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Facing our challenges



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# How Many Deaths Does it Take?

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## Oxidation, Effluent and Water Storage Ponds





## But how Many Deaths Does it Take?



A Moment's Silence for a decades loss (2009 – 2020)



## What is the magnetic force that attracts?

- Being inquisitive
- Splashing water
- Decoy ducks
- Still waters
- Stone skipping
- Model boats
- Dog walking
- Short-cut route
- Photography
- Bird watching
- Adjacent to tracks
- Swimming
- Wind surfing
- Work

All unaware of the invisible dangers!



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- Seven pre-schoolers
- A teenager trapped in a water storage Pond
- Two workers who lost their balance on a pontoon
- A farmer who slipped into a PE lined oxidation pond
- A tanker driver who slipped into a steep-sided concrete-lined pond
- Seven who drowned when their tractors/quad bikes went into ponds



## Access

The most at risk being pre-schoolers it would appear

- They can't read / understand signs
- They can't swim
- They don't know that they need to save themselves
- They can't climb up slippery batter slopes
- Unlikely to recognise any egress options
- Their cries for help are less likely to be heard





How did they get access?

By climbing



Ladder Gate



Large Mesh Netting



## Going through gaps



## Squeezing between wires





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## Crawling under the bottom



## Stock-proof fence not necessarily child or small animal-proof





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They were at work





## Fence Standards

- Ponds are not swimming pools
- There are no standards for pond fencing

## What Guidelines exist?

- Water NZ 2017 (Oxidation Ponds)
  - In many cases the “front entrance” to ponds is security fenced, with the “back door” being normal 7 or 8 wire stock fence.
  - Deer fencing can provide additional security



## IPENZ Practice Note 21 – 2017 (Farm Ponds)

- At very least a secure 5-wire fence with an electric fence hot-wire. In some locations, a higher fence such as deer fencing will be appropriate.

## Worksafe 2017 (Farm Ponds)

- Fence the pond and put up warning signs



## Dairy NZ

- All ponds should be fenced off with a netting fence
- Warning signs can be used to keep people out

These guidelines have little substance and how effective have they been in the prevention of death?



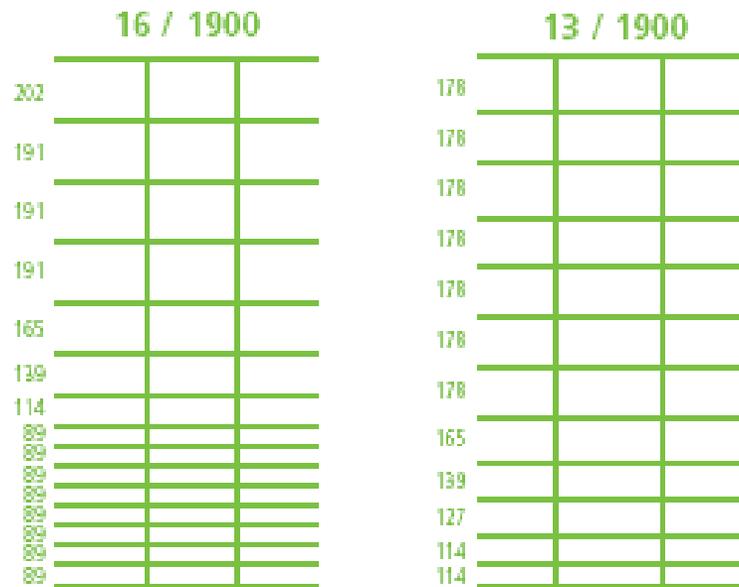
## What might Best Industry Practice look like?

- 1800 mm high
- 100 mm max line-wire spacing in lower portion
- 100mm maximum stay-wire spacing
- Barbed tension wire top and bottom clipped to netting
- Install with less than 100 mm clearance beneath



## Solutions

- Cyclone 16/1900 HT Tightlock deer fawning netting
- Mesh size 240W x 89H in lower 800mm
- Tensioned bottom wire clipped to netting
- Deer netting accepted by Worksafe in Gore
- Summit Steel 19/1800 XTM fence forged knot MT security netting
- Mesh size 50W x 100H over full height
- Cyclone HT Reverse Twist 1.6 x 100 barbed tension wire top and bottom clipped to netting
- Being adopted by some other Council's
- Gates similar





Once in the pond, what is the means of Egress?

Are there any?

Slippery Batter Slopes (sludge and biomass)





## Steep Batter Slopes



## PE batter Slopes



## Sludge layer in invert



## Floating pontoons

- How do you get out?
- How can rescuers assist?



