Coroners Act, 1996
[Section 26(1)]

Western Australia

RECORD OF INVESTIGATION INTO DEATH

Ref No: 47/04

*I, Alastair Neil Hope, State Coroner, having investigated the death of **Judith Lesley Ward and Lorraine Melia**, with an Inquest held at Albany Court House, Stirling Street, Albany on 7-16 December, 2004 and 24 January – 3 February, 2005 find that the identity of the deceased person was **Judith Lesley Ward and Lorraine Melia** and that death occurred on 27 December, 2003 at Taripta Farm, Lunt Road, Tenterden. Judith Lesley Ward died as a result of Thermal Injury and Lorraine Melia died as a result of Smoke Inhalation followed by Thermal Injury in the following circumstances –*

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INTRODUCTION

On the morning of Saturday 27 December, 2003 a bushfire started under the Western Power Corporation (Western Power) Mt Barker to Cranbrook 22,000 volt power line between poles CB721 and CB722.

The day was an extremely hot one with temperatures in the region of 40^0C.

On that morning a total harvest and movement ban had been put in place for the Shire of Cranbrook due to the extreme weather conditions of the day.

The Fire and Emergency Services Authority of Western Australia (FESA) recorded that at Katanning there was a north-westerly wind blowing at 37 kilometres per hour, gusting up to 54 kilometres per hour. In nearby Rocky Gully there was a north-westerly wind blowing at 40 kilometres per hour, gusting up to 60 kilometres per hour. The ambient air temperature was approximately 40^0 at Rocky Gully.

On the day the sky was clear and there was no evidence of lightening.

Shortly after 1:00pm residents of Cranbrook and Tenterden experienced problems with their power, television sets dimmed for a period of seconds. Approximately 3-4 minutes later power went out for a short period of time after which it came back on. It would appear that at that time conductors had clashed at a point approximately midway between poles CB721 and CB722. When they clashed molten hot metal globules fell to the ground and provided a source of ignition to dry stubble in the vicinity. As a result of the conductors clashing an earth wire between the two poles broke with the broken ends coming to the ground.

The fire which resulted was initially seen as a small grass fire by a Mr and Mrs Maddison who were driving along Albany

Highway. Mr and Mrs Maddison drove directly to the Tenterden Roadhouse, a distance of approximately 5 kilometres, and reported the fire to the proprietors of the roadhouse, Mr and Mrs Inglis. Mrs Inglis made a number of telephone calls to alert local bushfire fighters.

At about 1:30pm Keith Parsons was driving in a northerly direction along Albany Highway when he saw the fire which at that stage was in a paddock on the eastern side of Albany Highway. At that stage the fire was described as "fingers of fire" and there was no solid fire front. Mr Parsons continued on to Cranbrook where he was proposing to alert local fire authorities but on the way he passed fire fighting vehicles already heading in the direction of the fire.

Ian Walsh, a captain of the Central Fire Brigade, and his son, Michael Walsh, had prepared their utility equipped with a 1100 litre water tank and headed for the location of the fire. They appear to be have been the first persons at the scene of the fire which they attended at between 1:30pm to 1:35pm. Shortly afterwards other fire units attended at the scene having been alerted to the danger by Ronald Denny, the Chief Fire Officer of the Cranbrook Volunteer Bush Fire Brigade.

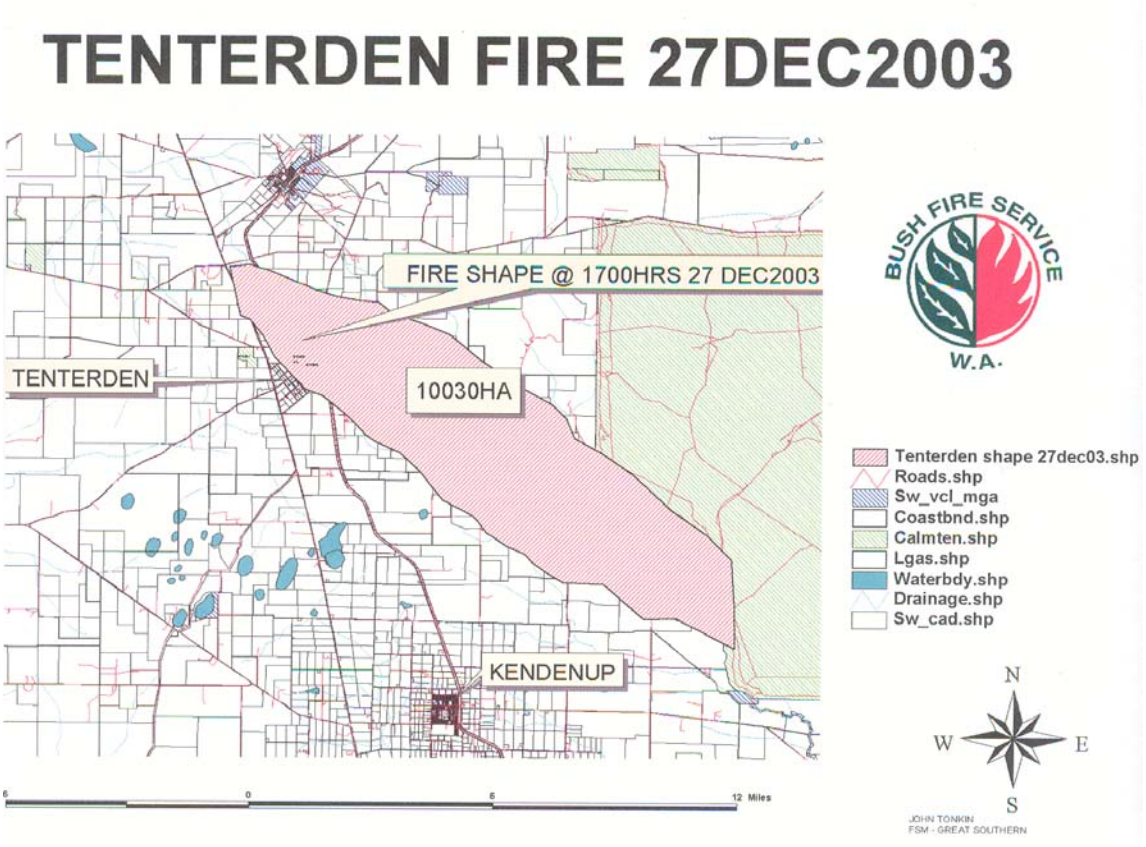
Keith Wilson was one of the first fire fighters at the scene and he noticed the power line down between the power poles. Mr Wilson advised Mr Denny of the situation and he arranged for Western Power to be contacted.

At about that time the fire jumped the Albany Highway and was burning on both the eastern and western sides of the highway. In spite of a remarkable response by local volunteer fire fighters which resulted in approximately 200 fire fighters being present and fighting the fire within a matter of one or two hours the fire rapidly increased in size.

A number of fire fighters who gave evidence at the inquest hearing described the fire as being the worst fire they had ever seen.

According to John Tonkin, a Fire Services Manager with FESA, FESA's subsequent analysis indicated that the fire had burnt so hot and vigorously that control was virtually impossible from an early stage. That view was confirmed by Russell Gould, FESA's Fire Service Manager for the Great Southern Region, whose analysis indicated that the fire had been burning with such intensity as to be, practically speaking, uncontrollable. He quantified the intensity of the fire as burning at 25,691 kilowatts of heat output per metre of fire perimeter (kW/m) using the McArthur Mark 4 meter. Fire intensity greater than 5,000kW/m produces very intense, erratic fire behaviour that is difficult to suppress with either direct or indirect fire tactics.

In spite of the allocation of very considerable resources to the fire, once it took hold it was extremely difficult, if not impossible, to contain until it burnt through to an area of previous burn after travelling over 25 kilometres in under 4 hour.



The above map depicts the fire shape on 27 December, 2003 and was created by FESA

As a result of the fire 9 persons were injured with injuries being treated at the Tenterden Roadhouse and later at the Mt Barker Hospital. Later in the afternoon the fire cause the deaths of Judith Lesley Ward and Lorraine Melia.

In a post mortem examination conducted on 31 January, 2003 forensic pathologist, Dr K A Margolius, determined that Lorraine Melia died as a result of Smoke Inhalation followed by Thermal Injury. On the same day Dr Margolius determined that Judith Lesley Ward died as a result of Thermal Injury.

The inquest in this case was held in order to determine how the fire started, whether action should have been taken by Western Power to prevent the fire from having occurred, what steps were taken in fighting the fire and how its progress ultimately resulted in the deaths. It has been considered particularly important to determine whether comments could be made relating to safety issues raised by the case with a view to preventing deaths occurring in similar circumstances in the future.

The above photograph taken by police depicts the fire scene from its starting location at poles CB721 and CB722

THE DECEASED

In an inquest such as this where considerable attention is necessarily directed to a range of issues, it is important not to lose sight of the personal tragedies involved.

It was very clear from the evidence that the deceased were persons of the highest repute who were caught in the fire in circumstances over which they had no control. In his evidence at the inquest Mrs Ward's husband, James Ward, described in some detail her life of considerable achievement. Part of the evidence of Mr Ward in this respect was as follows (t.185-186) –

> *"Sir, Judy was a remarkable person in many ways. She was intelligent and multi-gifted. She was an outstanding lecturer and teacher. She had a remarkable capacity to absorb and remember detail and to pass that on to others. She had a beautiful gentleness in her nature which sometimes masked a strong and determined inner spirit.*
>
> *She was a legitimately kind and caring person. She was a loving and supportive wife to me, a loving and caring mother, step-mother and mother-in-law and for the last few years of her life a proud granny Judy to grandson Jock in Bendigo.*
>
> *She shared with me the Christian faith and supported and helped me in my own ministry in many ways whilst exercising her own useful talents both within and outside the church. Both of us shared many interests together. May I just say that all of those things were embraced in quite a natural humility.*
>
> *Judy overcame a deep and person tragedy in her own life to bravely make a new, meaningful and purposeful life in Perth. In a relatively short period of time she achieved so much personally, academically, professionally. And I am today and will remain so very proud of her".*

Greg Melia, the son of Lorraine Melia, made a number of observations in his evidence on behalf of the family in respect of his mother. Part of those observations were in the following terms (t.233-234) –

"My mum was the most loving and caring person I had ever known. Everyone who met her was touched, amazed and even envious of her enormous love for life. Words can't explain the loss we have all felt since her death, nor will it help in trying to explain to my baby daughter about where her nan is. Every time she points at a photo and says 'Nan', I can't help but feel that her and her cousin Ruby will be at a loss all their lives due to the fact this totally amazing and more so loving grandmother will never be there to get to see them grow up.

Like I said, you can never have hoped for a better mother. She was the best".

THE CIRCUMSTANCES OF THE DEATHS

On 27 December, 2003 Mrs Ward was staying with her son, Daniel Findlay and his defacto wife, Lorraine Melia, at their home on Taripta Farm not far from Tenterden.

Mrs Ward had travelled from Perth, where she normally resided, with her husband on the previous day to visit and celebrate Christmas with her son.

The morning of 27 December, 2003 was unremarkable except that it was a very hot day.

In the afternoon Mr Findlay received a telephone call from Gary Goldsworthy who told him about the fire. At that time Mr Findlay went outside his house and saw the smoke. At that stage on the property were Mrs Melia, Mrs Ward and Mr Findlay.

Mr Findlay moved some sheep and then set up a fall back position on a relatively bare section of turf on his farm property where he positioned his fire truck. Mr Findlay's plan was to remain at the farm on this area, which provided very little fuel, until the fire went past. He did not expect the front of the fire to come across their farm.

During the afternoon Mrs Melia rang her son David and asked him where the fire was at that stage. David Melia and a

John McDougall travelled from David Melia's home in Cranbrook but were unable to reach the junction of the Great Southern Highway and Albany Highway due to the road being blocked. At that stage they saw very thick smoke which appeared to be about 2 kilometres away to the south in the direction of Albany.

They then returned to Cranbrook where Mr Melia rang his mother and told her of the location of the fire. Mr Melia asked his mother if she wanted him to come out to the farm and she replied that he could come if he wished to.

Mr Melia and Mr McDougall then drove in the direction of the farm, at the intersection of Jaffa Road and Ronaldshaw Road a police officer was blocking the roadway and Mr McDougall asked if they could go through to pick up three people from the farm. The officer said *"You can go, get them and come straight back out"*. The two young men then proceeded to the farm which was located off Lunt Road.

As the fire was approaching Mr McDougall left the farm in his Toyota to travel down Lunt Road in order to advise police that the three persons were staying at the farm. He returned a short time later because smoke and flames on Lunt Road prevented him from getting through.

Some minutes later Mr Melia and Mr McDougall drove down Lunt Road towards Tenterden to see where the fire was. At that stage the fire was burning on both sides of Lunt Road and had reached the Taripta property.

As the fire approached efforts were made to water the house and to prepare for its arrival. As the fire approached the farm house Mr Findlay told all those present to go to where the vehicles were parked. Mr McDougall got behind the water truck but as the fire arrived it became so hot that he could not breath and ran towards his utility vehicle. He then drove his vehicle to a dam a short distance away.

As the fire approached the location where Mr Findlay and the others were waiting, it set a row of pine trees on fire. By that stage, according to Mr Findlay, the fire was *"…like tornadoes of flames coming towards us".* According to Mr Findlay, while the front of the fire had been moving like a locomotive train, it was the flank of the fire which approached them, but it also was burning extremely fiercely.

As the fire approached Mr Findlay started up the water pump from the fire truck and told Mrs Melia to spray the ground with the fire extinguisher which she did.

Mrs Melia told Mr Melia that she was on fire but when he looked at her he could not see any fire. This is an indication of how hot conditions were at that stage.

By that stage the smoke had reached them and according to Mr Findlay it was very thick and full of black ash making it extremely difficult to breath. He described the smoke as *"…thick as soup"* (t.202). Mr Melia, Mrs Melia and Mrs Ward then started to run away from the fire. Mr Findlay remained on the relatively bare area of land and allowed the fire to go past.

