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Cape Cod



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Summary of
Recent Field Observations of
Adverse Health Effects from Wind
Developments in Australia,

and

Update from NH&MRC workshop
and Australian Senate Inquiry

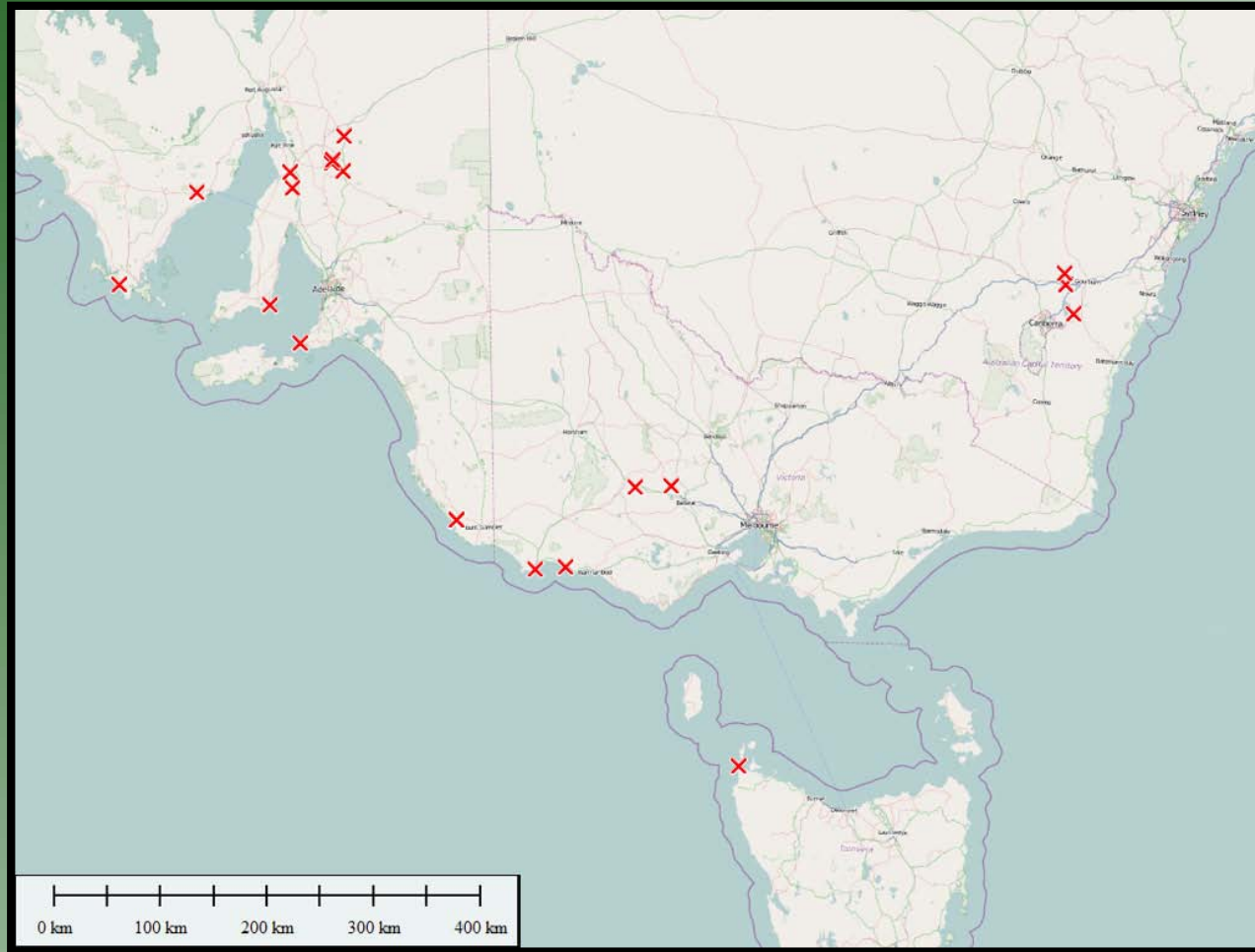
What is the Waubra Foundation?

