goodness, may deliver a major adverse environmental outcome.

A mature pine tree can produce upwards of 800 cones in a season, and each cone can release 30 seeds, all to blow away on the wind. Wild infestations of trees are the consequence.

Tougher rules for containment is the catch-cry, but how practical is that. Genetically modified plantings may be a solution, but NZ's regulation of GMO and gene editing is amongst the most restrictive in the world.

And trees need water. Wilding infestations in Marlborough are estimated to suck up around a third of river flows before they can get to the grape vineyards. Conifer infestation control in Marlborough alone already costs $5m pa. And this paid for by the same government that is cheerleading their propagation.

Planting a myriad of pine trees now with the best of intentions is all very fine, but with what forethought as to the potential cost to remediate the environment in the long term? Native trees, not currently accepted for carbon credits in the ETS scheme, may be a better choice.

Nervous over Corteva clean-up

Corteva Agrisciences' facility at New Plymouth has been decribed as a ticking time-bomb and the Government has ben asked to step in to force the company to clean it up.

The site is notorious and was the subject of major public protest during the Vietnam War when it was learned that the then Ivon Watins-Dow factory was being used to make Agent Orange defoliant that was spread over thousands of acres of Vietnam and Cambodia. Corteva has recently closed the 16-hectare site which borders Paritutu Centennial Reserve and residential housing.

From the 1960s through to 1987, IWD made the herbicide 2,4,5-T at Paritutu - which contained the toxic dioxin TCDD. In the mid 1980s, elevated levels of TCDD were found in the soil on the site's boundaries with reserve land and a residential street. In 1998, similar levels were found on Mt Moturoa some distance away.

New Plymouth Mayor Neil Holdom wants the site drilled and comprehensively tested. Although there are examples of Dow subsidiaries paying to remediate production sites around the world, the mayor fears without government pressure, Corteva could leave the New Plymouth site as it is – at a cost between $50 million and $60m to make the site safe.

"In a nutshell, if Corteva, a $35 billion United States agri-company, can sell that site, then any liability or connection they have with all the legacy toxic chemicals on the site essentially transfer either to the person that buys it or to the people of New Plymouth district."

Environment Minister David Parker said responsibility to ensure the site was safe did not fall with the government.

"It falls with the district council and the regional council between them, probably in the main with the regional council, to make sure they have all the information they need to make these assessments and if they haven't got it to ask for the additional information, and if it's not provided promptly to go onto the site and do their own investigations."

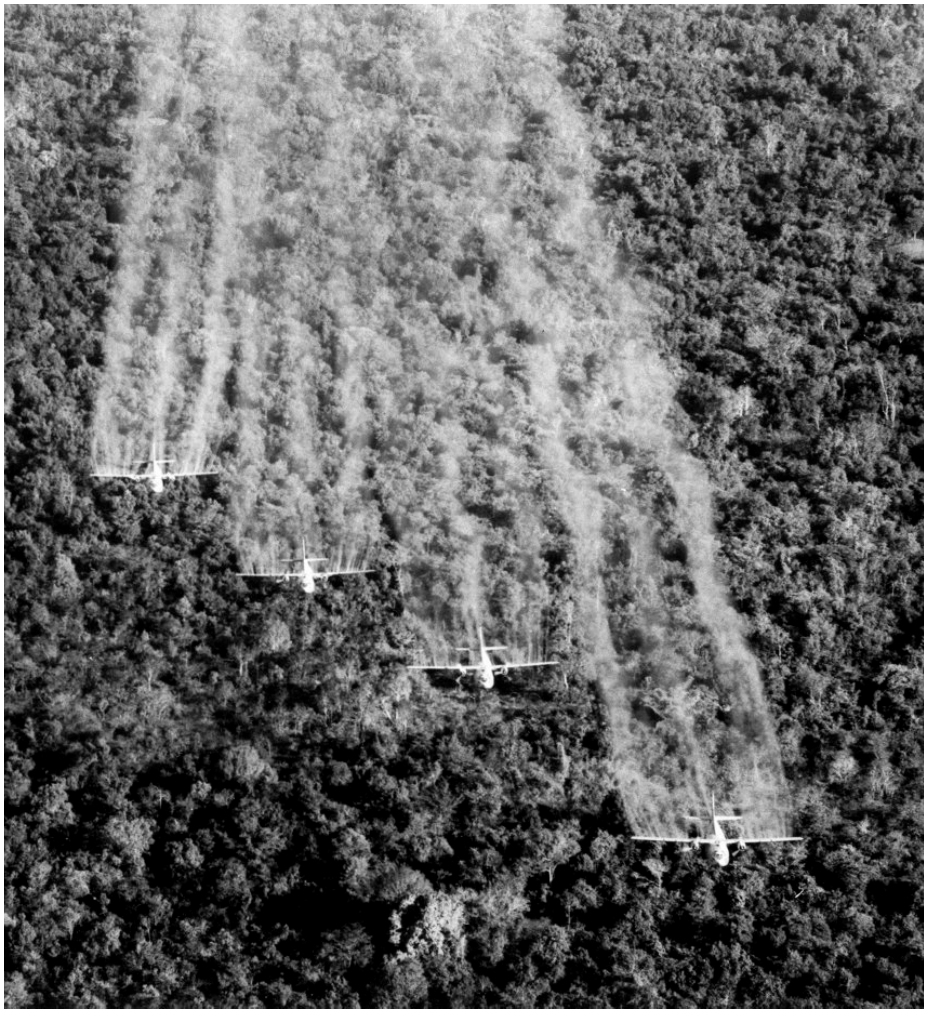
He expects the company will co-operate fully.