As the three who were running reached a fence Mr Melia threw his mother over the fence. He climbed over the fence and Mrs Ward climbed after him. The three kept running and Mr Melia was separated from the two women. It appears that the two women could not outrun the fire and stopped running at which stage Mr Melia heard his mother say to Mrs Ward *"I love you Judith"*, Mrs Ward then said the same to Mrs Melia. Mr Melia then ran back in spite of being burnt but could not save the two women. Later, after the fire had passed, the two women were found. Mrs Ward was already deceased and shortly afterwards Mrs Melia died after saying to her son *"Live and enjoy your life"*.

THE CAUSE OF THE FIRE

The fire was started by conductor clashing on a Western Power 22kv overhead line at a point approximately midway between poles
CB721 and CB722.

The fault was caused by the live red phase conductor and the underslung earth wire coming together due to erratic movement of both wires in strong gusting wind and high ambient air temperature. When the two live bare conductors came together they caused an arc to develop across a small air gap between them or at the a point of actual contact. As a result molten hot metal globules fell to the ground and provided a source of ignition to dry stubble (Electrical Incident Report prepared by the Energy Safety Division, Department of Consumer and Employment Protection (Energy Safety) exhibit "2"). Subsequent examination of the conductors between the poles indicated that there were electric arc burn marks on the aluminium of the conductor on the center phase and also on the underslung earth wire which had subsequently broken and had been immediately below it.

The above photograph depicts CB722 with the phase conductors aligned horizontally with the earth wire slung below (exhibit "13")

At pole CB722 the phase conductors had been aligned horizontally, with the earth conductor below, but at CB721 the conductors were aligned

vertically (a running disc angle). The reason for the change from horizontal to vertical alignment was to allow for a change in the direction of the powerline at CB721.

The above photograph (no. 1 of exhibit "45") depicts power pole CB721 taken on the afternoon of 27 December, 2003. The pole top had been on fire and Western Power employee Carl Weinert is in the process of extinguishing the fire, photograph taken by Alan Wilson

A "conductor" is defined in the "Guidelines for Design and Maintenance of Overhead Distribution and Transmission Lines" document prepared by the Electricity Supply Association of Australia Limited, ESAA C(b)1-2003 as –

> *"Conductor means a finished circular stranded assembly consisting of three or more metallic wires laid up together which has a specific function of carrying current".*

A matter of particular concern in the context of the present case is the fact that this was not an isolated incident of a fire caused by conductor clashing at that locality. Evidence at the inquest indicated that there had been previous fires caused by lines clashing on the same line and quite close to the bay in question possibly in 1983 or 1993 but certainly in 1991, 2000 and 2002.

OTHER FIRES CAUSED BY CONDUCTOR CLASHING

There is some confusion in the evidence as to whether there was a fire caused by conductor clashing in 1983 or in 1993. Mr Dew referred to being told of a fire in 1983 by Mr Bell, while Mr Bell referred to being told about a fire in 1993 when it was said the farmers' union took action against the then SEC. For the purposes of these reasons I will refer to the fire as having occurred in 1983.

In respect of 1991 fire, Norman Bell, Captain of the Narpyn Bush Fire Brigade, gave evidence that he attended that fire on 21 April, 1991. He described the fire location as about 6 kilometres north of Mt Barker and about 100 metres east of the Albany Highway.

Mr Bell saw two power poles on either side of the creek now known as Fox River and wires between the poles were swinging and contacting each other, showering sparks and small metal fragments onto the ground. These were igniting spot fires below the powerlines.

The wires continued to contact each other on a continuous basis until the wind died down some time later.

Fire fighters were able to contain the spot fires and the fire as whole was contained to an area of about 4 acres.

Mr Bell subsequently visited the same location in 2001 with a Brett Dew, who was then a Project Officer working with Western Power, and at that stage Mr Dew told him that the section of line still needed attention.

THE MT BARKER FIRE OF 28 DECEMBER 2000

Of particular relevance to the Tenterden fire was the Mt Barker fire which occurred on 28 December, 2000.

The then Office of Energy, now the Energy Safety Division of the Department of Consumer and Employment Protection, (Energy Safety) received no notification of the incident from Western Power and only became aware of the fire as a consequence of a report contained in the West Australian Newspaper of Saturday December 30, 2000. That report effectively summarised the gravity of the fire and includes the following –

> *"A faulty powerline may have caused a bushfire which destroyed two houses, damaged a business, destroyed several sheds and forced the evacuation of half of Mt Barker.*
>
> *The Great Southern town was surrounded by fire for several hours on Thursday as hundreds of people turned on hoses to save their homes and businesses".*

Later in the same article the following appears –

> *"More than 200 firefighters and townspeople tried desperately to keep the flames at bay. At the height of the blaze in the mid-afternoon there were 150 firefighting appliances in action.*
>
> *Plantagenet District Hospital and 60 houses were evacuated with 150 people gathering at the shire hall.*
>
> *Firefighters won a brief reprieve when the fire moved past the township and continued on the west side of Albany Highway for seven kilometres. But by 4pm the sea breeze turned the fire around, allowing it to jump Albany Highway and head north back towards Mt Barker.*
>
> *For another 2 ½ hours, firefighters and civilians battled a bushfire which many believed was determined to get their town. By 7pm, the Fire & Emergency Services Authority declared it was safe for people to return home".*

In a report prepared by Energy Safety which was strikingly similar to the report subsequently prepared in

relation to the Tenterden bushfire of 27 December, 2003, it was noted that the fire appeared to have resulted from the clashing of a live phase conductor and the underslung earth wire of the 22kv feeder on the Cranbrook feeder line. In the report the opinion was expressed that the clashing occurred when the live phase conductor and underslung earth wire made *"…direct contact due to erratic movement of the phase conductor in the strong winds and high ambient air temperatures"* (p3; exhibit "2").

It was noted in the report that the span length between the poles CB470 and CB471 (the bay were the clashing had occurred) was estimated at 158 metres. The conclusion of the report contained the observation that the spans of the conductors on the overhead power lines were long which could result in erratic movement of conductors in adverse wind conditions over exposed terrain. It was concluded that the fire was caused by the ignition of dry grass ignited by hot metal globules falling from the 22kv live conductor clashing with the earth wire.

The same report emphasised the significance of the different use of material for the phase conductors and the earth conductor. The observation was made that the *"…upper steel cored aluminium conductor carrying an electrical load and being large and heavier would tend to sag more than the smaller gauge and non-load carrying steel conductor located immediately below it"* (p.19).

The earth wire was constructed of 7 strands of 16 gauge galvanised steel strands while the phase conductor consisted of 6 0.118" aluminium strands and one 0.118"galvanised steel strand (Tenterden Powerline Report prepared by Mr R Strika – the conductors and earth wires were identical in the Mt Barker and Tenterden incidents; exhibit "38").

This report was particularly significant when it is noted that the span distance between the relevant bays involved in the Tenterden fire was over 181 metres and the same type of

upper steel cored aluminium conductors carrying electrical load were above small gauge non-load carrying steel earth conductors on that bay also. In other words, many of the same factors existed in the location where the Tenterden fire started as had existed and were of concern to Energy Safety at the location where the Mt Barker fire started three years earlier.

THE RESPONSE TO THE MT BARKER FIRE

After the Mt Barker fire of 28 December, 2000 Energy Safety was concerned about the potential for further fires which might result from conductor clashing in locations where there were long bays and differently constructed conductors of the types in use on the Cranbrook line.

In an effort to ensure that the issue was addressed Energy Safety arranged a number of meetings with Western Power, the first important meeting was held on 16 March, 2001 and was treated as being of sufficient importance for the Director of Energy Safety, Mr Albert Koenig, to attend himself. Mr Koenig and Douglas Ayre, an Inspector holding the position of Principal Engineer Electricity Supply, represented Energy Safety. Mr D Burrell, Mr L Seddon and Mr G Rowe represented Western Power.

At that meeting it was agreed that as a general principal *"…where incidents have been investigated the resulting information will be shared. This will ensure that significant facts and issues are clearly identified and agreed upon with the objective of developing mutually acceptable outcomes"* (Draft Notes : Part of exhibit "52").

It was also agreed that Western Power was to review the performance history of the Cranbrook feeder and other feeders coming from the Albany Sub-station and would prepare a broad action plan to prevent conductor clashing problems from occurring in the future. Mr Seddon and Mr Ayre were to meet in three weeks to discuss progress.

Mr Koenig stated that a purpose for convening the meeting was to discuss broader issues arising from the Mt Barker fire and in evidence he made the following observation – (t.622)

> *"When you refer to "broader issues" what are you referring to? - - - Well, in one context one might see the Mount Barker fire as being something related to a particular span on that particular feeder but on the other hand our view was that there was a - - there was a, you know, real concern that the problems that had been identified might in fact be replicated elsewhere.*
>
> *…*
>
> *Yes? - - - And the reason why I made this comment about this broader concern is that our experience with construction in the south-west interconnected country network was that these parts of the network were generally built as major projects".*

WESTERN POWER'S INVESTIGATIONS OF THE MT BARKER FIRE

Following the Mt Barker fire arrangements were made by Marek Lamparski, a Network Engineer, for Brett Dew, then a Project Officer working from the Picton Depot, to investigate the cause of the fire.

Mr Dew was unable to advise the court when it was that he was asked to investigate and, remarkably, he stated that he did not know about the damage caused by the Mt Barker fire and had no real appreciation of the consequences of the conductors clashing on that occasion.

Mr Dew was specifically referred to the descriptions of the fire contained in the West Australian Newspaper article of 30 December, 2000 but he could not recall if it was the fire which he had been asked to investigate. He said that he did appreciate that it must have been a fairly bad fire because when he attended the scene *"…there was quite a bit of damage coming down the road"* (t.203).

Mr Dew said that it was unlikely that he started his investigations before the New Year, but said that he believed they commenced not long after that time.

Mr Dew stated that a fire investigator from Western Power attended the fire but he never saw a report from him. If one was ever created it was not provided to the inquest. In that context I assume for the purposes of these reasons that no report was prepared by the fire investigator.

Mr Dew prepared an incident report (exhibit "31") which revealed that during his investigations he had discovered maintenance issues on the bays at either side of the bay where the clashing had occurred.

The clashing had occurred at the long bay between poles CB470 and CB471. Between poles CB469 and CB470 Mr Dew discovered that the earth conductor had previously broken and appeared to have been rejoined too tightly.

Mr Dew also discovered that new stays had been installed on an angle pole, CB472. He concluded that in the past the stays at angle pole CB472 might have rusted off causing the pole to lean over and that when new stays were installed the pole had not been pulled back to its original position, causing all of the conductors to be poorly regulated for *"…the next couple of bays"*.

It was Mr Dew's opinion that these deficiencies in maintenance to the two adjourning bays could have impacted on the bay in question causing the earth wire to be too tight and the phase conductors to be too loose.

The extent to which any deficiencies in the tensioning of the conductors adjacent to the bay in question would have impacted on that bay would have depended substantially on the slackness or otherwise of the ties at poles CB470 and CB471. The ties are intended to prevent a deficiency in tension from spreading from bay to bay. Mr Dew stated,

however, that he had not checked the ties to determine whether they were operating correctly or not.

In a memorandum dated 7 May, 2001 (exhibit "32") Mr Dew wrote to Mr Seddon, who was then the Principal Engineer at Jandakot, and advised him of the result of his investigations which included a review of sites of previous bushfires with Mr Bell. A part of that memorandum reads as follows -

> *"I have carried out a detailed investigation of one of these fire scenes, which occurred in early 1983. Although no marking of the conductor was evident, it appears to have been caused by the extended bay length and the fact that there is a combination of a steel running earth and Steel Core Aluminium (SCA) phase conductors. Although it appears some modifications where carried out at the time, the conductor separation is still insufficient".*
>
> *Further investigations of other incidents have revealed the cause to be long bays and dissimilar conductor types. I believe this condition is wide spread and only environmental conditions have prevented the risk being fully realised.*
>
> *NB: Whilst the December 2000 fire was caused by poor maintenance practices I believe these were accentuated by the long bay and dissimilar conductor types".*

Mr Dew's report and memorandum raised important issues for Western Power.

It is clear that Mr Dew, like Energy Safety, was concerned that long bays and dissimilar conductor types could be factors which could contribute to further conductor clashing and more fires.

Mr Dew's observation that *"…only environmental conditions have prevented the risk being fully realised"* referred to the fact that in the Great Southern region temperatures tend to be lower and the problems in respect of conductor clashing would be more likely to occur during hot conditions when the phase conductors would be likely to sag more than the underslung steel earth conductors.

Remarkably, in the context of the agreements of the meeting of 16 March, 2001 between the Energy Safety and Western Power that information would be shared, the specific results of Mr Dew's investigation were not shared by Western Power with Energy Safety.

The only communication in respect of these findings provided by Western Power to the Energy Safety was to advise that *"An internal WPC report of the incident concludes that the likely cause of the fire is incorrect maintenance repair, in that the repair work resulted in phase and running earth conductors being unevenly tensioned"* (letter dated incorrectly 8 March, 2001 from Mr Seddon to Mr Ayre attached at appendix 7 to the Electrical Incident Report of Energy Safety). Western Power never advised Energy Safety of the specific problems discovered at bays 469-470 and 471-472 and as a result Energy Safety did not conduct any investigation of those maintenance issues.

Mr Seddon was asked why he did not provide Energy Safety with a copy of Mr Dew's report and he stated that he could not recall why he did not do so but speculated that it was because legal professional privilege had been referred to by Mr Lamparski and he believed that it was likely that the document was one in respect of which privilege was being claimed (t.666)

Mr Ayre, who had drafted the Energy Safety report, stated in his evidence that had he been aware of these specific issues he would have returned to the scene and conducted further investigations. He stated that he wished, with hindsight, that he had had access to Mr Dew's report. He stated that the information contained in the report would have been helpful although he doubted whether it would have led to a change in their conclusions (t.832). Unfortunately it would appear that representatives of Energy Safety never specifically sought access to that report and were not aware of the issues identified by Mr Dew until the inquest hearing.