- **Advocacy body** to facilitate independent research into adverse health effects
- **Collect field observations** & then approach independent researchers
- **National Organisation**, links to key acoustic, scientific and medical researchers globally
- **Do not take a pro or anti wind position** – solely concerned with Adverse Health Effects

Location of Wind Developments



LOCATION OF WIND DEVELOPMENTS in South Eastern Australia



Recent Field Observations

- Ongoing data collection from multiple Wind Developments across SE Australia
- Includes information from following sources:
 - interviews with affected residents
 - medical records
 - treating physicians
 - personal health journals
 - acoustic monitoring inside homes

Summary of Key Findings

- Over 60 people interviewed so far
- Includes local residents, workers and visitors
- Symptoms characteristic of exposure to wind turbines (never previously experienced) noted up to 10km away
 - Night time waking in panicked state
 - Body vibrations
- Symptoms **ALWAYS** worsen with increasing exposure over time

Distance Effect of Wake Turbulence



Summary of Key Findings cont.

- Consistent with previous findings of Medical practitioners such as
 - Dr Amanda Harry (UK Rural Family Physician)
 - Dr David Iser (Australian Rural Family Physician)
 - Dr Nina Pierpont (US Paediatrician)
 - Dr Robert McMurtry in the Society for Wind Vigilance community health survey
- Many symptoms were known to, and reported by Acousticians such as Dr Leventhall, prior to 2004, in situations of known infrasound & low frequency noise (ILFN) exposure

Report for DEFRA by Dr G Leventhall, Dr P Pelmear & Dr S Benton May 2003

“A review of Published Research on Low Frequency noise and its Effects”

Summary of Key findings cont.

- Symptoms start to resolve when
 - Turbines are off (especially if more than 24 hours)
 - People move away from turbines

BUT

- People “sensitized” with prolonged exposure then notice symptoms with other sources of ILFN

- § Pumps

- § Heating & Cooling compressors/ventilation systems

Health Problems Identified

- **Preexisting medical conditions which worsen with wind turbine exposure**
 - Hypertension (high blood pressure)
 - Angina
 - Diabetes
 - Tinnitus
 - Migraines

Health Problems Identified cont.

- **Severe Chronic Sleep Deprivation** (multiple causes which include)
 - Audible turbine noise
 - Waking in a panicked state, wide awake, sometimes on multiple occasions every night
 - Increased nocturnal urination
 - Children's sleep problems
 - Bed vibrating

Health Problems Identified cont.

- **Severe Frequent Headaches**
 - Head “in a vice”
 - Children with no previous history of headaches
 - Migraines triggered, especially from shadow flicker
- **Visual Blurring**
 - Only occurring with turbine operation
 - Visual checks by health practitioners normal

Health Problems identified cont.

- **Tinnitus** (ringing or buzzing, one or both ears)
- **Ear pressure** sensations (painful at times, especially if previous eardrum surgery)
- **Hyperacusis** (extreme sensitivity to 'normal' sounds)
- **Balance disturbance** (especially in elderly)
- **Motion sickness/vertigo** like symptoms
- **Nausea** (severe)

Health Problems Identified cont.

- **Irritability, extreme anger** and other mood disturbances (also being reported in workers)
- **Memory & Cognitive deficits** (worsening over time)
- **Depression**, at times life threatening
- **Anxiety**
- **Body vibrations**
- **Tachycardias & arrhythmias** (fast & irregular heartbeats)

Additional Clinical Observations

- Reports emerging of two specific clinical illnesses known to be **caused by surges of adrenaline** occurring with exposure to wind turbines (and other sources of ILFN)
 - **Tako Tsubo** heart attacks
 - **Acute Hypertensive Crises**
- Limited animal studies confirm infrasound exposure can result in adrenaline surges
(NIEHS Toxicology of Infrasound report 2001)