Taranaki Regional Council science manager Victoria McKay said the company has removed all product from the Paritutu site, cleaned it thoroughly and validated the process through testing, and ongoing monitoring programme remained in place, including annual stormwater sampling and four on-site inspections.

"The TRC is not aware of any soil contamination on the property," although the council has previously acknowledged there are no records for soil contamination under the building where 2,4,5-T was made.

She said a change of land use at the site will trigger a requirement for further investigation.

Four American planes strip-spraying Vietnam jungle with Agent Orange.



Lessons from history:

Grain dust blast destroys silo facility

In December 1977, a crop-storage facility at Westwego in Louisiana, a port side terminal for the transfer of grain held in silos to/from vessels, rail and road transporters exploded, killing 36 people. The blast was heard and felt throughout the New Orleans area.

Forty-eight of 73 silos, holding soybeans, wheat and oats, were destroyed. Most of the 36 people who died were trapped in a two-story, office building that was crushed when the explosion toppled a 25-story grain elevator, and sent a concrete tower crashing down onto the office building.

At the Westwego facility the grain was dumped into receiving bins and transferred by conveyor belts to bucket elevators that transferred the grain to a facility above the storage silos called the 'workhouse'. The workhouse contained equipment for cleaning, weighing and blending grain before its transfer on belt conveyors into the silos. The workhouse also housed the head pulleys of the bucket elevators in an extension called the 'headhouse'. The overall height of the structure was about 80 metres.

Random spark

Investigators blamed the catastrophe on a random spark igniting grain dust, although the origin of the spark was never identified. Static electricity or machinery were two possible origins. Grain dust is estimated to be about 10 times more explosive than coal dust.

The four factors that must be present in any explosive situation are well known and provide a useful framework for thinking about ways to eliminate explosions in grain elevators. The four factors are:

- Fuel source--in this case, grain dust; suspended in a concentration within its explosive range.
- Oxygen.
- Ignition source of sufficient energy and duration to initiate an explosive reaction.
- Confinement (a condition that contributes to turning a fire into an explosion).

Any measure proposed to reduce the incidence of grain dust explosions must effect changes in at least one of these four factors.

Dust endemic

In an ideal world the most effective approach would be to control the dust ie remove the fuel. But grain dust is endemic to the operation of handling and storage of grain. There is no market for grain dust. At Westwego all grain dust formed during grain handling was reintegrated into the product stream.

From the official inquiry into the Westwego tragedy came new industry guidelines and national regulations on containing and controlling grain dust at elevators.