Mr Seddon, who was then responsible for the response to Energy Safety in respect of the matter, did seek a further report from a relatively junior Western Power engineer named Mark McKinnon who had commenced employment with Western Power in 2000 and had no previous experience of line design, construction and maintenance (t.305). Mr McKinnon provided a report dated 25 October, 2001. That report appears to have been altered from the time of its creation in that a new section headed "Background" has been inserted and the previous material contained under that heading removed while the report was stored electronically.

Mr McKinnon, in his report, made the following observation in respect of the bay length in question –

> *"For this type of construction the bay lengths in the Mount Barker area are generally 120-125m, however the bay being investigated was 167m long. Note that the design maximum bay length for this type of construction as per the Distribution Construction Manual to ensure minimum ground clearance requirements are met is 135m".*

The reference by Mr McKinnon to the Distribution Construction Manual requiring bay lengths to be less than 135 metres was a reference to a Western Power document relating to current design practices rather than the Australian Standard. The relevant document is titled "Network Distribution Design Manual Volume 5" (part of exhibit "59").

Mr McKinnon observed that the Australian Standard formula currently requires calculation of sag to take place at 50^0C and agreed in evidence that applying the appropriate formula at 50^0C there would have been an overlap between the conductors. He noted that the phase conductors were too loose and the underslung running earth conductor was too tight.

He observed that the conductors should be tensioned so that the sag of the running earth conductor equals the sag of the phase conductors at a temperature of 50^0C. Mr McKinnon's conclusion in his report was as follows –

"A minimum conductor separation, as defined in the Australian Standard, has not been met. This is primarily due to the excessive sag of the phase conductors and insufficient sag for the running earth for the given bay length and construction.

The actual bay length exceeds the design maximum bay length. This is likely to result in the minimum ground clearance of 5.5m not being maintained". (p.7)

It is clear, therefore, that all three investigation reports which had been prepared in respect of the Mt Barker fire had contained concerns expressed in respect of maximum bay lengths exceeding 135 metres.

THE MAINTENANCE ISSUES IDENTIFIED BY MR DEW

A major concern as to Western Power's response to the Mt Barker fire is the fact that even though it was Mr Seddon's view, based on Mr Dew's report, that the fire had resulted from poor repair work, no reasonable action was taken to ensure that maintenance staff were adequately briefed about the problems in question. Linesmen who gave evidence stated that they were never told that there had been a tensioning problem or that previous repairs had been carried out inadequately.

No real investigation appears to have been conducted as to how the maintenance problems identified by Mr Dew had occurred, Mr Seddon informally asked the Works Practice Senior Officer in Jandakot, Shane Elles, whether staff were aware of correct conductor tensioning practice and was told they did (t.588). Mr Seddon said that he did not know how the two different problems identified by Mr Dew within three bays had occurred (t.590) and could not tell from the records when they occurred.

Mr Seddon stated that he was told that linesmen were given extensive training in the correct tensioning of conductors (t.523). Assuming that Mr Seddon accepted this account on face value, it left unexplained the fact that Mr Dew's report had identified two bays adjacent to the bay in question where

correct tensioning had clearly not taken place.

Even accepting that Western Power's records were so deficient that they could not identify when or by whom the defective maintenance work identified by Mr Dew took place, the lack of investigation of these matters by Western Power is remarkable.

I would have expected that enquiries would have been made of linesmen involved in repair work on the Cranbrook line to seek to discover how such seriously deficient work came to have been completed. It would also have been an obvious step to ask the linesmen, themselves, about their repair practices. A minimal amount of questioning of those involved would have revealed that even if staff were aware of correct tensioning practices, they were rarely or never applied when re-tensioning conductors after repair work (this was the evidence of all Western Power linesmen who gave evidence about the matter at the inquest, many of whom had been working for Western Power for 20-30 years).

THE SIGNIFICANCE OF LONG BAY LENGTHS

While if conductors were tensioned precisely in accordance with the Australian Standards it might be possible for a line to meet the Australian Standards even in bay lengths in excess of 135 metres, the concern of Energy Safety was that in these lengthy bays it would be particularly difficult to maintain such accurate tensioning over time and in the event that any tensioning problems were experienced, the lengthy bays, with necessarily greater sag, would be more likely to be susceptible to conductor clashing.

In other words, with longer bays the margin for error is reduced. In the event of maintenance problems, the limited margin for error would contribute to the potential for conductor clashing.

Mr Koenig made the following comment to essentially the same effect – (t.624)

> *"…in principle having bays in excess of 135 metre length is, you know, fine from an engineering point of view providing all of the design and construction is carried out in a manner that is consistent with that particular objective. Our concern in this regard was that the power line we're talking about was constructed in the early 60s. It has obviously undergone a lot of changes in a physical sense during that time - - since that time, I should say. There have been many environmental factors that have changed".*

Mr Koenig observed that factors which would have impacted on the safety of the long bays included –

- The demand for electricity in the summer is greater now than when the line was constructed as a result of use of air-conditioning etc increasing summer peak loads which increases the of sag conductors;

- Corrosion and other similar effects will have caused conductor deterioration;

- The service life of some equipment, even with normal maintenance repairs being performed, is likely to be exceeded after 30 or more years.

Mr Seddon, himself, while discussing the Mt Barker incident, made the following comment in an exchange about pole top movement – (t.618)

> *"CORONER : But that would only be a relatively small movement, wouldn't it, the pole movement? - - - It doesn't take much movement to re-adjust tensions.*
>
> *So to the extent to make the situation dangerous? - - - To - - yes. Yeah.*
>
> *I see. Yes. Well - - ? That's speculation but - - but the - - the pole - - the pole movement can be quite slight to change the tension and sag at the conductor".*

Obviously the potential for pole movement to cause tension change and conductor sag would be greater for lengthy bays than for short bays.

Mr Seddon accepted when questioned by Mr Nash (who represented families of the deceased) that if a bay length is doubled, then in order to maintain a consistent line tension, the sag distance at mid span will necessarily be approximately quadrupled (Western Power's January 2001 Networks Distribution Design Manual Vol. 5, para 5.4.3 sets out the applicable formula).

Factors identified at the inquest which might cause sag problems would include –

- Movement of wooden poles from the verticle as a result of weather and ground conditions;
- Incorrect application of steel reinforcing to poles;
- Deterioration or breaking of stays to poles;
- Conductor deterioration over time;
- Movement of cross arms;
- Problems in adjacent bays; *and*
- Conductor or earth wire breaking and ends being re-joined without correct tensioning.

THE RESPONSE OF WESTERN POWER

Mr Seddon advised the court that when he received Mr Dew's memorandum of 7 May, 2001, he noted that Mr Dew had expressed a concern, which had also been expressed by Mr Graham Rowe at the meeting with Energy Safety on 16 March, 2001, that a combination of steel running earth and steel core aluminium phase conductors with a different co-efficient of expansion, could present a design problem.

Mr Seddon spoke to a Glenn Pearce, who had formally been a Distribution Overhead Line Design Engineer, and, according to Mr Seddon, Mr Pearce told him that the different co-efficient of expansion between the phase conductor and earth wire conductor would not be an issue as Western Power standard design would take into account that fact by requiring the earth wire sag profile at 15^0C to match the phase conductor sag at 50^0C.

The issue, then, for Western Power was that even if this was an accurate statement of the position, how could it be determined whether the conductors in question complied with their original design many years after construction and in the context of such repairs as might have taken place.

It was noted that in respect of the Cranbrook line it had been built in 1962 and so was over 40 years old.

Mr Seddon stated that he did not send a copy of Mr McKinnon's investigation to Energy Safety Safety because he was not satisfied that it was an accurate study of the bay under investigation.

Mr Seddon stated that one of the steps he took to determine whether there was a problem was to review fault records to discover whether those records would disclose evidence of conductor clashing. He indicated that his inspection of the fault records did not identify conductor clashing as having taken place.

Examination at the inquest of the records in question (the Distributed Facilities Maintenance System (DFMS)) did not identify any of the known conductor clashing cases which were referred to during the inquest as such.

The fires caused by conductor clashing in 1983, 1991, 2000, 2002 and 2003 were not identified as cases of conductor clashing in the fault records produced to the inquest and the Fault/Outage Report Form, the form on which the records

were based, relating to the Tenterden fire did not even identify that fire as having resulted from conductor clashing. These records were, therefore, clearly unreliable.

It is surprising that Mr Seddon did not identify this deficiency in the system at the time. He stated that he had looked at the records for over 10 years and found *"…there were no clashing conductor faults"* (t.600). That result would seem inherently incredible in a context where clashing conductors (for a range of reasons) must have occurred on some occasions and Mr Seddon was looking at a case of conductor clashing in the Mt Barker incident itself.

During the period from March 2001 until December 2002 there were ongoing discussions between Energy Safety and Western Power and an issue on which attention was focused was the perceived problem associated with spans of 135 metres and greater. The 135 metre cut-off had been suggested by Western Power during discussions as an appropriate basis for remedial action.

At a meeting on 27 August, 2002 it was agreed that Western Power would carry out a helicopter inspection of all three phase lines in the Plantagenet Shire which would include inspection of vegetation clearance and inadequate conductor separation.

While an effort was made to conduct a helicopter inspection, Keith Lucas, one of the Western Power officers who took part in the attempted inspection, gave evidence that it was not possible to examine sag from a helicopter and evidence of conductor clashing could only be seen from below.

Western Power then conducted a ground based review of bay lengths in the Plantagenet Shire.

Mr Ayre of Energy Safety stated that there was, from his prospective, a lack of evidence of real progress by Western Power between 2001 and 2003 in respect of follow-up work after the Mt Barker fire but given the limitations of Energy

Safety's powers as a regulator, it could do no more that it was doing during the period; i.e. making requests for progress reports and encouraging appropriate action.

The Shire of Plantagenet survey was completed by the end of January, 2003 and following that survey Western Power installed four new poles and modified pole top structures at several locations. The Cranbrook feeder line was inspected only to the boundary of the Shire of Plantagenet; poles CB721 and CB722 involved in the Tenterden fire were outside the area of survey, being in the Shire of Cranbrook.

Mr Ayre stated that he had assumed that the survey work which had been conducted in the Plantagenet area would in due course have continued in relation to the rest of the feeders coming out of the Albany Sub-station.

It would appear that Mr Ayre did not advise Western Power representatives of that assumption.

It is clear that there was no adequate engineering or safety reason to end the survey at the boundary of the Shire of Plantagenet, particularly when problems had been identified within that shire.

It was submitted on behalf of Western Power that it was reasonable to focus on the Plantagenet area because the 2000 and 2002 fires were in that area. I do not accept that contention as the division between the Shires was an arbitrary shire boundary while the Cranbrook line was the same line in both shires.

It was also submitted that it was reasonable to allocate priority to the Plantagenet area because it had been identified as a "high" risk for bush fires area while Tenterden had only been classed as "medium" risk by FESA. I do not accept this submission as having merit as even if priority had been initially been given to investigating the Plantagenet area the risk of fire in the Tenterden area was such that the inspection should have continued into that shire.

THE MT BARKER FIRE OF 12 DECEMBER, 2002

It appears that on 12 December, 2002 a further fire was caused by conductor clashing on the Cranbrook line close to Mt Barker.

Following that fire Mr Seddon wrote an e-mail to a number of officers of Western Power, on 18 December, 2002 as follows –

> *"Carl has mailed some photos of the bay that is thought to have caused the fire. Carl advises that it appears the phase sagged down into the earth on a approx 200m bay adjacent the bay that caused a fire last year.*
>
> *Carl arranged for a pole to be added mid bay last Monday 16th. He had the line inspected and found another bay of about 200m some 30 bays way, and on the day (relatively mild day) the phase had sagged close to the earth wire. Carl will add pole to that bay too".*

On the same day Mr Seddon wrote a further e-mail to Carl Swarbrick of Western Power, which again was copied to a number of other persons, which reads as follows –

> *"Men, it gets better. Keith Lucas was line patrolling yesterday & found another problem, 210m bay, running earth is stranded & blue phase conductor had spash marks on it (i.e. phase & running earth have clashed). Have a crew there today installing 2 pole to fix these problem. Also a pole was installed on Monday to fix last Thursdays problem. Any queries please ring. Carl S".*

On 20 December, 2002 Mr Seddon wrote a the following e-mail to a number of officers of Western Power –

> *"Please find attached the photos of line taken after bushfire on 12/12/02 (Can you confirm that date Carl?). Can you keep me advised of helicopter inspection review and strategy to address this problem please Joe,* ***as I have been informed Al Koenig will be pushing Doug Aberle to ensure we have no more bushfires caused by long bays and phases sagging into the running earths.***

Carl has already, following the fire, found two other 200m bays in the area with evidence of past arc damage, and had intermediate poles installed".

It is abundantly clear from these e-mails that at least by December, 2002 senior officers of Western Power were well aware that there was a problem of bushfires being caused by long bays with phases sagging into running earth conductors. In that context it is very difficult to understand why more direct action was not taken to address this issue prior to the Tenterden fire a year later.

Mr Seddon in his statement provided to the court and dated 19 January, 2005 (exhibit "43") at para 26 made the following observation in respect of the action in which he took –

"26. Because I also concluded that the issue of fault repair and the issue of ground clearance for conductor in bays over 135 metres long might be a problem, I wrote an email to Mr. Nenad (Joe) Kolibas on 4 January, 2002 asking him to investigate the matter further.

27. No action was taken in direct response to that memo, until after the Tenterden fire when I engaged Maunsell Australia Pty Ltd to undertake an investigation referred to in more detail elsewhere in this statement".

Mr Kolibas, in his evidence, stated that he does not believe that he ever received this e-mail and has no recollection of ever having read it prior to the hearing.

The relevant e-mail referred to the Mt Barker fire and in part contained the following –

"This particular long bay line has had a pole added to reduce the bay length, but the question remains as to whether this is a problem for the rural system, and if so what is the extent of the problem.

Mark McKinnon, who has carried out the investigation so far, has queried DFIS as to the number of 3 phase bays over 135m and found about 8000. This is first cut, and requires further investigation but significant problem may exist.

