

Challicum Hills Wind Farm

Bushfire Mitigation Plan

Pacific Hydro

Table of Contents

1. Overview	3
2. Contact Information	3
3. Description of Assets	4
4. Preventative Strategies.....	5
5. Works Program.....	6
6. Operations at High Risk Times.....	6
7. Investigations	7
8. Public Awareness of the Plan	7
9. Performance Measures.....	7
10. Prescribed Times of Inspection	8
11. Prescribed Form of Notice of Inspection	8
12. Pacific Hydro’s Policy on Assistance Provided to Fire Control Authorities	8
13. Management of this Plan	8
14. Appendices	9

1. Overview

The Challicum Hills Wind Farm Bushfire Mitigation Plan has been developed with the objective to identify possible electrical causes of fire and to reduce the likelihood and consequences of these through the implementation of various preventative measures.

This Plan has been produced to fulfil the requirements of the Electricity Safety (Bushfire Mitigation) Regulations 2003 (Version 003) whereby a new plan must be prepared and submitted to Energy Safe Victoria before the 1st July of each year.

The land on which Challicum Hills Wind Farm is established consists of grassed pastures and is used predominantly for low density sheep and cattle grazing. There are trees within the boundaries of the wind farm however there are none in close proximity of the turbines or substations and all overhead lines are kept clear according to Electricity Safety (Electric Line Clearance) Regulations 2010 .

Pacific Hydro recognises that there are multiple 'at-risk' electrical assets, not solely electric lines, located at the Challicum Hills Wind Farm where fire could originate from, including;

- The wind turbine nacelle,
- The Integrated Grid Connection Transformer and Switchgear inside each wind turbine,
- The Challicum Hills Wind Farm (CHWF) Main Substation,
- The Buangor (BGR) Switchyard, and
- The 5km of dual circuit 66kV overhead line between the CHWF Substation and BGR Switchyard.

Further description of these assets and their management can be found in Section 3 & 4.

2. Contact Information

(a) The name, address, and telephone number of the specified operator:

Pacific Hydro Pty Ltd
Level 11, 474 Flinders Street
Melbourne, Victoria, 3000

Phone: (03) 8621 6000

(b) The person responsible for the preparation of this plan is:

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Page 3 of 10	SharePoint Version: 9.0	Authorised by: Darren Sexton	Last reviewed: 08/08/2011 To be reviewed by: 30/06/2012
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(c) The person responsible for carrying out the plan is:

Mr. Shaun Blackie
Wind Farm Supervisor
Pacific Hydro Pty Ltd
Level 11, 474 Flinders Street
Melbourne, Victoria, 3000

Phone: (03) 8621 6000

Mobile: 0400 673 999

(d) In case of an emergency contact should be made with:

Mr. Shaun Blackie
Wind Farm Supervisor
Pacific Hydro Pty Ltd
Level 11, 474 Flinders Street
Melbourne, Victoria, 3000

Phone: (03) 8621 6000

Mobile: 0400 673 999

Powercor Control Room 1800 061 204

3. Description of Assets

3.1. Wind Tower (including Nacelle, Integrated Grid Connection Transformer and Switchgear)

The wind towers are approximately 70 metres high and comprise of a fully enclosed thick walled steel cylinder. The towers are tapered and approximately 5 metres in diameter at the base.

The nacelle on top of the tower contains the electrical generator and includes lubricating and hydraulic oils. The step up transformer is fully enclosed within a steel enclosure, which is located on a concrete foundation at the base of the tower. The high voltage switchgear is also located on a concrete foundation inside the base of the tower adjacent to the step up transformer, which is fused and fully enclosed with an SF6 insulant.

The likelihood of ignition of fire from the transformer is minimal and mostly limited to overheating or electrical breakdown within the unit. In the unlikely event that a fire was initiated within the tower, the fire should be contained within the tower itself.

3.2. Chalicum Hills Wind Farm (CHWF) Main Substation.

The main substation is contained within a fenced enclosure and is fully covered with crushed rock. There are two (2) main step up 22/66kV, 20/31.5 MVA transformers both filled with large quantity of oil. The transformers are all contained within the substation compound and have been separated to industry standard to prevent fire spreading between the two transformers and the building. Also within the compound there is another relatively small transformer (for station auxiliaries), which has been installed to industry standard to prevent any fire spreading.

Page 4 of 10	SharePoint Version: 9.0	Authorised by: Darren Sexton	Last reviewed: 08/08/2011 To be reviewed by: 30/06/2012
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All transformers have been mounted on concrete footings and surrounded with wall bunding to stop spreading of oil or fire. Ignition of fire from these transformers is possible but it is unlikely to spread, and is likely to be limited to overheating or electrical breakdown within the units. The area in the vicinity of the transformers is covered in crushed rock, minimizing the possibility of igniting any flammable material.

