

**IN THE MATTER**

of the Resource Management Act 1991 (“the Act”)

**AND**

**IN THE MATTER**

of applications by the Central Plains Water Trust (CPWT) and the Ashburton Community Water Trust (ACWT)

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**Statement of Evidence of Colin Morris**

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1. My name is Colin Morris. I live with my partner Liz Weir at 20 Lower High Street, Coalgate. I have lived in Canterbury since 1980 and moved to Coalgate in 1989. When I lived in the Rakaia Gorge, I used to travel through Glentunnel and Coalgate on my way to Christchurch. I always had good feelings about the area during those journeys, so much so that I purchased a section in Coalgate in 1987. I built my dream home in which I plan to spend the rest of my life.



View of Selwyn River from the start of the Coalgate Millenium Walkway



20 Lower High Street, Coalgate

2. The building of my house was a labour of love. It is a unique house - clad in river stone with many quirky features that you would not find in an average house. It took me 11 years to complete the house although other improvements are ongoing. The gardens are only now starting to flourish and complement what I consider to be the perfect habitat. Needless to say I am very proud of my house and love the peaceful environment of this area. I feel that I am fairly typical of many Coalgate residents, many of whom are retired, who have moved here to escape the city. I was drawn to this area because it is semi rural, very picturesque, nestled under the foothills, is comparatively quiet and sleepy but within fairly easy reach of the city.



View from my home



Coalgate Children's Playground  
A Community Project

3. In 2000, I began to be more active in the township and became a member of the Coalgate Township Committee. Since then I have been involved with various projects in the township including the construction of the children's playground and many beautification working bees. I was delegated to build the 'Coalgate Millennium Walkway' with a Y2K grant from the SDC (the same walkway the Commissioners went to on their site visit). I have since been responsible for ongoing improvements and maintenance of the walkway, and I am very proud of this achievement. The walkway is approximately 6 km long and offers walkers spectacular views of the Malvern Hills and in the distance, The Southern Alps. Because of the stunning views, it is a popular walkway with people from all around the region. The views will not be so stunning with an ugly, intrusive dam in the foreground.



Coalgate Millenium Walkway

4. I got the first inkling that something was being planned for the Malvern area in about 2001. There was an air of excitement in Coalgate about a new 'lake' that was being created in close proximity. That had to be good for the township, right? I remember going to the first public meeting in Glentunnel and being told of a proposal to build a large dam in the Wairiri Valley to hold back a significant quantity of water for irrigation. Immediately I was opposed to the idea of having to live beneath this structure, which was to be only 4 kms upstream from my home. Memories of the Opuha Dam collapse were still fresh.
5. Since that first meeting and after the dam sight was changed to the Waianiwaniwa Valley, I have found it difficult to obtain accurate and specific information from CPW about what was being planned. I attended every meeting, and read everything I possibly could, but found that important questions were not answered satisfactorily. Questions were either deferred or never answered. In short, consultation with affected parties has been disappointing and unsatisfactory.

*PowerPoint: Definition of consult: to ask advice from (someone), confer with, to refer to for information, to have regard for (a persons feelings, interests etc.) in making decisions or plans; consider.*

*Consultation: a conference of discussion or seeking of advice.*

6. This is the definition of 'consult' taken from the Oxford dictionary. I have never been asked for my opinion and no one has ever consulted me about the CPW scheme. All dialogue has been one way- CPW simply telling us what will happen. All sticky questions were answered with; 'we will take that on board and get back to you'. They never did get back to us.

*PowerPoint: letter from CPW*

7. My home is less than 1 kilometre away on the down-stream side of the proposed dam site. From the map, it is also approximately 200 metres from the level headrace. On 23 November 2005 I received this form letter from CPW. It was addressed "To the Landowner," there were no names and it was very impersonal. It told me that my own property had been identified as being required for the scheme. They did not have the courtesy to visit my home or even phone me to discuss the issue.
8. I had been following the progress of this proposal quite closely but it was still a huge shock for me, and my immediate neighbours, one of whom became quite ill as a result. I subsequently wrote a letter to CPW asking for clarification as to why my property was required when, from the plan, the canal was clearly 200metres away. I received no reply. Mine is a typical case. I am also aware of people who received no letter informing them that they were affected. They learned that their property would be required when their name appeared listed in the AEE. One couple I know of found out that they would lose their property under the dam footprint on Christmas Day. What a great present that was. It is interesting to note that the arrival of this letter coincided exactly with the announcement that CPW had been granted 'Requiring Authority'.