As this is an asset issue I would like to hand it over to you and Darryl for the ongoing investigation.

Please call if have questions etc."

Mr Kolibas stated in his evidence that he had not previously had knowledge of clashing of conductors as he had previously been responsible for transmission work. He was not aware of the fire of December, 2002. He was located at the Head Office of Western Power in Wellington Street and had never been to Albany or Mt Barker.

Mr Kolibas stated that he did not become involved in the matter until September or October 2002 and at that stage he said that he was concerned about the lack of activity on the part of Western Power in respect of the issue.

Mr Seddon agreed in his evidence that there was then a significant failure of management to act as there was no progress in relation to the issue after January 2002 when Mr Seddon wrote his e-mail to Mr Kolibas until after 27 August, 2002 (t.743).

In light of the fact tha it had then been recognised that there was a problem of bushfires being caused by long bays and conductors sagging into earth wires this lack of action demonstrated a failure by Western Power Management to adequately prioritise what was clearly an important safety issue.

On 27 August, 2002 there was a meeting between Energy Safety and Western Power representatives. On that day the meeting notes relating to the Mt Barker bushfire incident indicate that a report had been promised by Western Power on their investigation into overhead lines in the area, the "outcome recorded" was that a survey to identify bay lengths of 140 metres or more had not been done but now that Joe Kolibas had been appointed, this would be followed up. The notes indicate "The lack of action is not acceptable to DAA (Doug Ayre) who will write to LS (Laurie Seddon) and ask

for this to be completed before the bushfire season starts this year" (Tab 1, exhibit "59", documentation provided by Western Power).

It would appear that no report was provided and no survey outside the Plantagenet Shire was completed by Western Power prior to the Tenterden fire.

As to the lack of action following the Mt Barker fire the following exchange took place with Mr Seddon – (t.747-748)

> *"In respect of this matter - - the Office of Energy had specifically raised this issue of length of bays and different conductor types on this particular Cranbrook line, hadn't it, in the 2001 fire? - - - In the - -*
>
> *It was squarely raised by the Office of Energy? - - - Yes.*
>
> *That they were concerned about the lengths of the bays and the different conductor types? - - - Yes.*
>
> *A step which could have been taken would have been to insert additional poles to limit the size of the bays? - - - Yes*
>
> *CORONER : The step which was eventually taken years later? - - - Yes.*
>
> *Are you the person responsible for the failure to take that sort of direct action following the recommendations of the Office of Energy? - - - Yes.*
>
> *If that's a factor that contributed to the deaths in this case do you appreciate that clearly in that circumstance your inaction may be a factor in causing the deaths? - - - I don't believe the cause of the Tenterden fire has been established".*

MR SEDDON'S INVOLVEMENT

Following Mr Seddon's admission referred to above that he was the person responsible for the failure to take direct action following the recommendations of the Energy Safety, Mr Seddon was warned that an adverse finding could be made in respect of his conduct and submissions were invited on his

behalf, particularly in relation to that admission.

On reviewing the matter, I have determined that it would not be appropriate to make any findings in respect of any employees of Western Power, including Mr Seddon. I note that Mr Seddon's e-mails referred to herein were copied to a number of other officers of Western Power and it is apparent that he was not acting in isolation without consulting other personnel. It is also clear that other Western Power personnel had involvement in the matter such as Mr Aberle, who was mentioned in the e-mail of 20 December, 2002. I also note that Western Power's deficient record keeping may have misled Mr Seddon as to the extent of the problem, particularly as he did not appear to have access to information about the fires of 1983 and 1991 and the fault records which he reviewed were unreliable.

An observation is, however, merited in relation to the submissions on Mr Seddon's behalf to the effect that he had not been afforded natural justice. It was noted in the submissions that on 28 October, 2004 counsel assisting gave written notice to Western Power of the possibility of an adverse finding being made against the Corporation, but no such notice was given to Mr Seddon. It was also noted that little criticism was made of Mr Seddon in the opening speech of counsel assisting on 7 December, 2004.

In that context it should be noted that prior to the inquest the Coroner's Court had received no information from Western Power as to the decision making processes involved. Mr Seddon was not even identified as a possible witness until Western Power, through Mr Barsden, wrote on 11 November, 2004 to *"ask the Coroner to hear evidence from Mr Laurie Seddon on behalf of Western Power"*. Mr Seddon did not provide a witness statement prior to the inquest hearing commencing on 7 December, 2004 and his first witness statement did not answer the questions which had been asked of Western Power by counsel assisting. That statement was dated 8 December, 2004. Mr Seddon provided a second

statement dated 19 January, 2005 which was received together with a large quantity of additional documentation prior to the inquest re-commencing on 24 January, 2005. The Coroners' Court, therefore, had very little opportunity to determine the extent of Mr Seddon's involvement prior to his giving evidence and it was only during his oral evidence that he made the important admission referred to above. In these circumstances the Coroner's Court, as a matter of reality, was not in a position to provide Mr Seddon with effective notice of possible adverse findings when that possibility was not known to the court itself.

The late provision of materials by Western Power, including the late provision of Mr Seddon's statements, therefore, not only caused problems for the Coroner's Court which necessitated an adjournment of the inquest, but also placed Western Power's personnel, particularly Mr Seddon, in a difficult position in the event that evidence would come to light which could result in adverse findings.

As indicated later in these reasons it is my view that Western Power should have instigated a comprehensive investigation and report into the incident which caused the Tenterden fire shortly after 27 December, 2003 and the report should have covered all of the material contained in both of Mr Seddon's statements and been provided to the Coroner's Court well before the inquest commenced.

In the absence of adequate information about Western Power's actions between 2000 and 2003 being available prior to the inquest it has been difficult to ensure that Western Power, itself, was given adequate notice of possible adverse findings as the evidence unfolded and for that reason I endeavoured during the hearing to raise possible concerns in a relatively direct manner.

This situation has highlighted the importance of providing such witness statements at an early stage.

THE TENTERDEN FIRE

A report was prepared into the power line fault and bushfire at Tenterden which occurred on 27 December, 2003 by Mr Ayre of Energy Safety dated 16 January, 2004.

Mr Ayre had been notified of the incident by an officer of FESA on the evening of Saturday 27 December, 2003.

On this occasion it was determined that there had been conductor clashing on the Western Power 22kv overhead line north of Mt Barker at a point approximately midway between poles CB721 and CB722 at approximately 1:08pm on 27 December, 2003. The fault appeared to have been caused by the live red phase conductor and the underslung earth wire making direct contact with each other.

The report contains the following opinions –

> *"…this fault appears to have been caused by the live red phase conductor and the underslung earth wire making direct contact with each other due to erratic movement of both wires in the strong gusting wind and high ambient air temperature. There is a high probability that the subsequent discharge of electricity resulted in the creation of molten hot metal globules that then fell to the ground and provided a source of ignition to the dry stubble in the vicinity of the power line".*

On this occasion the span length between poles was approximately 181 metres (this measurement was determined by Western Power, in the report it is referred to as 187 metres).

Again on this occasion, as with the Mt Barker fire, Energy Safety concluded that the safe clearance of live conductors could have been compromised by excessive sag between supporting poles and the situation would have been exacerbated by high ambient air temperatures and the use of steel as an underslung earth conductor below an aluminium and steel current carrying conductor that had a greater co-efficient of expansion and would sag more as a consequence.

Comparing the features of the conductors involved in the clashing of the Mt Barker fire of 2000 and the Tenterden fire of 2003, they involved conductors of the same type forming part of the same line which was probably constructed at almost the same time in about 1962, the bay length of the Tenterden fire being longer than the bay length involved the Mt Barker fire. The Tenterden construction was further complicated by the fact that one of the poles was a running disc angle bay and so the conductors in question crossed over from the horizontal to the vertical at that point. In such circumstances, according to Western Power witnesses, newly constructed bays would not be constructed longer than 80-90 metres.

The fact that a similar fault causing a ground fire had occurred on the same feeder line and not far from the Mt Barker fault within such a short time span was clearly a matter of great potential embarrassment at least for Western Power.

THE STRIKA REPORT

In spite of the fact that shortly after the terrible Tenterden fire it was known by Western Power that the fire was caused by its equipment at a long bay with different conductors, Western Power's immediate response to investigating its own fault was less adequate than had occurred after the Mt Barker fire.

After the Tenterden fire Western Power did not provide Energy Safety with a written report relating to an investigation into the incident as was required by Regulation 36 of the *Electricity (Supply Standards and System Safety) Regulations 2001*. Such a report should have been provided within 20 working days after the day when the incident occurred or within such further period as the Director of the Energy Safety might have allowed. Western Power, therefore, did not comply with its legal obligations in that regard.

Mr Koenig was asked about Energy Safety's response to

this failure and the following exchange took place –

> *"CORONER : in respect of the Tenterden fire wasn't Western Power required to provide a written report on the outcome of the investigation in a form acceptable to you? - - - Yes, it was, and I'm aware that it wasn't provided but at the time - - and we didn't insist on it because at the time, to be perfectly honest, we thought it wouldn't add much by way of information because we were - - we had already been discussing the preliminary findings following the on-site investigations and indeed there was a quite obvious dispute between what we had assessed as the - - you know, the basis of the fire and what Western Power was prepared to acknowledge. So at that particular point we didn't pursue that".* (t.635)

This was, in my view, an unsatisfactory approach for Energy Safety to take. Western Power as a network operator should have had access to information about the history of the line not necessarily available to Energy Safety and may have been able to identify problems not discovered by Energy Safety's investigations (as occurred in the Mt Barker case). Energy Safety should have ensured that Western Power was adequately investigating its own problems so that safety issues would be identified and addressed.

The only report dealing with the cause of the fire obtained by Western Power and provided to the inquest following requests for production of any such reports was a report prepared by Rodney Strika of Alliance Power and Data. The report is undated but bears a print date of 2 December, 2004.

Mr Strika's report contains as an appendix his instructions which were communicated by e-mail from Mr Barsden, solicitor for Western Power (Appendix A to exhibit "38"), which asked him to investigate the line and indicated that Energy Safety had already published a report. As that report was not published until 16 January, 2004 it is clear that Mr Strika was not retained until after that date.

It appears, therefore, that in spite of the fact that this was a major fire which caused two deaths, Western Power did not instigate an investigation which would result in a report as

to how its equipment had caused the fire until after it had received a report from the Energy Safety. This was a disgracefully inadequate response to such a serious fire caused by its own equipment.

The e-mail from Mr Barsden contained the following instruction –

> *"I require your report to advise Western Power in relation to anticipated legal proceedings against Western Power".*

Mr Strika's report was, therefore, not prepared with any urgency after the fire and was prepared for the purpose of assisting Western Power in legal proceedings, it was not prepared for the purpose of determining what action should be done to prevent repetition of the tragedy.

Mr Strika prepared a number of drafts of the report and by 22 March, 2004 he had prepared a third revision.

The report, however, was not completed until December, 2004 and was not provided for the purposes of the inquest until its commencement. This was in spite of the fact that Mr Barsden's instructions had contained the advice to Mr Strika that *"There will be an inquest"*.

In addition to Mr Strika's reports Western Power commissioned expert reports from Jensen Engineering Metallurgy and Maunsell Australia Pty Ltd but these reports were of a technical nature and did not purport to address the issues relating to how the fire was caused.

Although not appearing on the face of the report, it appears that Mr Strika had a long association with Western Power prior to preparing the report and had been employed by that organisation between 1973 and 2002. Mr Strika had been the Manager of Network Assets from 1998 and from 2001

the Manager Assets Strategy. He left the employment of Western Power in February 2002, less than two years before receiving the request to prepare the report.

In Mr Strika's report he did not refer to his past association with Western Power and, of some significance, he did not mention the fact that as Manager of Network Assets he had been responsible for the line in question at the time of the Mt Barker fire, although he claimed in evidence that he could not recall receiving a report about that fire and did not recall seeing Mr Dew's report on it.

In his conclusions Mr Strika expressed the view that it was not possible to determine the mid span separation compliance or otherwise with the "Code of Practice for Line Construction" C(b)1 (published by The Electricity Supply Association of Australia - ESAA) of the spans CB721-722 at the time of construction or as it stood just prior to the bushfire because the bushfire under the power line caused damage to the poles and wires requiring the earth wire and the running disc angle poles to be changed therefore modifying the line profile prior to when measurements could be obtained.

ESAA C(b)1 is the current version of an established industry standard for the construction, design and maintenance of overhead power lines.

Mr Strika noted that metallurgical evidence which had been obtained indicated that there had been a significant electrical power arc occurring between the low phase (red) conductor and the underslung earth wire in between poles CB721 and CB722. He also formed the view that it was probable that the power arc had caused the earth wire to separate or break. These conclusions were consistent with the conclusions of Energy Safety in respect of the matter.

Mr Strika conducted a number of case studies using sag and tension data from other pole spans and applied that data to the span in question. His conclusion in that regard was

that the case studies did not prove conclusively if there was adequate separation just prior to the bushfire but they did raise a possibility that other factors might have come into play. He suggested that using his the data from the other spans used in his case studies the minimum mid span separations referred to in the Code C(b)1 applicable at the time and more recently would have been satisfied.

Mr Strika's use of case studies was an unscientific method for assessing whether or not it was likely that the span in question complied with Code C(b)1 immediately before the fire. Mr Strika agreed that he had no basis for assuming that the other bays used for his case studies had been tensioned in the same way as the bay in question. Mr Strika's case study approach also did not take any account of the fact that conductors of the bay in question had clashed while the conductors in the other bays had not, which might be attributable to different tensioning.

Mr Strika did say that he walked along and had a good look around the area *"…and there was nothing that caught my eye as being particularly, you know…the phase conductors and the earth conductors were slack the same amount. There wasn't any overly slack phase conductors and really tired earth wires that I looked at in the system"* (t.380). This was not a comprehensive or scientific method for determining whether Mr Strika's case studies were representative of the line. The Plantagenet inspection had revealed cases of poorly tensioned conductors on the same line and Mr Tomlinson discovered tensioning problems nearby at the time of his inspection (see p. 41, 42 of these reasons). It is clear, therefore, that the entire line was not consistently tensioned and there were locations where tensioning was not satisfactory.