The overhead lines within the main substation are the 66 kV conductors from the main transformers. The conductors' length within the substation is in the order of 20 metres and have been spaced so that the conductors cannot clash. The area under and in the vicinity of the 66 kV conductors is covered in crushed rock, minimizing the possibility of igniting any flammable material. The high voltage switchgear used is fully enclosed with a SF6 insulant. The other components inside the substation buildings such as batteries, battery chargers and capacitors are fully enclosed and the likelihood of fire is minimal.

3.3. Buangor (BGR) Switchyard

The BGR switching station is contained within a fenced enclosure and is fully covered with crushed rock. The overhead lines within the BGR switching station are 66 kV bus conductors interconnecting the Powercor subtransmission line to the dual circuit 66kV line from the CHWF Main substation. The area under and in the vicinity of the 66 kV conductors at the BGR switching station is covered in crushed rock, minimizing the possibility of igniting any flammable material.

The conductor length is in the order of 50 metres and has been spaced so that the conductors cannot clash. The high voltage switchgear used is fully enclosed with a SF6 insulant.

3.4. Overhead Line

The 66kV overhead line connecting the CHWF Main Substation to the BGR Switchyard is strictly managed by the Electric Line Clearance Plan.

4. Preventative Strategies

In accordance with Regulation 5, Section (h) and in line with Pacific Hydro's plan objectives the strategies to be adopted for the prevention of fire ignition from overhead lines, substations and wind turbines are detailed in this section.

3.5. Wind Tower (including Nacelle, Integrated Grid Connection Transformer and Switchgear)

The kiosk transformers at the base of the turbine are routinely maintained at yearly intervals. Weed spaying is performed on a needed basis.

3.6. Substations/Switchyards

Quarterly housekeeping inspections are performed by Pacific Hydro personnel of substations and transformers to ensure they are clear of vegetation. In addition prior to the Declaration of the Fire Danger Period (DFDP) action shall be undertaken to ensure that:

- There is no vegetation growing within the Wind Farm Substation and Switchyard (eg, weed spraying),
- The Substation guttering is checked and cleared of all debris, and
- The area around the CHWF Substation and 66kV BGR Switchyard shall be slashed if required to minimize the amount of flammable material within 5 metres of the Substations.

As soon as practicable after the declaration of the fire danger period an audit shall be undertaken to ensure the substations are clear of any vegetation and that the surrounds of all substations remain clear of any significant vegetation for a distance of 5 metres from the structures.

The substation equipment has additional routine maintenance performed in accordance with the sites Maintenance Plan which has activities such as inspection, thermal imaging, service and refurbishment that vary from monthly to 25 yearly intervals.

Page 5 of 10	SharePoint Version: 9.0	Authorised by: Darren Sexton	Last reviewed: 08/08/2011 To be reviewed by: 30/06/2012
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3.7. Overhead Line

The Challicum Hills Wind farm Electric Line Clearance Plan details the asset inspection and vegetation clearance program for the overhead line. In summary, Powercor Australia ('Major Electricity Company') is contracted to perform the annual pre-summer line vegetation inspection and clearance that is conducted prior to 1 December or the DFDP.

In addition the routine works program for the overhead lines also consists of;

- An annual patrol of the Overhead lines for defects and potential failures prior to the DFDP;
- 2.5 Year limited inspection for specifically identified assets (not required prior to the first 5 Year full inspection); and
- 36 month full inspection in accordance with Regulation 5, Section (j) and Regulation 8 'Prescribed standards of inspection'.

The auto reclose is currently suppressed on the power line and the line is inspected prior to re-energising after faults.

In accordance with Regulation 5, Section (k) the Agreement between Pacific Hydro and Powercor Australia requires that personnel completing the asset inspection and vegetation line clearance inspection and clearance works hold current qualifications approved by Energy Safe Victoria. In accordance with Pacific Hydro's Wind Farm Health, Safety and Environment Plan, Pacific Hydro requests these training records and receives them from Powercor prior to the inspections taking place. The Pacific Hydro Wind Farm Supervisor is on site at the commencement of the inspections to ensure that the qualified personnel perform the works.

The asset inspection and vegetation line clearance reports identify and prioritise any rectification work required on the assets or vegetation around the electrical lines. The rectification work is programmed according to the priorities given with high priorities completed before the DBFP.

Thermal imaging of the power line is performed as required.

4. Works Program

In accordance with Regulation 5, Section (i) the routine preventative strategies previously mentioned for the Wind Tower, Substations/Switchyards and overhead line are recorded as individual works in the Maintenance Plan and tracked through the use of Pacific Hydro's computerised maintenance management system WTM Service.

5. Operations at High Risk Times

5.1 In the event of fire

In the event of fire which prevents the safe operation of the HV overhead line, the line will be de-energised to minimise further ignition sources.

Where the fire is in the area but presents no risk to the safe operation of the overhead line, the overhead line will continue to operate with the auto reclose suppressed.

5.2 During a Total Fire Ban

During a time of total fire ban Chalicum Hills Wind Farm and the associated overhead line will operate in accordance with normal operating practices (auto reclose suppressed).