*PowerPoint: Section 167(4) of the RMA: the applicant giving "proper regard to the interests of those affected..."*

9. I feel that the applicant has shown no due regard to affected parties and that the consultation process has been totally inadequate.
10. In July 2005, the Coalgate Township Committee surveyed the residents of Coalgate to gauge reaction to the scheme; 85% of respondents were opposed to the scheme, their primary reason being the ‘hazard of dam failure/overspill’. It is not fair or reasonable that a private company can subject a whole community to the inconvenience and danger of living beneath such a significant structure, simply for the financial benefit of their shareholders.
11. There are many other issues confronting the residents of Coalgate. It is estimated that it will take at least 3 years to construct this 2km long, 55m high dam. Apparently work will be ongoing 24 hr/s a day, 7 days a week. The edge of the Coalgate Township is only 100metres from the dam footprint. There will be constant heavy truck movement, machinery operation, blasting, drilling, vibration, dust and every imaginable activity associated with a project of this scale. I do not believe there any measures that can adequately mitigate that level of constant disruption.
12. In 1980, I worked for 12 months on the Ohau power scheme in Twizel and have first hand experience of this kind of work. I can tell you now that living in Coalgate during this construction phase will be utterly intolerable. Coalgate is on the SE side of the dam site and will experience intense dust storms during the prevailing Northwesterers.

#### The “Dam Safety Assurance Report”

*PowerPoint: cover of report*

13. This was compiled by URS, the company that will build the dam if the scheme proceeds. I have real doubts as to the impartiality of the report, after all URS stand to make a lot of money from the construction of this dam so would want it to see the scheme proceed. They would clearly minimise the risks and downplay the severity of any risks that do exist. The peer reviews for this report were done by engineers from around the world but these peers are also employed by URS. Much of the report content is very technical and way above my head. However, I would like to comment on parts of the report.

*PowerPoint: “dams by their very nature impose risk and benefits to their affected communities”<sup>1</sup>*

14. The report does include such profound statements such as this. I can tell you for a fact that this particular statement is of NO comfort to the community of Coalgate. The community is being asked to bear all the risk yet reaps no benefit whatsoever. We cannot use the water from the scheme, will receive no compensation for hardship, loss of enjoyment of life, inconvenience etc. and as far as I am aware there are no shareholders living in Coalgate.

*PowerPoint: Tolerable risk: “a risk that society is willing to live with so as to secure certain net benefits”<sup>2</sup>*

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<sup>1</sup> CPW Dam Safety Assurance Report, page 2-1.

<sup>2</sup> Ibid, page 4-1.

15. I have never been asked if I am willing to live with this risk and doing so would be most intolerable.

*PowerPoint: Comparative risk; figure 4.2*

16. This figure is supposed to put my level of risk in context with other activities or events. The problem with this chart is that the majority of the activities listed are ones I have at least some control over, ones that I can choose to do. I have no control over a total dam failure and feel extremely uncomfortable about the idea of living directly beneath this structure. I know of at least one family who have already moved away from Coalgate because their daughter was having nightmares about the dam collapsing.

*PowerPoint: Probability; table 4.1*

17. The report states that ‘A failure of the coffer dam during construction would not lead to major flooding. Water depth would be mainly below 1 metre and velocities below 2m/s<sup>3</sup>. They put the annual probability of failure at 1 in 40,000. It is no assurance to me that if there is a failure during construction that I will only get 1 metre of water through my house.
18. The conclusion on page 4-8 tells me that the design, construction and operation of the dam will achieve a probability of failure of 1 in 4 million. How many people buy lotto tickets each week with similar odds? The point is that I do not want **any** risk.
19. Elsewhere in the report it quotes a recent report (*Foster et al 2000*)... ‘Shows that just over 1% of embankment dams have failed historically<sup>4</sup>. It continues, ‘0.5% of embankment dams more than 15m high constructed since 1950 have failed<sup>5</sup>. With my limited mathematical knowledge, I say this gives the dam more like a 1 in 100 to 1 in 200 chance of failure. The Foster report identifies 11,192 embankment dams, of which 136 have failed since 1950<sup>6</sup>.
20. The Connecticut Department of Environmental Protection website shows that in the 20<sup>th</sup> century there have been about 200 notable dam and reservoir failures with over 8000 deaths<sup>7</sup>.
21. If one Googles “dam collapse” a staggering 228,000 sites appears. From internet searches, I have been able to compile a list of significant dam failures and resulting carnage. Please refer to this in the appendix; it makes sobering reading.
22. The dams which failed were all designed by engineers. I expect in every case that they had to reassure the local communities that the dams would be built to the highest standard and would be perfectly safe. One would expect in this day and age that structures would be designed and built safely.