Clinical Evidence for Sympathetic Nervous system stimulation

- ILFN induced Sympathetic nervous system stimulation, via Vestibular stimulation or direct stimulation of the brain, is experienced ACUTELY by the person affected as:
 - Tachycardia (fast heart beat)
 - Elevated blood pressure including acute hypertensive episodes
 - Tako Tsubo heart attack episodes
 - Nighttime waking in a panicked state
 - Acutely anxious feelings
 - Unmasking of previous PTSD symptoms (but either well controlled or in abeyance at time of initial exposure to wind turbines)

Additional Clinical Observations cont

- Observations of new onset hypertension (high blood pressure) with turbine operation
- Multiple causative mechanisms likely, probably concurrent
 - § Infrasound (experimental studies have shown this effect, via direct or indirect (vestibular) stimulation of sympathetic nervous system 'fight – flight')
 - § Stress
 - § Sleep Deprivation

Qibai and Shi (2007) The Effects of Low Frequency Noise and Vibration on People (ed Prof C. Hansen) *An Investigation on the Physiological and Psychological Effects of Infrasound on Persons* 303-310

Predictors of Onset & Severity

Predictors of **Rapid Onset of Severe Symptoms** of Wind turbine Syndrome (WTS) appear to be

a) Living downwind of a line of turbines (cumulative impact)

a) Presence of ground borne (seismic) vibrations

§ Beds vibrating

§ Glass of water vibrating

Cumulative Impact



Other reports of residential overnight exposure to ILFN

- **Overnight exposure to ILFN** seems particularly **damaging to health**
- Others who have developed similar health problems including Tako Tsubo Heart attacks, sleep deprivation and high blood pressure which start to partially resolve when exposure ceases
 - **Residents in suburban Melbourne** next to industrial chillers at Melbourne University
 - **Residents 5km away from open cut coal mining** activities active at night (diesel machinery)

Links to Vibro Acoustic Disease

- Substantial body of work by Professor Mariana Alves Pereira & Dr Nuno Castelo Branco over 30 years in Portugal
- Serious health concerns (VAD) with chronic exposure to ILFN (variety of sources)
- Based on their recent work, **levels of measured ILFN inside homes near wind developments will result in VAD in residents**

Tissue Pathology observed in VAD

- **Thickened collagen**, resulting in
 - Decreased lumen of blood vessels (arteries)
 - Thickening of exterior lining of the heart (pericardium)
- **Malignant tumours** in the sole autopsy case
 - (patients with WTS have been noted to have elevated cortisol which will certainly decrease the body's own immunity and ability of the immune system to eradicate abnormal cells over time)

Tissue Pathology observed in VAD

- Professor Alves Pereira also described collagen pathology found in horses on the farm in Portugal, using a case control design
 - The collagen changes are “cross species”, adding further weight to the evidence of a biological causal effect of ILFN on tissue with chronic exposure