## What Egress Guidelines are there?

- Water NZ 2017 (Oxidation Ponds)
  - Silent
- IPENZ Practice Note 21-2017 (Farm Ponds)
  - Working around water requires a minimum of two people with one always available for support and rescue.
- Worksafe 2017 (Farm Ponds)
  - Ponds with synthetic liners should have exit devices (and) .... have rescue lines and a lifebuoy close to the pond.
- Dairy NZ (Farm Ponds)
  - Ponds should have at least one permanent....means of escape in case a person falls in.
  - You can have a lifebuoy available in the area too
  - pontoons should have anchor points to improve stability



## Egress Solution – Sheet Lined Ponds

- PE Ladder



Viking Geoladder



AEL Hi-vis Safety Ladder



## Egress Solution – Earth / Stone / Concrete Batters

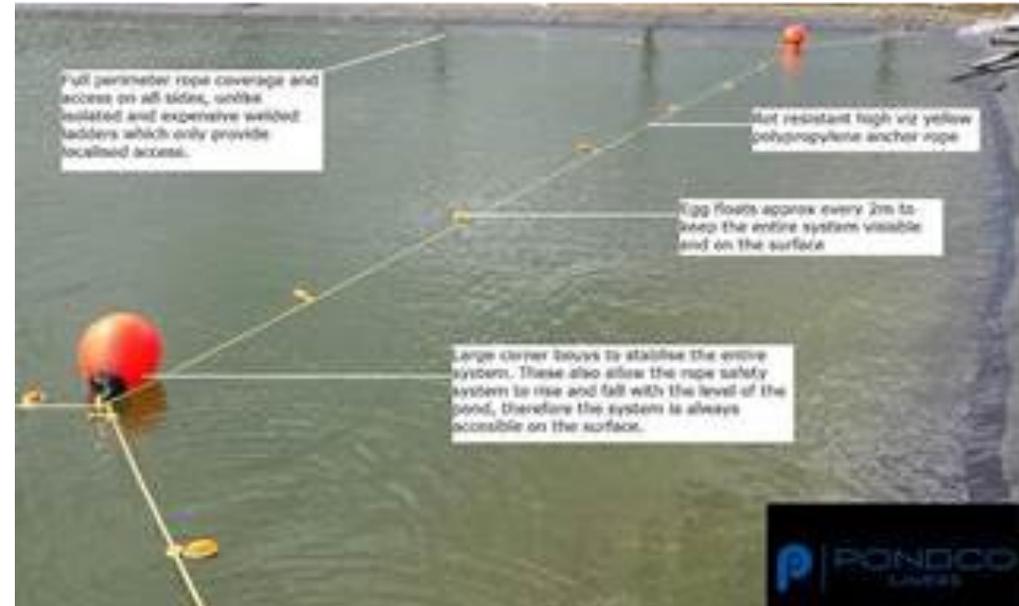
- Tyre Ladders



- Spacing / Location
- At each corner of pond, Worksafe precedent minima (Gore DC)
- At inlets and outlets
- At sampling/monitoring locations
- At maintenance locations, eg pumps, aerators
- Maximum spacing between ladders 50m recommended, based on water safety and marine guidelines



## Egress Assistance – Float and Buoy Line (Recommended by Dairy NZ)



Pondco Liners



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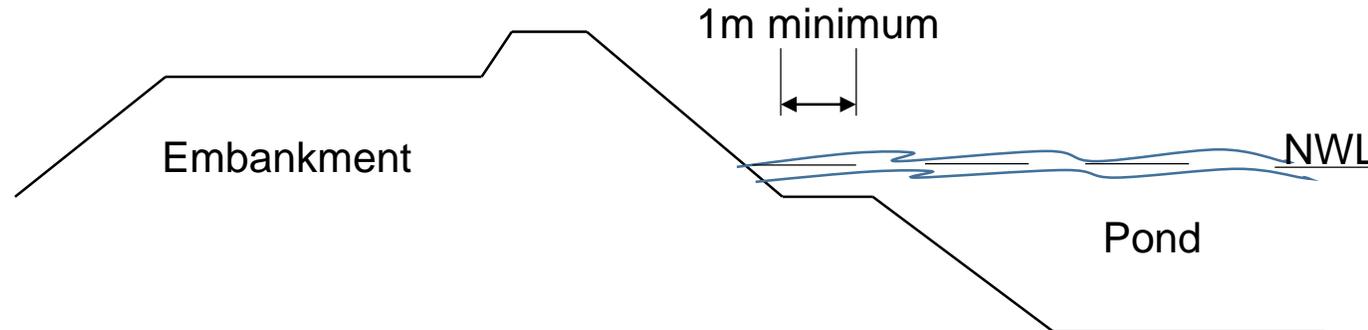


Courtesy of Dairy NZ – <https://www.dairynz.co.nz/effluent/effluent-storage/effluent-pond-safety/>



## What else can you do to assist self rescue?

- Incorporate a bench in the batter at 300mm below normal water level to swim on to. This can also be useful for maintenance access.





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## Employee Safety at Ponds

- Is Grazing separated from ponds?
- Access/Security Control Procedures
- Working Alone Procedures
- Make sure all workers can swim
- What tasks require two person attendance?
- Monitoring Procedures
- Maintenance Procedures
- Safety Equipment



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## Some Batter SiD Items

- Slope
  - Safety vs earthworks volumes
- Profile
  - Bench 300 below NWL
  - Maintenance access
- Finish
  - Grass / stones / concrete
- Embankment vehicle access
  - Width
  - Location
  - Not a transit route
  - Mound on top edge of crest pond-side



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## Some Access/Egress SiD Items

- Access control and details
- Landscaping that discourages access
- Grazing controls
- Access procedures
- Maintenance procedures
- Egress provisions and locations



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**May the lives of those  
who have drowned in  
ponds not been in vain**