*PowerPoint: Minneapolis Bridge Collapse*

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<sup>3</sup> Ibid, page A-7.

<sup>4</sup> Ibid, page 2-2.

<sup>5</sup> Ibid, page 2-2.

<sup>6</sup> Ibid, page 2-2.

<sup>7</sup> [www.ct.gov/dep/cwp/view.asp?a=2720&depNav\\_GID=1654&q=325632](http://www.ct.gov/dep/cwp/view.asp?a=2720&depNav_GID=1654&q=325632).

23. Mistakes do, however, occur. Especially, it seems, when monetary and time budgets are being exceeded. Quote from Victor M Ponce, Department of Civil and Environmental Engineering, San Diego University *'Despite the existence of ample documentation, the prevailing mechanisms of earth dam failure are still not clearly understood'*<sup>8</sup>.
24. I take from this statement that dam design and construction is an inexact science. My point is that my family and fellow residents are expected to live with the nagging feeling; 'have they got it right?' The consequences of a dam incident could be catastrophic for Coalgate, a township less than a kilometre from the dam site. For this reason alone, I believe the Commissioners should decline the consents.

*PowerPoint: Picture of Opuha Dam*

25. The Opuha Dam collapse is a sobering reminder of how engineers and dam construction experts can 'get it wrong'. On February 6<sup>th</sup> 1997, 1000 head of cattle perished, 25 farms suffered many hundreds of thousands dollars of damage, \$500,000 worth of damage occurred to river protection works, 200 people were evacuated and 2 groups of campers had a miraculous escape. A common response from the local community was *'how can something like this be allowed to happen?'*<sup>9</sup> Since the Opuha dam was rebuilt, I understand that it has continued to have problems. *PowerPoint: 2007 Dam Safety*
26. To compound these fears there is also the worry of a major earthquake hitting the area and what effect this would have on the dam. Households are constantly being reminded by Civil Defence to be prepared for earthquakes and that we are due for the 'big one'.

*PowerPoint: EQC warning*

*PowerPoint: EQC brochure*

27. Yet URS assure us that the proposed dam will withstand significant seismic activity and state that *'complete failure of a large dam due to earthquake damage is very rare'*<sup>10</sup>. Who do I believe?

*PowerPoint: CCN cutting: Quaking in our boots*

*PowerPoint: EQC Map*

28. Several significant fault lines are in the proximity of the proposed reservoir. These are mentioned in the Dam Safety Assurance Report with facts and figures to comfort the public. I have done some further reading which I do not find so comforting.
29. With reference to the Porters Pass fault which runs for 40 kms between the Rakaia and Waimakariri rivers, 27 kms to the NW of the dam site: *'(It) provides a significant contribution to the total strain budget and impacts both*

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<sup>8</sup> <http://ponce.sdsu.edu/dambreachgeometry.html>.

<sup>9</sup> [www.ipenz.org.nz/nzsold/2003Symposium/LargeDams2003pages84-104.pdf](http://www.ipenz.org.nz/nzsold/2003Symposium/LargeDams2003pages84-104.pdf) (page 89).

<sup>10</sup> CPW Dam Safety Assurance Report, p 2-50.

*on regional tectonics and on the assessment of earthquake hazards in the central South Island*<sup>11</sup>.