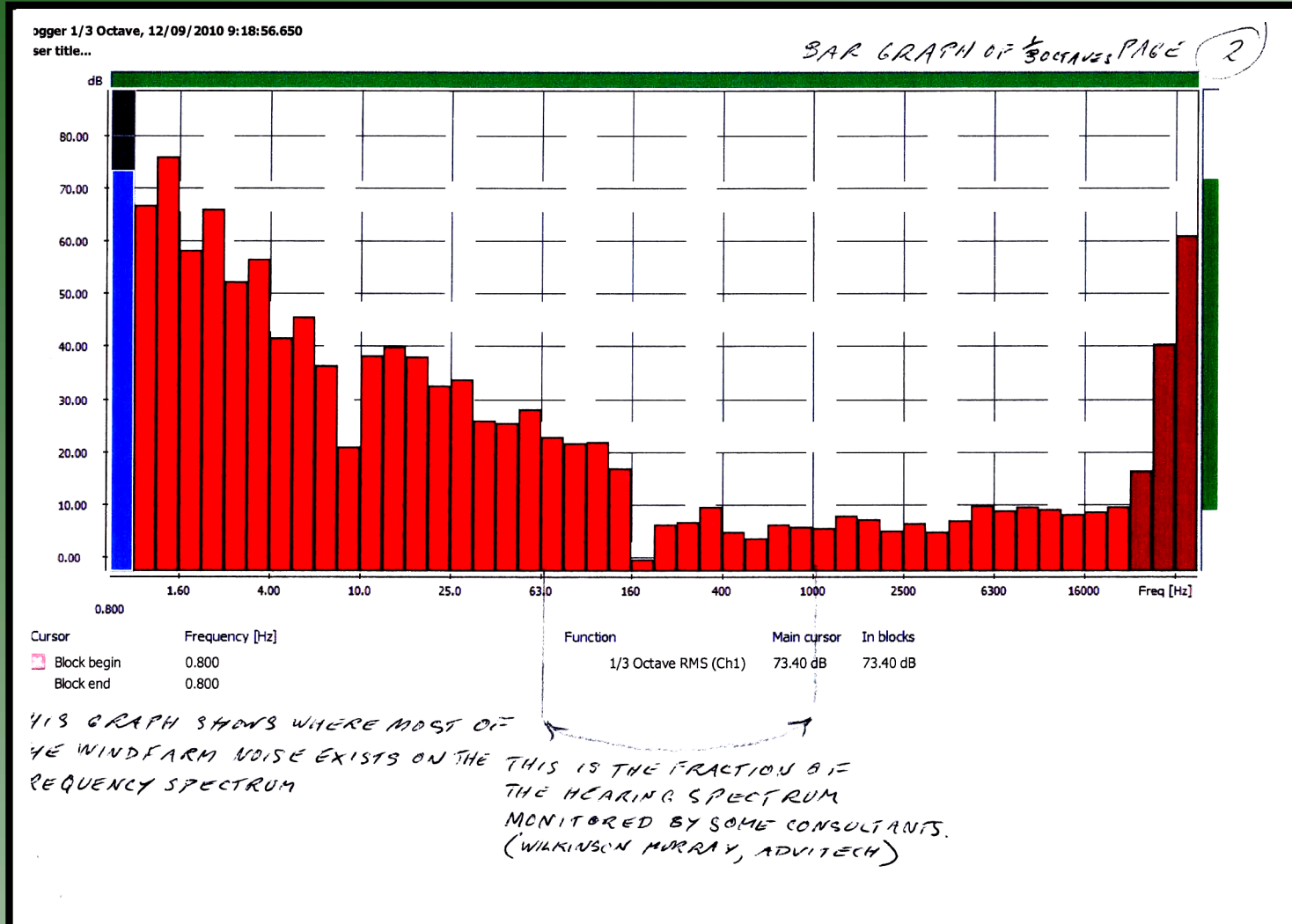
The relationship between WTS & VAD

- I think Dr Pierpont is right, in stating as she did in Ontario that maybe we should call WTS “ILFN syndrome”
- Acousticians for years have been calling these symptoms “annoyance” without Medical Clinicians realising that there are serious health problems emerging with acute and chronic exposure (with a few notable exceptions such as Dr Harry, Dr Iser, Dr Pierpont & Dr Castelo Branco)