Mr Strika had no knowledge as to whether or not maintenance had been conducted on the other bays used in his case studies and stated that Western Power records were defective in respect of maintenance work done prior to 2000 and so for 38 years the history was effectively blank (t.371).

It was apparent from photographs taken at the time of the fire that there had been some maintenance carried out at the bay in question as both poles CB721 and CB722 had been strengthened with angle iron. Western Power was unable to provide information as to when the steel reinforcing was added or whether it formed part of a bulk reinforcement program or was added to deal with a specific problem (t.718-719).

There was also evidence that the cross arms on the line had been changed in 1988 (t.606). What other maintenance had been conducted in the bay since 1962 is unknown because of lack of Western Power records. The use of case studies would be obviously meaningless if the bays used for the studies had different histories from the bay in question.

Mr Strika stated that he had not in fact examined the Cranbrook feeder line in spite of the request that he "investigate the line". It would appear that his investigation had been effectively limited to the nearby bays used for his case studies and he could not say whether they were a representative sample of bays in the line.

Mr Strika was referred to the history of the line as revealed a the inquest and the following exchange took place –

> *"…Would you - - would you agree with me that the history of clashing conductors causing fires in 83, 91, 2000, 2002 and 2003 is suggestive of a significant issue in terms of the construction or the maintenance of that particular line? - - - It certainly would raise some issues, yes.*
>
> *All right. Off the top of your head, do you know of a line in Australia - - Western Australia that has a worse history? - - - No."* (t.435).

The instructions to Mr Strika from Mr Barsden (Appendix "A" to exhibit "38") asked him to *"…investigate the line for me and prepare a report about … what is its history of earth faults and other failures that might result in fire, since it was built".*

Mr Strika's report, however, contains no reference to the

earlier faults which had caused fires in 1983, 1991, 2000 and 2003. Mr Strika claimed, in evidence, that he did not have knowledge of these incidents.

A striking feature of Mr Strika's report is that he confined his investigation of the fault history to a three month period prior to the incident. While the poor state of Western Power's records may have made it easier to focus on that timeframe than to examine the history more widely, Energy Safety's report, which had been referred to him in his instructions, contained extensive references to the Mt Barker incident of 2000 and the perceived similarities between the incident and the Tenterden incident of 2003. Mr Strika made no comments in respect to the observations of Energy Safety in that regard.

Mr Strika claimed that although he was Manager of Network Assets at the time of the Mt Barker fire and was responsible for the performance of the asset he –

- Did not recollect seeing the Energy Safety report relating to it (t.360);
- Did not recall media reports as to the extremely dangerous nature of the fire (t.360);
- Had no memory of Mr McKinnon's report even though Mr McKinnon had worked for a branch under his control and had concluded that an Australian Standard had not been met (t.400); *and*
- Had no recollection of Mr Dew's report (t.363).

Mr Strika was asked about Mr Dew's concerns as to poor maintenance practices and the following exchange took place –

> *"Shouldn't that have come to you as the person in charge? Weren't you the person responsible? - - - That, along with lots and lots of other issues that are going on all the time. It's continual. It's a continual thing that's happening all the time. Developments, identifying issues, developing strategies and it's - - it's not just that everyone is sitting*

around in this team waiting for something to happen. It's just that there - -

No, but something had happened? - - - And what I'm suggesting is I - - - I would presume that it went through the normal process and I can't recollect that specific instance". (t.363).

The failure of Mr Strika to review the history of the Cranbrook line in his report reduced its usefulness, particularly as he agreed in evidence that a review of the history would have raised issues for consideration. It is surprising that over the lengthy period between the preparation of his draft reports and the completion of his final report no one at Western Power advised Mr Strika about the known history of the line. Mr Strika's lack of knowledge about the Mt Barker fire, which occurred on the Cranbrook line, while he was in charge of managing the asset, was very surprising and his failure to compare features of the Mt Barker and Tenterden incidents detracted from the usefulness of his report.

REPORTS OBTAINED BY THE WESTERN AUSTRALIAN POLICE SERVICE

The Western Australian Police Service obtained reports from their own Arson Investigation Unit and in addition commissioned a helpful report from Guy Tomlinson of CCD Australia Pty Ltd.

The Arson Investigation Unit concluded that there were no indications which could suggest that the fire had been deliberately lit and it appeared clear that the fire had originated in an area of open pasture in the vicinity of Western Power pole number CB721.

Mr Tomlinson's report was essentially consistent with the report prepared by Energy Safety and expressed the view that on "balance of probabilities" the cause of the fire resulted from an electrical short circuit between the steel earth conductor and lowest aluminium active conductor which resulted in hot

sparks of molten steel and the then severed ends of the earth conductor, also containing deposits of hot molten steel, falling on the dry stubble below.

Mr Tomlinson expressed the view that in respect of the length of spans, the longer the span, the greater the need to tension correctly.

Although not commissioned to review the quality of other equipment in the area, Mr Tomlinson indicated that a brief examination of nearby Western Power equipment caused him to have a number of concerns in respect of maintenance practices.

The following photographs and captions are taken from Mr Tomlinson's report.

The above photograph depicts an example of Western Power pole leaning off vertical alignment. Support stay wire not tensioned. Pole and stay wire were not affected by recent fire. Pole located approximately 1 kilometre south of pole CB721. Exhibit ""13"(25).

This photograph depicts an example of an insulator not securely fitted to the top of a Western Power pole. Pole located approximately 20 kilometres south of pole CB721. Exhibit "13"(26)

MAINTENANCE PRACTICES OF WESTERN POWER

Following the 2000 bushfire at Mt Barker and receipt of Mr Dew's report which had raised maintenance issues, particularly issues relating to conductor tensions, Mr Seddon stated that the extent of any investigation into maintenance practices conducted by him was to speak with an officer from Western Power's Work Practices Section, Shane Elles. Mr Seddon stated that as a result of that inquiry he believed that correct procedures were being used to achieve conductor tensions.

According to Mr Seddon he believed that detailed instructions in respect of line tensioning contained in Western Power documentation such as the "Handbook for Linesmen" (document "P" of exhibit "59") were used by linesmen. The specified methods for checking the sagging of conductors contained in this documentation included methods such as sagging by timing and sagging using a dynamometer. All of the methods of sagging in question require the use of

equipment and careful measurements being made by the linesmen involved.

Linesmen who actually worked on the line in question and gave evidence at the inquest, however, all stated that none of these methods were used in re-tensioning earth wires and conductors. They did claim that when new lines were being put in place, the technical methods described were utilised. They stated, however, that when conducting repair work, if there was a problem which affected the tension of a conductor or earth wire, none of the taught methods were used and they simply attempted to check the sag visually by determining whether the sag appeared to be parallel between the phase conductors and the earth wire. They said they used this approach irrespective of the ambient temperature.

It would appear from the evidence that linesmen doing repair work did not usually have a dynamometer with them for use in checking sagging by dynamometer and they did not carry stop watches necessary for sagging by timing (see e.g. t.135).

Mr Kurt Weinert (a linesman) stated in relation to the failure to use the dynamometer method that *"... there's only a couple of those in the yard"* (t.134).

A number of these linesmen had been working on the lines for 20 to 30 years and said that throughout that entire period this incorrect method of checking the extent of sag had been used.

Mr Lucas, who had worked as a linesman, agreed that the practice of re-tensioning earth wires by sight attempting to hang them parallel was *"... pretty universal amongst the linesmen"* (t.916).

It is clear from other evidence, such as the evidence of Jonathon Andrews, the Acting Coordinator of Power Training Services with Western Power, that this approach is wrong and

will cause the lines to be incorrectly tensioned because the lines should be tensioned to be parallel at 50^{0}C. If they are tensioned to be parallel at a relatively low temperature, such as the usual ambient temperature in the region, then the earth conductor will be too tight and the phase conductors will be too loose and the conductors will be too close together.

It would appear from this evidence that for a period of at least 20-30 years many, if not all, lines which have been re-tensioned in the Great Southern Area have been re-tensioned incorrectly.

This problem of inappropriate repair work would appear to be exacerbated in a context where the Cranbrook line in question is over 40 years old and there are no routine checks of conductor tensions undertaken by Western Power throughout the network.

Western Power does conduct four yearly pole inspections and vegetation inspections. The requirements of the pole inspections do not, however, require those performing the inspections to examine the conductors and in recent years the pole inspections have been made by contractors who, while they receive training in respect to problems relating to the power poles, receive no instruction in respect of conductor issues (according to Mr Andrews). The contractors conducting the pole inspections are not trained linesmen (as was the case some years ago) and so they have no particular ability to identify problems relating to tensioning etc.

Western Power, therefore, does not systematically check its conductors for possible defects.

THE POSSIBLE TIGHTING OF EARTH CONDUCTORS

Linesmen who gave evidence stated that they believed that the steel underslung earth conductors in use on the Cranbrook line tighten with rusting and ageing.

Brian Holman, the holder of an electrical licence who had worked with the State Energy Commission (later Western Power) and had been Assistant District Supervisor in the Albany region, volunteered information relating to this issue and expressed concerns that it was a matter which was being inadequately addressed by Western Power.

According to Mr Holman the phenomenon of earth conductors becoming tighter with age was becoming relatively common in the later 1980's as the conductors aged. He believed that the tightening was caused by corrosion between the strands of the conductor forcing the strands apart. He expressed the view that the lower phase conductor constructed of steel core aluminium would not tighten while the steel earth conductor below would tighten, resulting in a loss of separation between the phase and earth conductors.

Mr Holman in his evidence stated that he would be happy to show the court a number of nearby locations where this phenomenon could be observed. As a consequence the inquest was adjourned to a number of locations on the nearby Frenchman's Bay Road where Mr Holman pointed out steel earth conductors which were corroded and over tight.

While at mid bay the earth wires should have sagged more than the phase conductors, it was obvious that at each of the locations identified by Mr Holman the earth wires were extremely tight with almost no sag while the phase conductors exhibited significant sag. In a number of locations the earth conductors appeared to be guitar string tight.

If the linesmen and Mr Holman are correct this is clearly a potential problem for long bays as if earth conductors are tightening as suggested, they will be moving closer to phase conductors and the problem will be more severe at longer bays where phase conductors will normally have greater sag (with other factors being equal).

If they are not correct, then the tensioning of the earth wires at the locations identified by Mr Holman has carried out in a grossly incorrect manner.

While it appears that there is no expert literature which has reviewed this perceived phenomenon, if the observations of Mr Holman and the linesmen who gave evidence is correct, this is a potentially serious problem for lines such as the Cranbrook line. Unfortunately in the absence of scientific evidence about this issue it is not possible to determine whether it is relevant to the bay in question. The earth wire between CB721 and CB722 certainly appeared to be rusted from a superficial examination although expert analysis indicated that its integrity and strength was not compromised.

On the evidence presently available I would not be prepared to make a positive finding that this phenomenon did apply in this case, however, I would not be prepared to exclude it as a possible relevant factor.

CONCLUSIONS AS TO WESTERN POWER'S INVOLVEMENT

It is clear from the above observations that Western Power Management was well aware of a potential problem associated with long bays with differently constructed conductors on the Cranbrook line well before the extremely serious fire of 27 December, 2003 was caused by conductor clashing.

The bay in question where the clashing took place in 2003 was between poles CB721 and CB722, the span was over 181 metres and the bay was a running disc angle bay. All of these aspects of the construction of the bay were matters of possible concern known to Western Power well before the time of the fire.

In addition it should be noted that the fire occurred on the same feeder and not far from the location of the fault which almost caused the destruction of Mt Barker on

28 December, 2000. Following that very serious fire Energy Safety had requested Western Power to take action and had certainly identified the issue of very long spans and differently constructed conductors.

After the Mt Barker fire Western Power Management had further reason to be concerned, particularly during December 2002 when internal e-mails refer to ongoing problems of conductor clashing related to long bays and inaccurately tensioned conductors.

There had been previous fires caused by conductor clashing in 1983, 1991, 2000 and 2002 which should have been known to Western Power Management. Although Western Power's records did not contain information about the first two fires, there was ample cause for concern following the fires of 2000 and 2002 together with the evidence of other conductor clashing discovered during the investigations of December 2002.

It should also be noted that the 2003 fire took place at a location adjacent to the Albany Highway, a main access road between Perth and Albany, and was not a remote or an inaccessible location. Any Western Power officers travelling on the Albany Highway should have been aware of the fact that there were long bays in the area not far from the location where the Mt Barker fire had started.

In spite of everything that had happened after the Mt Barker fire, by the time of the Tenterden fire 3 years later Western Power had not even identified the bay in question as being a long running disc angle bay, far less taken any action to address the problem. The lack of action was inexcusable in the circumstances.