They included:

• Locating offices or other peopled spaces away from

Security cameras caught the moment of the initial explosion.

grain handling plant.

- Installing heat sensors and alarms to warn of malfunctioning equipment or excess friction.
- Systems to automatically shut down conveyor belts when they slip.
- The mounting of bearings outside of enclosures containing dust.
- Installing magnets to remove ferrous materials that can produce sparks.
- Installing ground fault detection systems to detect short circuits and shut down equipment.
- Installing devices to detect such things as humidity, gases, dust concentration, and static electric charges.
- Flame arrestors, explosion suppression devices, and explosion venting can minimise the effects of explosions rated a mention, but are somewhat 'after the event' measures.

The end requirement from a safety perspective is to assure that all potential methods of reducing grain explosions are considered. The same requirement, the identification of all potential hazards, applies to the design and operation of all process operations.

– Dave Lascelles

Uncle Archie

Kia ora HS Professionals!
2022 is progressing in Aotearoa, and we have a variety of issues already.

Closing Marsden

The closure of New Zealand's only oil refining capability at Marsden Point has been confirmed and we will now rely on all of our transport oil imports from offshore Asian markets. This may mean that we may well be short of fuel in the unlikely events of virus pandemics, transport halts or trade disputes. Yes, a case of Bike it Hard or Saddle up the Sheep !!

Compliance corner

The Covid bug may have spooked us but safety compliance never sleeps! This means that many compliance certifiers are finding increased urgent requests as chemical supplies are being ordered late, along with delayed deliveries. But then with viruses to fight us and RATs to defend us, little is a surprise !

New Compliance Certifier performance standard

Just in time for Christmas a new HSAW performance standard 2021 for Location Compliance Certification Classes 2,6,8 was issued. 59 pages of treats here!

HSAW (Hazardous Substances) Amendment Regulations 2021

An update to the Hazardous Substance Regulations 2017 was released in December 2021 to try and resolve issues with the initial regulations. Many of these were useful to match safe Industry Practice. Included in the 33 pages of reading treats are a possible Reduction in required Separation distances for controlled Class 6&8 substances and some Stationary Container requirements

Electric transport

Closing refinery capacity will mean a reduction in carbon-based transport and hopefully an adoption of electric transport. This could be a good idea provided that we can quickly develop significant new renewable energy sources and infrastructure.

Burning power

One issue of warmer air is that it holds more water vapour, which can mean long dry periods before larger rain deluges fall. This has been the case in New Zealand during the last year with the hydro and gas resources lower causing sub-optimal Indonesian coal being burnt for electricity supply.

A wealth of vaccines

Medicines and vaccines are required for all of the human race if we are to properly stop the Covid virus morphing into many new variants. This means richer nations will need to donate vaccines to poorer nations. But who are the richest? The richest 10% of the global population currently take home 52% of the income. The poorest half of the global population have just 8%. A net worth of $93,170 U.S. is enough to make you richer than 90 percent of people around the world, Credit Suisse reports. As this is only $NZ138,000, every NZ house-owner is in the richest 10% !

If you want to send your comment, you can send it to archie@NZIHSM.org.nz.

The ideas expressed in this column are not necessarily the views of the NZIHSM or Flashpoint *and, in some cases, the NZIHSM frankly does not approve!*

NZ Institute of Hazardous Substances Management (Inc)

MEMBERSHIP APPLICATION FORM

1. **Name:** .....
   First Name Surname

2. **Employment:**
   Business/Employer's Name: .....

   Position and Contact Details:

   Position Held: .....

   Qualifications: .....

   Experience in HS:
   .....

   .....

   .....

3. **Preferred mailing address:** .....

   Telephone Contacts: (Bus).....

   Residential: .....

   Mobile: .....

   Email: ..... **Web:** .....

4. **I have previously been a member of the Institute: Yes**..... **No** .....
   If No, I am applying to be a

   Member: ☐ **Associate member:** ☐

5. **Return to:** PO Box 10-385, The Terrace, Wellington
   Email: office@nzihsm.org.nz

How did you find out about us? .....

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