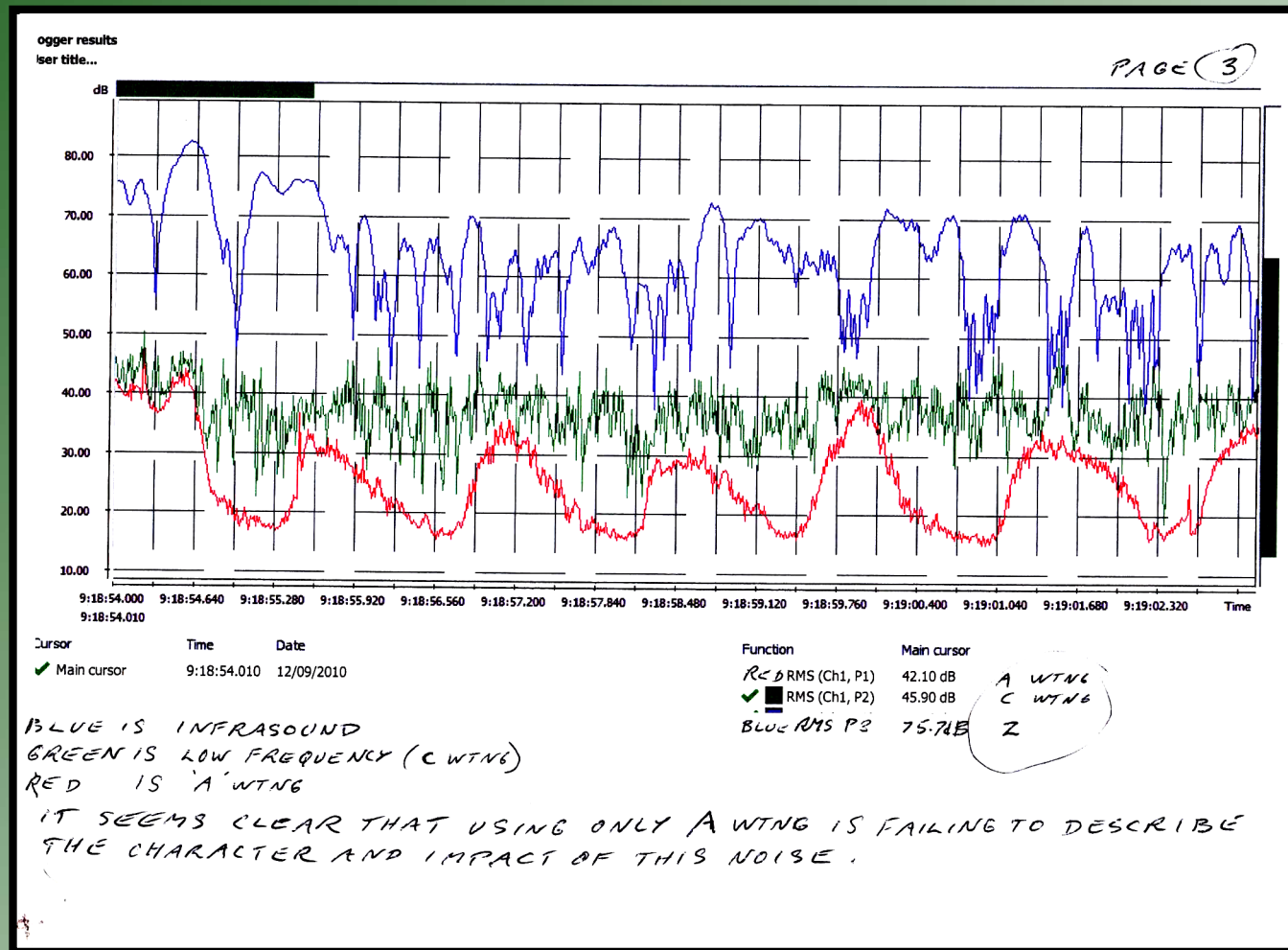
The relationship between WTS & VAD

- My conclusions
 - There are multiple pathophysiological mechanisms causing the pathology we are seeing
 - **There is a difference between the effects and therefore the symptoms of acute exposure (WTS) and chronic exposure (VAD)**
 - There may be a synergistic effect eg angina
 - Acute effect – adrenaline surge leading to vasoconstriction
 - Chronic effect – collagen thickening producing structurally narrowed diameter of blood vessel
 - **BOTH PATHOLOGIES ACTING TOGETHER WILL RESULT IN DECREASED BLOOD FLOW TO THE HEART MUSCLE**

Acoustics Field Data from inside Noel Dean's bedroom, Waubra



Acoustics Field Data from Inside Noel Dean's bedroom at Waubra



Outcome - Home Abandonment



Waubra Foundation Strategies

- **Empower** affected residents with information
- **Educate** treating Medical Practitioners
- **Publicise** the problems via the media & community information sessions
- **Data Collection** (local residents leading the way with personal health journals)
- **Liase** with Researchers **globally**
- **Liase** with Politicians and Bureaucrats **locally**