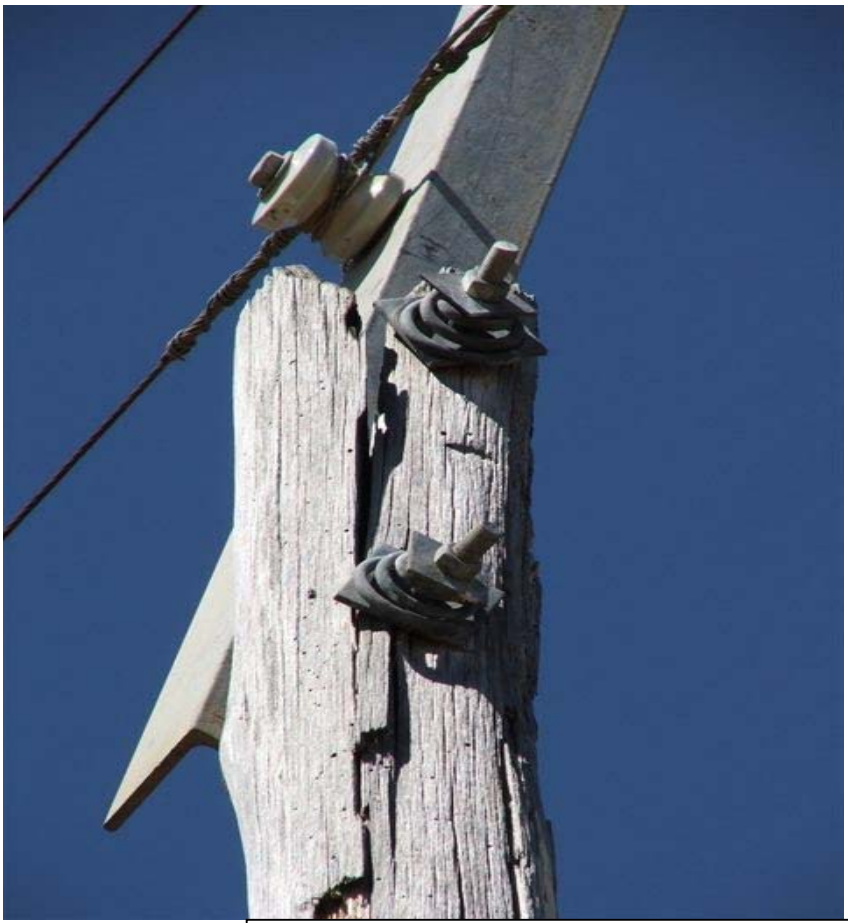
If Western Power had acted to insert an additional pole to reduce the bay length (as it did after the fire) I am certain that the conductors would not have clashed and there would have been no disastrous fire and no deaths on 27 December, 2003.

OTHER CONCERNS AS TO WESTERN POWER'S MAINTENANCE PERFORMANCE

During the course of the inquest a number of concerned persons contacted the court and raised issues in respect of Western Power's maintenance practices. One of those witnesses was Brian Holman, whose evidence has already been discussed.

Another such witness was Ian Findlay, a farmer whose farm is situated at Narrikup, south of Mt Barker.

Mr Findlay provided the court with a video tape and photographs showing what he perceived to be deficiencies at his property such as broken and rusted conductors. He also provided photographs which had been taken by a neighbour, Kelvin Ridgeway, during the course of the inquest itself. Mr Ridgeway's photographs depicted a power pole on his farm, the galvanised angle iron top supporting the insulators on the pole can be seen tilting over as a result of degeneration of the wood.



The above photograph is one of the photographs taken on the Ridgeway farm and depicts a split pole inadequately supporting angle iron and conductors (part of exhibit "28").

Brian Taylor, an Immediate Past President and former Captain of the Moonies Hill Bush Fire Brigade, provided the court with a comprehensive report relating to his assessment of the overhead power-line distribution of electric power in the Great Southern District. Attached to Mr Taylor's report were a number of photographs depicting problems said to be existing on a 4 kilometre section of line near Kojonup within the Moonies Hill Bush Fire Brigade area.

A further witness who provided photographs and expressed concerns in relation to maintenance issues was Gordon Adams of "Broome Farm", Kojonup.

Mr Adams gave evidence about a fire which occurred on his property on Old Broomehill Road, Kojonup on 27 December, 2003. The fire took place on the same day as the Tenterden fire and could easily have joined that fire, increasing its ferocity.

In Mr Adams' view the fire on his property started by powerlines falling to the ground when the insulator on the top of the pole spilt, releasing the wires. Mr Adams' particular concern was that when contacted Western Power had indicated that the power would be back on at 11:30am that morning. At that stage the fault had not been identified by Western Power and nothing had been done to correct the problem. Mr Adams was concerned that had the power been switched on at 11:30am, the wires which were down might have arced, causing a fire in areas of high fuel loads.

Fortunately Mr Adams was able to contact a supervisor who agreed to ensure that the power was not turned back on until the fault was rectified.

As the issues raised by these witnesses are not directly related to the fire and the cause of death, I do not propose to deal with their evidence in any detail in these reasons. It is noted, however, that in the context of the inquest, the local community was generally extremely concerned about safety

issues and I accept that these witnesses were representative of the views of a number of persons, concerned to ensure that Western Power's maintenance practices are improved and the likelihood of fires caused by the network in the region reduced.

THE FIRE FIGHTING RESPONSE

As indicated previously initial efforts to contain the fire appeared to be reasonably successful. Shortly after the fire had started there were five fire units at the fire which had been directed to the location by Mr Denny, the Chief Officer of the Cranbrook Volunteer Bush Fire Brigade, who had been advised about the fire at about 1:17pm. Mr Denny became the Incident Controller in respect of the fire fighting response.

Because of the severity of the day Mr Denny activated a general call out procedure and used an office at his home which had been set aside for that purpose for coordinating the activities.

At his office Mr Denny continued to coordinate activities with the assistance of his daughter-in-law and wife.

Even though the first information which Mr Denny received suggested that the fire had been controlled, because of the weather conditions he was particularly concerned and continued to call for more equipment.

Not long after the fire fighting activities had commenced Mr Denny was advised by Mr Walsh that the fire had escaped across Albany Highway to the western verge. Police were then contacted and asked to control traffic.

Within a reasonably short period of time police arrived at the scene of the fire and began to set up road blocks.

Mr Denny received advice that a Susan Toovey was leaving her home to warn residents in Tenterden about the fire. He arranged for other persons to be contacted so that

people in the locality could be warned that the fire was close to them.

Within a reasonably short period of time it appears that approximately 200 volunteer fire fighters were on the scene. These people demonstrated great courage in fighting the fire. In addition to those directly involved in fighting the fire a considerable number of other local people contributed by arranging to provide food, water and other necessities to the fire fighters. The response on the part of the local community to the fire was quite outstanding.

Unfortunately because of the extreme conditions on the day the fire relatively quickly became uncontrollably and it was not feasible to attempt to carry out fire fighting activities at the fire front. Efforts were made to contain the extent of the spread of the fire on its wings. At that stage the risk to the community was extreme, the fire in fact directly effected 60 families in varying degrees in the Tenterden/Kendenup areas and in addition to causing the two fatalities and injuries to a number of fire fighters caused considerable property and infrastructure damage. Because of the severity of the fire and the inability of those involved to control it, it is fortunate that the fire did not cause even more damage and loss of life.

While fire fighting activities were taking place and the fire was burning out of control, the Shire of Cranbrook eastern repeater providing VHF radio contact failed. Because of the fire there had been a failure of mains power and the back up battery which served to operate the repeater in the absence of mains power had also failed.

The Shire had a second repeater which was referred to as their western repeater and at that stage it was still operating although on battery power as mains power had been cut to it as well. The western repeater had limited coverage of the fire scene which at that stage was to the eastern section of the Shire.

Mr Denny contacted his second in charge, Tom Ettridge, and asked him to take over while he drove his motor vehicle to the eastern repeater with a replacement battery.

Unfortunately at about that time the western repeater also failed.

Mr Denny drove some distance to the eastern repeater site with the replacement battery, but unfortunately when that battery was used the repeater would not fire up. Mr Denny then rang the electrician used by the Shire, Christopher Pollock of Australian Communications Systems.

Mr Pollock received Mr Denny's telephone call at about 4:00pm and arrived at the repeater site which was on Sukey Hill at 5:15pm. He conducted a test of the multi-meter and confirmed that there was no power. He checked the back up battery and found that it was providing a too lower a voltage to operate the repeater. Mr Pollock then connected the battery from his vehicle to the back up battery using jumper leads. He left the back up battery recharging for about 2 hours so it would provide enough power to run the repeater until a new battery could be brought to the site.

This problem with the repeaters resulted in serious communication difficulties for Mr Denny in attempting to coordinate fire fighting activities at a time when the fire was extremely dangerous. It is extremely important for safe fire fighting to have good communications, particularly with the incident controller, as any movement of fire fighters at the fire scene must be carefully controlled, particularly as such fires are likely to burn erratically.

At about 4:55pm, still without the VHF access, Mr Denny resorted to flying his own small aircraft over the fire area using a UHF radio to broadcast to bush fire mobiles asking them to change to channel 37VHF (this was provided by the Tambellup Shire whose repeater covered the relevant area).

Communication problems were exacerbated at the scene because local police had no access to a VHF radio and so could not be contacted directly by the Incident Controller.

At the inquest it was revealed that past experience in Western Australia during significant bush fires has indicated that repeaters have often failed. This matter was discussed by Mr Pollock during his evidence and he made the observation that in the event of a fire causing failure of mains power, back up batteries provided to most repeater stations have a limited life of at most 3-4 hours when in 100% use, assuming that the batteries are in reasonable condition.

The length of battery life to be expected would depend on the age of the battery and the usage. While these batteries are often tested, as they were regularly in this case by Mr Denny, there is a significant difference between test usage of short duration and conditions experienced during a major bush fire when the frequency is in constant usage.

In a bushfire situation, such as the Tenterden fire, Mr Pollock explained that back up batteries can only be relied upon for a relatively short periods of time and even then the extreme use which is experienced during high activity while fire fighting is likely to lead to the batteries running out fairly quickly.

In respect of the use of the alternative repeater, Mr Pollock explained that the western repeater used by the Shire of Cranbrook did not cover sections of the eastern part of the Shire, partly because of relatively hillier land in the western part of the Shire limiting the range of the repeater. In that context it was important to have in place arrangements with other Shires or other organisations which could provide more reliable repeater back up.

Since the Tenterden fire the Shire of Cranbrook has purchased a VHF radio for use by the local police officer, is a

matter of some concern that police are not in a position to communicate in emergency situations with other organisations and have no direct access to VHF radio.

Mr Denny's problems with radio contact continued for a total period of several hours, but his action in taking his aircraft was a sensible and practical solution which helped to provide improved coordination.

Under the State of Western Australia's Emergency Management Arrangements, policy statement 7, responsibility for combating the emergency and providing effective management rested with the two local authorities of Cranbrook and Plantagenet.

The Fire and Emergency Services Authority of Western Australia (FESA) had no direct responsibility in the management of the emergency and its role was that of support to the two local governments. An offer of help from FESA was taken up by the Shire of Plantagenet was declined by the Shire of Cranbrook.

During the late afternoon a significant cooler southerly wind change eased pressure on the fire fighting activities and the Kendenup Community which had been potentially under threat from the fire. The change in direction of the wind took the fire into the Stirling Range National Park where the Department of Conversation and Land Management (CALM) was able to manage its progress.

While the main fire run was contained by late 27 December, 2003, mop up and control activities continued until 7 January, 2004.

CONCLUSION

Lorraine Melia and Judith Leslie Ward were both killed by a fire which at the time was burning out of control in the Tenterden area on 27 December, 2003.

The fire was caused by conductor clashing which had occurred on a Western Power 22kv overhead line north of Mt Barker at a point approximately mid way between poles CB721 and CB722 at approximately 1:08pm on 27 December, 2003.

More specifically, the fire was caused when the live red phase conductor and the underslung earth wire made contact with each other following which molten hot metal globules fell to the ground and provided a source of ignition to dry stubble in the vicinity of the power line. In addition the power line clashing caused the earth wire to break resulting in the two ends of the wire falling to the ground.

At the time when the fire commenced conditions were extremely hot and windy and in spite of valiant efforts to contain the fire, particularly those of volunteer fire fighters, the fire quickly became uncontrollable and burnt with considerable ferocity.

Although there were communication problems in respect of fighting the fire, those problems did not contribute to the sequence of events which led to the deaths in any way as the fire was by that stage uncontrollable and it would not have been practicable to attempt to make a direct fire attack.

I am satisfied that a significant factors which contributed to the conductors clashing were –

- The bay in question was 181 metres long (it was a very long bay);
- The bay was a running disc angle bay (which involved the conductors crossing over); *and*
- The phase conductor which clashed and the underslung earth wire were constructed of different materials with different co-efficients of expansion (the phase conductors would sag more in hot weather and conditions of high power usage than the earth wires).

Because of these factors there was very little margin for error in order to maintain adequate separation and it was important for maintenance and repair work, particularly when it involved conductor tensioning, to be performed correctly and with precision.

In reviewing Western Power's repair and maintenance performance in relation to the bay in question I note –

- Western Power has no records in respect of any maintenance performed prior to 2000 so for 38 years the history is missing;

- Photographs of the power poles and lines reveal angle iron attached to the base of the poles and sleeves on phase conductors which could be consistent with repairs having been effected at the bay in question. In addition evidence at the inquest indicated that the cross-arms had been changed in 1988. In these circumstances I consider that it is likely that repair work had taken place at some time at the bay in question or at adjacent bays;

- Linesmen who gave evidence described the method used by them to re-tension conductors while performing repair work. The evidence referred to earlier in these reasons indicates that the methods used were wrong and would result in phase conductors having too much sag and earth conductors having too little sage.

I accept the evidence of Mr Strika, Mr Koenig and others to the effect that even with the bay being a long running disc bay with differently constructed conductors, if the conductors had been tensioned accurately they should not have clashed. In my view, however, the margin for error was unacceptably small for equipment of the age of the equipment in this case. That margin for error was breached either as a result of inadequate maintenance and repair practices or as a result of

changes taking place over the 40 years since construction effecting the tensioning of the earth wire or conductors, or both.

Of particular concern in this case is the fact that similar fires had been caused by conductor clashing on the same line nearby on a number of occasions and Western Power should have been well aware of the problem. The fact that no action had been taken to address the problems associated with the bay in question in spite of the knowledge of Western Power as to other earlier problems is a matter of great concern. Had Western Power taken remedial action, such as by inserting an additional pole (as occurred after the fire) the problems associated with the long bay would have disappeared, virtually eliminating the possibility of conductor clashing at that location. I am satisfied that if such remedial action had taken place, the fire would not have started and the great damage and deaths caused would not have resulted.

I am satisfied that Western Power management was aware of the problems in the region but had not acted in a timely way to address them.

As the fire was caused by the actions and inactions of Western Power I find that the deaths arose by way of Misadventure.

COMMENTS ON SAFETY ISSUES

Western Power's Maintenance Practices

This case has identified serious problems with maintenance practices of Western Power. In my view these may have contributed to the fire in question. It is of great importance that more emphasis is placed by Western Power on effective maintenance and more resources are directed to that end.