30. There is also the Alpine fault which, *'is considered capable of generating a great earthquake >magnitude 8, and this is likely to impact the entire Canterbury region*<sup>12</sup>. There are *'about 90 major active earthquake source faults within and surrounding the Canterbury region*<sup>13</sup>. Further, *'despite the absence of major damaging earthquakes in Canterbury for more than 70 years it is clear from the historical record and from regional geological studies that Canterbury lies within a zone capable of generating large and relatively frequent earthquakes... Effectively, because of the geographic extent of the Canterbury region, a large earthquake anywhere in the South Island may impact on the region*<sup>14</sup>. *'The Canterbury Plains...represents a significant source area of hidden, but as yet unstudied earthquakes in the region*<sup>15</sup>.
31. URS acknowledges the existence of the Springfield fault about 14kms from the proposed dam which *'has experienced repeated movements during the past 10,000 years and probably generates earthquakes of 7+ every few thousand years*<sup>16</sup>.
32. Then there is the Western Gully Fault, which is situated under the proposed reservoir. Apparently it poses no problem to the dam or reservoir. It was, however, enough of an issue to prevent plans for a proposed rubbish dump in the same valley from proceeding. Many people are still scratching their heads about that logic.
33. The Hororata fault is the most significant seismic threat to the reservoir running only about 3 kms from the proposed dam. This has a similar history and occurrence as the Springfield fault.

*PowerPoint: Faultline Map Section 6 figure 2*

*PowerPoint: Geological map of the Harper Hills*

34. Looking at these maps, the Harper Hills run parallel with the Hororata fault indicating that at some stage in history, the hills were pushed up as a result of activity from this fault. The resulting ridge is called a 'Hanging Wall Anticline'. It has been eroded away at the Selwyn valley at the exact location of the proposed dam. It begs the question 'could future activity from the Hororata fault produce enough uplift at the dam footprint to cause damage?' An example of uplift was seen during the recent Solomon Islands earthquake.

*PowerPoint: Cutting from the Press; Jolt Raises Island 3 Metres*

*PowerPoint: Geological map of the Harper Hills*

35. Also from this map, it appears that the ridges either side of the proposed dam site are slightly offset which leads to speculation that this was due to a seismic rupture.

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<sup>11</sup> Holocene Paleo Earthquakes on the Strike-Slip Porters Pass Fault, Canterbury, NZ (*Howard, Nicol, Campbell and Pettinga*), page 59.

<sup>12</sup> Earthquake Source Identification and Characterisation for the Canterbury Region (*Pettinga, Yetton, Van Dissen and Downes*) page 301.

<sup>13</sup> Ibid, page 282.

<sup>14</sup> Ibid, p 284.

<sup>15</sup> Ibid, page 298.

<sup>16</sup> CPW Dam Safety Assurance Report, page 2-2 (*J Campbell*).

36. Who knows what effect 280 million tonnes of water will have on the geological integrity of the Valley. Could it be that the effect of filling the reservoir may well in itself produce an earthquake, as I believe was the case when the level of Lake Pukaki was raised in the seventies?

37. The point is that despite all the facts and figures about occurrences, probabilities and return rates, the study of earthquakes remains an inexact science. Nobody can say for certain what will happen or when it will happen.

*PowerPoint: Inundation Area*

38. All these facts produce intense feelings of concern about how safe it will be to live beneath this dam. Statements such as *'this event will probably constitute the maximum design earthquake for dam design...'*<sup>17</sup> does not inspire confidence in people required to live under the dam. I could probably survive a large earthquake, especially because I know how well my house is built but a sudden collapse of a dam holding back that volume of water, would not give the people living underneath any chance of survival.

*PowerPoint: photo of proposed dam site from the Tavern*

39. I sincerely hope that the dam and associated scheme is never built. However, assuming it is there are other disadvantages that the Coalgate residents will have to contend with. There is the visual impact of the dam. At the moment we have a pleasing outlook of trees and rolling hills. The prospect of looking north at a featureless, barren dam face does not excite me.

40. I understand that the applicant has no intention of clearing the Waianiwaniwa Valley before it is inundated. I can only imagine the stench wafting across the township from all that rotting vegetation. Varying reservoir levels will undoubtedly produce a breeding ground for mosquitoes and midges.

41. There is also speculation that a reservoir of that size will permanently change the climate in the district, making it damper and cooler with more mist and fogs.