Page 6 of 10	SharePoint Version: 9.0	Authorised by: Darren Sexton	Last reviewed: 08/08/2011 To be reviewed by: 30/06/2012
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5.3 During the Fire Danger Period

The Challicum Hills Wind Farm will be operated in accordance with normal operating practices (auto reclose suppressed) during the Fire Danger Period.

Early in December or before the DBFP the bushfire mitigation actions will be audited by the Pacific Hydro Wind Farm Supervisor, referred to in Section 2 (c) of this document, to ensure that they have been carried out in accordance with this plan.

6. Investigations

Electrical faults are recorded on Pacific Hydro's Field Incident Report. For faults or incidents requiring investigation, Pacific Hydro's Defect Reporting and Root Cause Analysis processes are utilised. These processes ensure that incidents are properly investigated and actions taken to reduce their likelihood of re-occurring.

7. Public Awareness of the Plan

Pacific Hydro's overhead line Operations & Maintenance contractor, Powercor Australia, is responsible for processes and procedures for enhancing public awareness including the responsibilities of the owners of private overhead electric lines in relation to mitigation of bushfire danger.

The approved Bushfire Mitigation Plan is available at Pacific Hydro's Website for the general public. They can also get a copy of Bushfire Mitigation Plan at the responsible persons office.

8. Performance Measures

The works shall be reviewed annually as initiated by the computerised maintenance management system WTG Service. Performance is monitored by the closure of maintenance work orders related to bushfire mitigation by the 1st December or before the DBFP each year, whichever is earlier.

The Pacific Hydro Bushfire Index is calculated as follows:

$$\text{Bushfire Index} = \text{Number of outstanding works} \div \text{Total works required}$$

Works include all routine asset maintenance and vegetation clearance scheduled and remedial works.

The bushfire index for all Pacific Hydro sites is sent to Energy Safe Victoria before the 1 December each year.

The current 'outstanding works' for Challicum Hills is as follows:

- There are no outstanding/overdue works for this site.

The 'works required' include:

- Line Vegetation assessment and recommendations carried out.

Therefore:

$$\text{Bushfire Index} = 0 \div 1 = 0$$

Page 7 of 10	SharePoint Version: 9.0	Authorised by: Darren Sexton	Last reviewed: 08/08/2011 To be reviewed by: 30/06/2012
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9. Prescribed Times of Inspection

In accordance with Regulation 7 of the Act:

- All serviceable poles shall be inspected within 1 month of the prescribed time of 36 months.
- All limited life poles shall be inspected within 1 month of their 2.5 year cyclic inspection date.

10. Prescribed Form of Notice of Inspection

For the purposes of section 83B(2) of the Act, the prescribed period within which notice to the occupier of the land is to be given before inspection of a private electric line is carried out will be between 21 and 45 days notice before the inspection.

11. Pacific Hydro's Policy on Assistance Provided to Fire Control Authorities

Pacific Hydro will allow access to and assist fire control authorities in the investigation of fires at or near our electrical assets.

12. Management of this Plan

In accordance with Regulation 5, Section (n) there are a number of processes and procedures used by Pacific Hydro to manage this plan including:

- Monitoring the implementation of the plan is performed by the computerised maintenance management system WTG Service which records the requirement for inspection and vegetation clearing listed in this plan.
- Auditing of this plan is performed at a maximum of 2 yearly intervals as part of Pacific Hydro's Health, Safety and Environment audit program.
- Identification of any deficiencies in the plan or the plan's implementation relies on the person's carrying out this plan to provide feedback to Pacific Hydro management.
- Monitoring and auditing the effectiveness of inspections carried out under the plan is performed by the "Maintenance Quality Assurance" procedure. Asset performance and condition audits are performed every 3 years by Pacific Hydro's corporate operations team as part of the company's asset management framework.
- Improvement to the plan and the plan's implementation if any deficiencies are identified is performed via the "Change Management" procedure and annual reviews of this plan.
- Training necessary for persons assigned to perform functions under the plan is provided under the Operations & Maintenance Agreement between Pacific Hydro and Powercor Australia.
- Monitor and audit the competence of the persons assigned to carry out inspections under the plan is performed by the "Maintenance Quality Assurance" procedure and requirements under the contracted services.
- Outcomes from Defect Reporting/Root Cause Analysis investigations are reviewed as part of the annual review of this plan and any learning's are fed into this plan.

Page 8 of 10	SharePoint Version: 9.0	Authorised by: Darren Sexton	Last reviewed: 08/08/2011 To be reviewed by: 30/06/2012
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13. Appendices

Appendix A: Challicum Hills Wind Farm Site Layout showing the location of Turbines, CHWF Substation, the Underground and Overhead electric lines and BGR Substation – Site Layout. In accordance with Regulation 5, Section (g).

Page 9 of 10	SharePoint Version: 9.0	Authorised by: Darren Sexton	Last reviewed: 08/08/2011 To be reviewed by: 30/06/2012
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