Important maintenance issues identified at the inquest include the following –

(a) Western Power's Maintenance Management Structure

Senior management of Western Power were not aware that in the Great Southern Region all linesmen re-tensioning conductors attempt to tension the conductors so that they are parallel irrespective of the ambient temperature at the time contrary to Western Power's own documentation including its "Handbook for Linesmen".

Western Power management also did not know that it was a commonly held view of linesmen in the Great Southern Region that steel earth wires tighten over time and that this is a real maintenance issue which needs to be monitored.

Evidence from Mr Seddon and others at the inquest indicated that Western Power has no engineers in the Great Southern Region, no senior supervisor, two foremen and no leading hands as such (see t.749).

This contrasts markedly with the situation which existed about 40 years ago when Mr Holman began working with what became Western Power. At that stage there was a District Engineer, a Distribution Engineer, a Trainee Engineer, two Assistant District Supervisors and a number of foremen.

At that time there was a leading hand in charge of each work crew (t.5-6).

Linesmen now receive daily instructions by email and they contact engineers in Perth by telephone in respect of technical issues. This appears to have resulted in a considerable lack of communication between Western Power's management and linesmen involved in hands-on maintenance activities.

I recommend that Western Power review its management structure with a view to ensuring that there is adequate supervision and technical input provided to its workers in regional locations.

(b) Lack of information about its own system

Western Power was not able to identify from its own records which bays were in excess of 135 metres in the Mt Barker area after the 2000 fire. Efforts were made to identify the long bays using a helicopter survey which were unsatisfactory and eventually a number of bay lengths where checked in the Plantagenet Shire from the ground. The fact that Western Power had no accurate records in respect of bay lengths for a large part of its system is a matter of concern.

Western Power had no repair or maintenance records in respect of the Cranbrook line prior to 2000 and was not able to determine whether repairs had been conducted on the bay involved in the Tenterden fire or in other nearby bays. Without accurate information relating to its own repair and maintenance practices, Western Power's ability to monitor its own network is lacking.

It is important for a network operator such as Western Power to have reliable information about its own system so that adequate strategic planning can take place and maintenance issues with safety implications can be addressed before incidents such as the Tenterden fire occur. In other words, for a network operator to be proactive rather than merely reactive it must have reliable data about its own network.

I recommend that Western Power should as a matter of priority take steps to upgrade the information which it has available as to its own network system.

(c) Lack of monitoring of conductors

Western Power conducts no systematic monitoring of its conductors as such. Western Power does have in place a four yearly cycle of vegetation and pole inspections but these are unlikely to identify problems with conductors.

The present arrangements in respect of pole inspections involves use of outside contractors who are not linesmen and are not trained or equipped to identify issues relating to conductors. The contract documentation relating to pole inspections does not require that adequate conductor inspections take place at the time of pole inspections.

It was not suggested that vegetation inspections would assist in identifying conductor problems.

I recommend that Western Power ensure that throughout its network there is a process of regular conductor inspections which would identify such issues as past conductor clashing, excessively tight earth conductors, excessive sag on phase conductors and other issues relating to conductor maintenance and tensioning which might impact on possible conductor clashing.

(d) Lack of capital replacement strategy relating to power poles or conductors

Western Power had no strategic plan in place for the Cranbrook line to address the potential need to replace power poles or conductors at the end of their safe working life. In addition during the 40 year history of the line there had been no systematic review or assessment conducted of it (t.606).

While there is some dispute as to the design life of poles, particularly where pole bases have been re-enforced with angle-iron and chemical treatment has been provided, where lines have been constructed 40 years or more ago consideration needs to be given to the possibility of a need to replace multiple poles at about the same time. It may be that depending on the soil type, rainfall and other outside factors the life of poles will vary from place to place, but in particular locations where the same type of wood has been used, planning should be in place for the possible need for widespread replacement.

There should also be in place a strategic plan relating to the potential need to replace conductors which have deteriorated over time. This would particularly apply to steel earth conductors which may become significantly affected by rust which may have an effect on their sag and eventually compromise their tensile strength.

Mr Koenig was asked about the Cranbrook line in the context of its age and the following exchange took place –

> *"… In any event, it's your view that a prudent operator in Western Power's position should have been looking at replacing the entire line at an earlier stage than the stage of the Tenterden fire? - - - That would have been my position as a manager, yes."* (t.633)

While the evidence at the inquest was not sufficiently detailed to enable me to determine whether Western Power should have been looking to replace the entire line prior to the Tenterden fire as suggested by Mr Koenig, I consider that there should have been a strategic plan in place, which could have been reviewed from time to time depending on the ongoing condition of the equipment, but which addressed the issue of replacement of the various components of the line or the line as a whole. That plan should have taken account of issues such as bay lengths, changes in power usage, the condition of earth wires, the condition of pole tops etc.

I recommend that Western Power review its network and put in place strategic plans which will ensure that power poles and conductors are replaced before the end of their safe working life.

(e) Western Power's failure to update their feeder-lines

The Cranbrook feeder-line which had been constructed in 1962 had not been upgraded in accordance with more recent in-house Western Power safety initiatives.

Since the time of construction of the line Western Power has determined that for similar lines the bay length should be no more than 135 metres over flat ground and running disc angle bays should be constructed at no more than 80-90 metres. There was a very considerable difference between current Western Power standards for construction (t.746) and what was in place at the location of the fire (a bay length of 181 metres).

Western Power does not appear to have a procedure in place to review its old lines and to upgrade design and construction to take into account changes in practice, technology and knowledge generally. Mr Seddon did state that equipment is replaced if there is a performance or safety issue (t.946) but in the absence of such a clearly identified issue, it would appear that modern standards are not applied to old equipment.

While it would not be realistic to expect Western Power to upgrade its entire existing system each time there is a change in practice or technology, there should be a process in place to upgrade old equipment over time and there should also be a process which would identify and address cases where the difference between what is existing and current practice is very great.

In this case the existing bay length was double the maximum bay length for similar bays according to the current Western Power standards for construction.

If steps had been taken to upgrade the bay in question so that it complied with current bay length construction practices I am confident that the clashing would not have occurred in this case and the fire would not have been caused.

I recommend that Western Power put in place –

- **a strategy for ensuring that changes in technology and configuration practices are introduced into its old lines so that they should be reasonably compliant with current practice within a reasonable timeframe; and**
- **a strategy for identifying cases where the difference between what is existing and current practice is very great and ensuring that consideration is given to whether in those cases there is a need to upgrade the existing equipment.**

(f) The inaccurate fault records

In this case when issues were raised in respect of the Cranbrook feeder-line, Mr Seddon stated that he examined the Distributed Facilities Maintenance System (DFMS) database to determined whether there had been previous incidents of conductor clashing.

That system of recording faults was inaccurate and unreliable and did not record any of the cases of conductor clashing which had caused fires and which were examined at the inquest hearing. Mr Seddon agreed

in his evidence that they appeared to be seriously deficient (t.744).

Western Power's records in this regard rely on Fault Outage Report Forms completed by linesmen who attend to repair faults.

The Fault Outage Report Form relating to the Tenterden fire (exhibit "34") which was filled out by linesman, Carl Weinert, did not even record that fault as a case of conductor clashing. A perusal of the form provides a ready explanation as to why this may be the case, under the heading "cause" there are a number of items listed in respect of which the linesman is expected to circle an identified cause. In this case the cause circled was "Wires down/but why?". This was the third item on the list. The item relating to "Clashing conductors" is item "31" on the list. It is not surprising that a linesman going through the list would stop at item 3 which adequately describes what the linesman would have seen at the location (wires down) and not go on to attempt to identify the cause of the wires being down, in this case the clashing conductors at item 31.

A further problem in respect of the reliability of this form is the fact that Mr Weinert, who completed it, stated that he believed that under each heading he was required to circle only one item even if more than one cause applied (although under the heading "Equipment Involved in the Fault" a number of items had been identified by someone).

In my view the use of this form is not likely to produce reliable results as it is unrealistic to expect a linesman to be able to identify some of the causes listed with any confidence from a brief inspection conducted during the course of doing repair work. In addition the layout of the form would encourage identification of items such as "Wires down – but why?" rather than "Clashing conductors". The form also does not adequately address

the possibility that there may be a number of causes all contributing to a fault.

I recommend that the fault-outage report form should be redrafted to make it easier to use by linesmen and to ensure that multiple causes for faults are adequately identified. I further recommend that in many cases of fault-outage, where there is an issue of concern, that the cause of the fault should be investigated and the form completed by a suitably qualified and skilled Western Power representative and not only determined by the linesmen involved in performing the repair work.

(g) Western Power's reports and response to safety issues

After the Mt Barker fire of 28 December, 2000 Western Power did not report the fire to the Energy Safety. Although it was not legally required to do so, this failure demonstrated an unsatisfactory attitude to the regulator and its safety role.

In spite of an agreement during the meeting of 16 March, 2001 between senior representatives of Western Power and Energy Safety that as a general principle where incidents had been investigated the resulting information would be shared, Western Power did not provide Energy Safety with Mr Dew's report or advise Energy Safety as to the important specific maintenance issues referred in that report, namely the information that Mr Dew had discovered a broken earth wire which had been rejoined too tightly between poles CB469 and CB470 and the fact that Mr Dew had discovered that new stays had been installed on angle pole CB472 and it was likely that the pole had leaned over and not been pulled back to its original position. This was in spite of the fact that the

Energy Safety had provided Western Power with its draft incident report relating to the fire on 12 March, 2001 and it was clear from that incident report that these issues had not been identified by Energy Safety. Had these issues been referred to Energy Safety, that would have prompted further investigations by that office which might have resulted in a better appreciation of the poor maintenance standards of Western Power on the line in question which might have been relevant to its appreciation the potential dangers associated with long bays etc.

After the Tenterden fire Western Power did not provide Energy Safety with a written report following an investigation into the incident as required by Regulation 36 of the *Electricity (Supply Standards and System Safety) Regulations 2001*. Such a report should have been provided within 20 working days after the day when the incident occurred or within such further period as the Director of the Energy Safety might have allowed. Western Power, therefore, did not comply with its legal obligations in that regard. Again this demonstrated an unsatisfactory attitude towards the regulator and its safety role.

At the time when the inquest commenced Western Power had still not provided either the Coroner's Court or Energy Safety with a report relating to the incident. Western Power did not provide a statement from a witness representing it until Mr Seddon's first statment was provided after the inquest had actually started. In spite of the fact that counsel assisting had raised specific questions with Western Power to be answered by its representative, Mr Seddon's first statement answered few of the questions which had been raised. These failures could have compromised the Coroner's role in identifying safety issues connected with the deaths if the inquest had not been adjourned, after which it should be stated that adequate information was provided by Western Power.

The submissions on behalf of Western Power contended that one of the reasons for the delay in providing Mr Seddon's statement was the fact that on 1 December, 2004, only three working days before the inquest began, counsel assisting wrote an e-mail asking that Mr Seddon address a number of questions.

I do not accept that contention as having merit as the statement of Mr Seddon did not directly answer the questions raised by counsel assisting and in respect of some of the questions no answer was provided at all. At one stage Mr Seddon was specifically asked about questions numbered 3 and 4 and the following exchange took place –

> *"There was no attempt whatsoever to answer those questions was there? - - - In hindsight, no"* (t.838).

In any event the questions asked by counsel assisting were in most cases extremely obvious and basic questions.

Had Western Power conducted an adequate investigation I would have expected most, if not all, of those question to have been answered by the investigation and reported on.

Questions such as questions numbered 3 and 5 by counsel assisting were obvious questions to ask –

> *"3. After 28 December, 2000, for the purpose of avoiding a repetition of the fire that occurred at Mt Barker on 28 December, 2000, did Western Power give to any of its employees or contractors, any instructions to inspect any part of its overhead power lines system?*
>
> *…*
>
> *5. During the period 28 December, 2000 to 27 December, 2003, were power poles CB721 ("721") and CB722 ("722") and the overhead power lines between those poles, at any time inspected by anyone acting on instructions from Western Power?"*

A competent network operator should have investigated the cause of an incident such as the Tenterden fire and prepared a report for the Coroner's Court (as suggested in the Saylor Inquest in 1997). Such a report should have covered all of the information contained in both of Mr Seddon's statements.

Western Power's response to investigation of the two incidents could only be described as inadequate.

In respect of the Mt Barker incident it failed to notify Energy Safety of the incident to enable that organisation to conduct a timely investigation and although investigations were conducted by Mr Dew and later by Mr McKinnon it appears clear that they were not conducted with any sense of urgency or real appreciation of the gravity of what had occurred. Mr Dew did not even know how much damage had been caused by the fire and was not aware that Mt Barker had been threatened by it, did not know on what date he commenced his investigation and did not check important matters such as the serviceability of ties which would have impacted on the sagging issues to which he referred.

At the time of the Tenterden fire Western Power did not conduct an investigation which would result in a report in a timely fashion and it breached the relevant regulations by not providing a report to Energy Safety.

This approach to the investigation of serious incidents is more than a matter of procedure, it has serious safety implications. It is particularly important that if there is a serious incident, it should be appropriately investigated by the network operator. Such an investigation should commence as quickly as possible after the incident at a time when, as far as possible, the scene and equipment involved are relatively unchanged and at a time when memories are relatively clear.

It is important that Western Power provide Energy Safety with a written report in respect of such incidents as the sharing of information between the two organisations should ensure that significant facts are known and issues are clearly identified and addressed.

Reports provided to Energy Safety should be scrutnised by that organisation and if they do not contain sufficient information, they should be rejected as not being acceptable.

I recommend that Western Power, as a matter of priority, should put in place systems which will enable it to adequately investigate and report on notifiable incidents in a timely fashion. Western Power should ensure that serious incidents are investigated shortly after they occur and that all information obtained in respect of those incidents is adequately recorded in the written report forwarded to Energy Safety within the 20 day specified period.

In the case of incidents which result in very substantial damage and/or risk to life and property the report should be prepared by a qualified senior officer with considerable relevant experience or by a consultant of considerable standing in the industry.