*PowerPoint: Teton Dam collapse sequence*

42. Once the reservoir is up and running, I can only trust that the integrity of the dam structure will be constantly monitored by an independent body, one that has no financial interest in the operation of the irrigation scheme. If a problem is perceived then presumably there will be contingency plans to evacuate Coalgate and other residents living in the flood path. How will this be managed? How quickly can the reservoir be emptied? How will I be able to operate my business until the problem is sorted out? Will I receive compensation from loss of earnings and the inconvenience? These are nagging questions that bother my fellow residents and me.

43. If the dam does fail, who will be responsible? I can foresee a raft of people denying responsibility or going bankrupt to avoid facing the aftermath. Many

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<sup>17</sup> Evidence from Timothy McMorrom 31/01/08 para 104.

of the dam failures listed in the appendix have resulted in long, legal battles to establish who is accountable, while the affected victims wallow in misery.

44. Quote from Alistair Hunt, a retired civil engineer talking about the Opuha dam;

*'In my experience, when dams fail in developed countries overseas, there is more or less inevitably an inquiry, but in New Zealand at present, despite a dam's potential to cause such immense damage, this does not seem to be the case. It is the policy of the Government here now to let the market 'sort it out' and this results in a plethora of costly, long winded court actions which in my view may not resolve all the issues. The only way for there to be a powerful inquiry here now, it seems, is for there to be loss of life, and the impact of big news. This is not good enough. Though there was no loss of life at Opuha, this was fortuitous, and farmers in the region have told me that some people only just managed to get out of the way of the rampaging flood in time'<sup>18</sup>.*

45. I would also like to know what happens when the Waianiwaniwa dam reaches the end of its productive life. Despite all efforts to still the water and limit the entry of sediment into the reservoir, it will inevitably silt up. Another scenario is that the dam will cease to be economic to maintain. Who will pay to decommission and demolish the dam? Will this cost be factored into the cost of construction?

46. Quote from Robert S Devine, an environmental writer in the US:

*'In retrospect, it seems that a number of dams should never have been built. But they were, and they aren't going away anytime soon--at least not many of them. Some egregiously harmful dams that lack influential constituencies may be demolished. Numerous government agencies, Native American tribes, and conservation groups hope to remove two dams from the Elwha River, in Washington, one inside Olympic National Park. But demolition isn't an option in most cases. For one thing, communities and industries are too closely tied to most dams. For another, removing just the two Elwha dams--one is 210 feet high and the other is 100 feet--will cost about \$70 million. **Omitting the expense of removal from financial calculations constitutes yet another big subsidy. All those aging dams are a fiscal time bomb of many megatons'**<sup>19</sup>.*

47. There is the issue of the level headrace, which, from the map, will be routed 200 metres below Coalgate. The 235 contour runs through Coalgate and consequently the proposed route has been shifted further east, i.e. to lower ground. This will result in a huge embankment being constructed to keep the canal level. This will provide another unsightly eyesore for the local residents, not to mention further noise, dust and disruption during construction.

48. In conclusion of all these facts and opinions, I suggest that Coalgate will be an extremely unpleasant and unhealthy place to be if the CPW irrigation scheme should proceed. This would be particularly true during the construction phase but will extend into eternity with ongoing issues of flies, smell, outlook and most of all, constant worry of a dam failure.

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<sup>18</sup> [www.nzine.co.nz/views/alisterhunt.html](http://www.nzine.co.nz/views/alisterhunt.html).

<sup>19</sup> [www.alexlood.org.nz/Articles/Trouble%20with%20Dams.htm](http://www.alexlood.org.nz/Articles/Trouble%20with%20Dams.htm).

49. I know I will not want to live in Coalgate under these circumstances and will be forced to move despite my fond feelings of the district and all the effort and work I have put into my house. I am not alone in these feelings and I am certain there will be an exodus from the township. I have absolutely no doubt that property prices in Coalgate will plummet if the scheme goes ahead. There will be a distinct reluctance for people to purchase real estate there. Will I receive appropriate compensation for my losses?
50. My original submissions contained many more reasons for opposing this scheme. I still believe that the proposed scheme will have a huge detrimental effect to the region as a whole. There are dozens of issues ranging from the dewatering of the braided rivers through to pollution of groundwater that needs to be addressed. There are others who are far more qualified to speak to these issues than me. I have read several of submissions from the likes of: Forest and Bird, Fish and Game, Canterbury District Health Board and I fully support these.
51. I have tried to give the Commissioners an idea of how I feel this scheme will directly affect me as a Coalgate resident. I cannot stress enough how passionate I am about this area. It saddens me that it could all be potentially ruined to directly benefit only a few private shareholders. I am fairly typical of most Coalgate residents with these feelings. Many are retired and are seeing out their autumn years in what they perceived to be a peaceful and safe environment. I am young enough to move on but many have neither the energy nor the resources to do so.
52. I believe that the negative effects of this scheme far outweigh any benefits and ask the commissioners to decline all consents and to withdraw the Notice of Requirement.