Mechanisms for harm to health

- **KNOWN** – audible noise
- **HIGHLY LIKELY** – Infrasound & low frequency noise
 - § Airborne pulsations
 - § Resonance within dwellings
 - § Seismic (ground borne) vibrations
- **POSSIBLE** – Electromagnetic radiation effects
- **OTHER?**

What we know already

1. **Chronic severe sleep deprivation and high blood pressure are very damaging to health** (extensive peer reviewed research)
2. **Both are being identified as new health problems** in residents adjacent to wind developments after commencement of turbine operation
3. **Both are measurable**

These need to be investigated and quantified

Research Questions

1. What is a 'safe' setback distance?

1. What are the mechanisms of causation?

Waubra Foundation Research Priorities

- **Concurrent audible noise & ILFN monitoring inside people's homes** with symptom reports, and
 - § sleep studies,
 - § blood pressure studies (24 hour ambulatory blood pressure)
 - § Biochemical indices (cortisol)

Data collection from Residents up to 10km away from turbines

Waubra Foundation Research Priorities

- **Replication** of Dr Michael Nissenbaum's recent study of Sleep, Depression & Quality of Life
- **Case control study** - effect on children's sleep, learning & cognition

Waubra Foundation Research Priorities

- **Epidemiological studies** to investigate
 - range of medical and psychiatric health problems being experienced, and
 - Analysis of their severity
- **Prospective case control study** of residents adjacent to two small wind developments (2-3 turbines) in Victoria

Waubra Foundation Research Priorities

- **Monitoring of Worker's Health**
 - Partnership with key Occupational Health and Safety Stakeholder
 - Development of prospective audit program
- **Retrospective analysis** of case reports of Tako Tsubo heart attacks from medical records
- **Prospective collection of clinical and biochemical data** from Tako Tsubo episodes and acute hypertensive crises from multiple sites
- **EMF measurement**

Update – NH&MRC workshop

7th June, 2011 Canberra

- Variously described as a “Workshop” and a “Scientific Forum”
- Battleground is probably a more accurate descriptor!
- First time affected residents, health bureaucrats, academics, advocacy groups and wind developers were together
- Panel of speakers represented various points of view, followed by small group workshops

Update, NH&MRC workshop cont.

- The two speakers who presented clear evidence of serious health problems resulting from wind turbines (Professor Alves Pereira & Dr Bob Thorne) were
 - Clear & concise
 - Evidence based
 - talked about their own empirical research

Update, NH&MRC workshop cont

- In contrast, the other two presenters had **no primary research in this area of their own**, and **misrepresented research of others** which they did talk about, in order support their “case”
- Conclusion from most attendees at the forum (with the exception of some developers) is that
 - There is further independent research required
 - Those asserting “there is no problem” are on increasingly shaky ground

Update – Australian Senate Inquiry report tabled 14th June, 2011

- Tabling of report delayed yet again – now due Wednesday 22nd June
- Senator Fielding (instigator of inquiry) leaves Parliament on 30th June
- Widespread suspicions of politicisation of inquiry outcome
 - § Green Senator is Chair of committee
 - § 2 Labor Senators
 - § 1 Liberal Senator (Senator Judith Adams)
 - § 1 Family First (Senator Steve Fielding)

Update – Australian Senate Inquiry report tabled 14th June, 2011 cont.

Individuals and groups supportive of wind development who **agreed there was a need to address the health concerns** in their oral or written testimony included

- CFMEU (construction union sub no 638)
- Clean Energy Council CEO Mr Matthew Warren p31, Melbourne Hansard transcript
- Mr Simon Holmes a Court (sub no 628, and p62 Melbourne Hansard transcript)
- Professor Simon Chapman, p118 Melbourne Hansard transcript
- Mr Lane Crockett, Pacific Hydro, p 76 Melbourne Hansard
- Mr Cam Walker, Friends of the Earth, p 118 Melbourne Hansard