In 1996 after holding inquest into the death of a 10 year old boy who died from electrocution, I made the following rider –

"That in any case of death or serious injury caused by Western Power equipment an immediate investigation be conducted by Western Power and a report prepared with a

view to ascertaining whether immediate action should be taken to prevent the repetition of the event. The present focus, which appears to be wholly centered on litigation, is not satisfactory where human life may be at risk. It is also not sufficient to rely on the Energy Safety to raise all safety issues by way of orders pursuant to section 30 of the *Electricity Act 1945* or otherwise".

Unfortunately that recommendation was not adopted by Western Power which did not prepare such a report in this case where –

- The reports which were obtained by Western Power were not prepared with a view to ascertaining whether immediate action should be taken to prevent repetition of the event, they were not prepared for safety reasons (t.384);

- The reports were prepared substantially for the purposes of litigation and legal professional privilege was initially claimed in respect of all of them (t.382); *and*

- The focus appears to have been centred on possible litigation and not on the potential risk to human life.

I recommend that Western Power adopt the recommendations which I made in 1996 in this regard.

I note that Western Power has accepted that it did not prepare and submit to the Coroner's Court a report of the type referred to in the Saylor inquest and the Managing Director has now expressed regret as to that failure and has agreed to ensure that such a report will be submitted

in future cases (further written submissions on behalf of Western Power; paras 1.3-1.5).

General concerns as to the performance of Western Power

A number of aspects of the evidence in this case have raised questions of real concern in respect of Western Power's performance in respect of the Cranbrook line and generally. While the scope of the inquest has been limited to the circumstances surrounding the deaths taken within a context, some of the evidence has raised issues with implications for the network as a whole.

Evidence bearing on Western Power's performance includes the following –

- There were previously fires on the same line in 1983, 1991, 2000 and 2002 all apparently caused by conductor clashing yet nothing had been done to prevent a further case of conductor clashing nearby at CB721 and CB722 by 2003 when the Tenterden incident occurred.

- After the 2000 Mt Barker fire the issue of long bays and different conductor types had been identified by Energy Safety as a potential cause of the fire and a problem for the network generally, yet Western Power had not even identified a similar problem a few kilometres away near a major highway on the same line by 2003 when the Tenterden fire started.

- After the Mt Barker fire Western Power was unable to determine how common the problem relating to long bays was on its own network. It did not have access to a reliable map of its own network.

- Western Power's records relating to conductor faults was inaccurate. The records failed to record every known case of conductor clashing identified at the inquest, the failure in that regard should have been manifest.

- The Mt Barker fire was inadequately investigated by Western Power.

- The response following the Mt Barker fire was disgracefully inadequate as no action was taken to determine how identified defective repair work had occurred.

- Evidence at the inquest revealed that linesmen working in the Great Southern area have incorrectly tensioned conductors on every occasion when a repair has been effected which required a re-tensioning to occur. This appears to have been the case for many years but was not known to the management of Western Power.

- While checking conductors in the Plantagenet Shire after the Mt Barker fire, problems were identified by Western Power relating to the tensioning of conductors, yet the survey was not extended to the adjacent Cranbrook Shire, even along the same line, for no good reason.

- When the Tenterden fire occurred Western Power breached regulation 36 of the *Electricity (Supply Standards and Systems Safety) Regulations 2001* in that it did not prepare a written report and provide it to the Director of Energy Safety within 20 working days or up until the time of the inquest.

- Western Power's response to the Tenterden fire was unsatisfactory. Western Power should have obtained a comprehensive report as to how the fire started which should have –

(i) Involved an investigation commenced immediately after the fire culminating in a comprehensive report;
(ii) Reviewed the past history of the line;
(iii) Made some real effort to determine whether problems existed elsewhere on the line; *and*
(iv) Made appropriate safety recommendations aimed at preventing future similar events from occurring.

In general terms the following appears to be the evidence –

- Western Power repairs in the region involving conductor tensioning were performed incompetently for many years;

- Communication between head office and linesmen working on the ground was unsatisfactory;

- Western Power's records were serious deficient;

- The Cranbrook line was old, it did not conform with present standards and its quality had not been upgraded to account for increased power demand;

- Western Power's response to two serious fires in the region was inadequate;

- Western Power had no strategic replacement plan in place to replace ageing poles and conductors on the Cranbrook line;

- Western Power's response to Energy Safety did not comply with relevant legislation; *and*

- The fire was not investigated by Western Power with a view to preventing further tragedies.

In reviewing the above conclusions, an obvious question is how this state of affairs was allowed to continue until 27 December, 2003. It is obvious from the evidence that many of the maintenance problems are of long standing and have become increasingly worse as the Cranbrook line, and similar other parts of the network, get older.

I note that the written submissions on behalf of Western Power contain an assertion that it has commenced a 4 year $1.8 billion investment program on its South West Interconnected System and has recently increased its commitment to maintenance of the distribution network. It is

to be hoped that lessons will be learnt from this tragic case and that safety considerations will receive greater priority in future.

The Role of Energy Safety

At the time of the Mt Barker fire on 28 December, 2000, the relevant powers of Energy Safety were very limited.

There were general investigative powers of inspectors contained in section 14 of the *Energy Co-Ordination Act 1994* which could be used to investigate electrical incidents, but the power for Energy Safety to require remedial action was limited essentially to section 18 of the *Energy Co-Ordination Act 1994* which permitted an inspector to make an order prohibiting the use of a thing considered to be unsafe or not in conformity with an act and to disconnect the supply of energy to that thing. This provision, therefore, only allowed orders to be issued to Western Power in respect of specific parts of the network identified as being unsafe.

If an order had been issued in respect of the Mt Barker fire it could only have related to the span between CB470 and CB471 where the conductor clashing took place on the basis of the investigation conducted by Energy Safety. In the event it was not necessary to issue an order as an additional power pole had been put in place and there had been remedial action carried out on the span in question.

The ability of Energy Safety to regulate the activities of Western Power has been extended by the *Electricity (Supply Standards and Systems Safety) Regulations 2001* which came into force in January 2002. These regulations set out in legislative form the minimum standards of safety for electricity networks, but do not enable the issuing of network wide orders which might require action to be taken such as the conducting of surveys and the taking of subsequent remedial action by network operators.

A Bill has drafted which was passed in the Legislative Assembly but not yet the Legislative Council, which contains expanded powers to make orders relevant to network operators, the *Gas and Electricity Safety Legislation Amendment Bill 2003*. That Bill, if enacted, would appear to enable the making of more general orders.

In January 2004 following the Tenterden fire the Minister for Energy required Western Power to abide by any requirements imposed by Energy Safety to avoid a recurrence. Liaison then followed as a result of which an order was issued in March 2004 requiring network wide action by Western Power in the form of a remedial action plan. Pursuant to this action plan long bays in excess of 135 metres were identified in a large number of locations and a considerable amount of work has been done on the Cranbrook line to address that problem on that line.

It would appear that until recently Energy Safety has not had the power to make appropriate orders to ensure safety on the network following identification of a problem considered to have ramifications extending beyond its immediate location. This is particularly significant because Energy Safety does not have sufficient resources to undertake surveys in order to determine whether an identified problem exists elsewhere on the network.

Mr Koenig stated in his evidence that Energy Safety is a small office comprised of under 50 persons. During his evidence Mr Ayre was asked how many of those staff actually worked in relation to electricity supply issues to which he replied that there were *"…4 of us"* (t.819).

I recommend that urgent action should be taken to enact relevant legislation which would empower Energy Safety to make orders directed to network operators which would require, in appropriate cases, the conducting of surveys or investigations and the taking of

remedial action whenever such action is necessary for safety reasons.

It is clear from the evidence of Mr Koenig and others that Energy Safety is not presently resourced at a sufficient level to enable it to review the safety standards of network operators such as Western Power. Mr Koenig, in his evidence, was asked what Energy Safety was able to do in relation to identifying a number of safety issues relating to the network identified at the inquest and his response was –

> *"I think it would be fair to say that it would be beyond our capacity to undertake very broad scale surveys" (t.269)*

I recommend that consideration be given to resourcing the regulator so that systemic network problems can be adequately identified and addressed by the making of appropriate orders.

Radio Communications

The evidence established that there were deficiencies in radio communication as a result of the failure of Cranbrook Shire's VHF repeaters, the lack of an efficient contingency plan and the incompatibility of the Police Service's communications equipment with that of other agencies. This resulted in a lack of overall coordination of resources and had the potential to expose fire fighters and others to hazards.

As mains power is likely to be disrupted in most major bush fire situations, the reliability of back up batteries for repeaters is crucial. A similar back up battery failure occurred in the Gingin bushfire.

I note that the Cranbrook Shire is taking action in this regard in consultation with FESA.

I recommend that in consultation with FESA, all local governments in areas prone to bushfires regularly upgrade and maintain their radio communication infrastructures, including back up batteries, to ensure their reliability and their ability to perform for a significant period of time in the absence of mains power.

The evidence indicated that there were at least three other VHF channels which could have been utilised by the Cranbrook Bushfire Brigade Officers when the Cranbrook repeaters failed (see the evidence of Mr Broomhall). The Shire, however, did not have a contingency communication plan and proceeded in the expectation that if one repeater failed, the other could be utilised.

Evidence at the inquest indicated that the Cranbrook Shire now has the ability to put such a plan in place (see the evidence of Mr Stanley).

I recommend that all local governments ensure that they develop adequate communication plans which include contingency plans in the event of repeater failure.

The Western Australian Police Service maintains its own UHF radio communications network and while that network itself functioned during the Tenterden fire, the network was incompatible with the VHF systems employed by FESA, CALM and local governments. Prior to the fire Cranbrook police were not equipped with a separate VHF radio to enable them to communicate with the other agencies.

Following the fire the Cranbrook Shire has, to its credit, made available a handheld VHF radio to the Cranbrook police for use in emergency incidents. The provision of that radio

has been an immediate and practical solution to the problem highlighted by the fire.

It is clearly important that in the long term police throughout the state are able to communicate with FESA, CALM and local governments in cases of emergencies.

I recommend that steps be taken by all of the relevant authorities to ensure that a compatible system of radio communication can be established.

The Command Structure and issues relating to change of control

The importance of the role of volunteers in responding the Tenterden fire and other fires throughout the state cannot be overstated.

I should also say that I was most impressed with the commitment of Mr Denny and others who worked with him on the day in question. Mr Denny has volunteered a great amount of time over many years to fire safety issues. Mr Denny has a dedicated office at his home where he has two telephones, a facsimile machine, a computer, VHF and UHF radios, extensive maps and access to a light aircraft. Many of these items have been paid for by Mr Denny out of his own pocket.

Mr Denny's approach to fighting the fire and his recognition that the head fire could not be fought directly, would have appear to have been undoubtedly correct. Mr Denny's actions in attempting to replace the battery when the eastern repeater failed and then flying over the fire fighters attempting to communicate with them more directly after the western repeater failed showed considerable practical commonsense.

It should be noted, however, that as a fire scene becomes more difficult to control and more and more resources are required, it becomes increasingly difficult for a volunteer fire officer, even a person as dedicated as Mr Denny, to control all of the activities adequately.

In July, 2004 in my findings relating to the inquest into the death of Craig Dee Sandy in a bushfire at Gingin, I noted that the AIIMS-ICS is generally accepted as being the appropriate management system for controlling bushfires (this observation was supported at the inquest by evidence of witnesses, namely John Tonkin, Greg Broomhall and Norman Bell). In order to ensure that AIIMS-ICS is implemented in a major incident, it must be implemented at the outset of relatively minor incidents which have the potential to become major incidents. It is clear from the evidence of Mr Denny that he now appreciates the significance and potential usefulness of such a system. While Mr Denny did not use the system itself during the emergency on this occasion, his approach was in many ways in accord with that system.

AIIMS-ICS is a component of the current State Wildfire Emergency Management Plan which is a comprehensive but concise plan issued by FESA and CALM on behalf of the State Emergency Management Committee.

I recommend that local governments adopt and implement the State Wildfire Emergency Management Plan, especially those aspects of it referring to AIIMS-ICS, as the management plan for bushfire control and that they liaise with FESA to obtain the relevant training.

While the Shire of Cranbrook would appear to be supportive of such an approach, it would appear that other local governments have differing views in respect of the plan.

I recommend that consideration be given to the enacting of supporting legislation to

ensure statewide implementation of the State Wildfire Emergency Management Plan.

While I recognise the importance of using local knowledge during the fighting of a bushfire, I accept that managing large fires is complex and demanding and can be under-estimated by those involved. The management of a fire requiring extensive resources should be in the hands of a trained professional when one is available.

In order to ensure a seamless transfer of control from local personnel to more experienced personnel, particularly FESA personnel with relevant experience, I recommend that the *Bushfires Act 1954* be reviewed with a view to amending section 13(4) to provide FESA with the power to take control of a bushfire in appropriate circumstances.

Notification of CALM and FESA

CALM only learned of the existence of the Tenterden fire 1½ hours after it had started and then only from monitoring radio traffic on the Plantagenet bushfire radio network (Mr Broomhall's evidence). The Stirling Range National Park, where the fire eventually stopped, is a CALM estate for which CALM has responsibility in the event of a bushfire. From the time when the fire was out of control, there was at least a possibility that it would move towards that National Park.

It is clear that in these circumstances CALM should have been notified of the fire much earlier.

It would also appear that FESA was not notified of the existence of the fire at an early stage. As FESA has the ability to support the response to a fire if necessary, in my view it is

important that FESA should have been notified of its existence at a very early stage.

It appears that there was no formal process of notification existing at the time and shortly after the fire took hold, Mr Denny and others involved were extremely busy organising fire fighting activities and were not well placed to give consideration to such issues.

While it is not necessary that in the case of every bushfire FESA and CALM should be notified, it is important that there should be triggers identified which would result in notification. I recommend that local governments work together with CALM and FESA to develop and implement a process whereby CALM and FESA would be notified of potentially major bushfires as quickly as possible.

STATE CORONER
11 March 2005