Colin Morris  
April 2008

## Appendix 1

### Historic dam failures

- 1889, May 31 -Kaloka Dam, Johnstown, Pa, USA. Over 2200 dead
- 1928, Mar 12 - St. Francis, LA California USA. 200 dead, 300 missing
- 1959, Dec 2 - Malpasset, France. 2 villages destroyed, 500 dead
- 1963, Oct 9 - Vajont, Longarone, Italy. Overtopping destroyed 5 villages, nearly 2000 dead
- 1963, Dec - Baldwyn Hills reservoir, California USA 5 dead, destroyed 277 homes
- 1963, - Spalding Pond Dam, Norwich, Connecticut, USA. 6 dead, US \$6million damage.
- 1966, May 1 - Sgorigrad, Bulgaria. 488 dead
- 1972, Feb 26 - Buffalo Ck, W Virginia. 125 killed, 4000 homeless, US \$400million damage
- 1972, - Canyon Lake Dam, Sth Dakota, USA. 139 dead, US \$60million damage.
- 1975, Aug 8 - Banqiao and Shimantan Dam, China. 171,000 dead during and as a result, 6 million homes destroyed
- 1976 June 5 - Teton Dam, Idaho, USA. 11 dead, US\$1billion damage
- 1977, Nov 21 - Kelly Barnes Dam, Tocoa Falls, Georgia USA. 39 dead, US\$30million damage.
- 1982, - Lawn Lake Dam, Colorado, USA. 3 dead, US\$21million damage.
- 1982, - Bushy Hill Pond Dam, Deep River, Connecticut, USA. US\$50million damage.
- 1985, July 29 - Stava, Dolimites, Italy . 80 dead, 300 missing
- 1993, Dec 6 - Maguila, Guila, Philippines. 2 children swept out to sea
- 1995, May 31 - Quesnel River, BC Canada. (Govt. maintained) Cattle and property destroyed
- 1995, Aug - Omai River, Guyana. 3.5million cu. Ms. Cyanide-laced waste, construction failure, Canadian company, clean up cost US\$30 million
- 1997, Feb 6 - Opuha Dam, NZ. 200 residents evacuated, 2 groups of campers had miraculous escape, hundreds of thousands dollars worth of damage
- 1998, Apr 25 - Los Frailes mine, nr Seville, Spain. Discharges 5.5million cu.ms. of water, flooded 1000 hectares, \$42.5million damage.
- 2001, Jan 21 - Altorricon, Huesca, Spain. Collapse during 1<sup>st</sup> filling.
- 2002, June 4 - Zeyzoun, Syria. Built 1996. 22 dead, hundreds homeless

2005, Feb 11 - Shadikor, Pansi, Pakistan. Over 60 dead

2005, Mar 29 - Sultan Dam, Zamin Kola, Afganistan. No injuries, village completely destroyed

2005, July 2 - Hadlock Dam, Fort Anne NY USA. 10 million Gallons spilled, no injuries, 600 evacuated

2005, July 21 - Yunnan Province, SW China. 3 villages inundated, 16 dead, 23 injured.

2005, Oct 15 - Tunbridge, Tasmania. 60 residents evacuated with town under threat from leaking dam. (*Sydney Morning Herald*)

2005, Oct 16 - Allaire, Mansquan River, New Jersey, USA

2005, Dec 14 - Taum Sauk, Missouri, USA. 1 billion gallons, family of 5 injured, state park could have been full of campers

2006, Mar 14 - Kaloko reservoir dam, Kauai, USA. 1 dead, 7 missing.

2007, Mar 27 - Um Al Nasser, Gaza Strip. Sewage dam, 4 dead, 11 missing, 16 injured, 1500 homeless.

2007, Nov 25 - Shiqiaozi, Liaoning Province, China. 10 dead, 17 injured