TOUR 1

Australian Forest Growers National Conference
Launceston, Tasmania
23 – 26 October 2016

Industry plantations and native forest

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Acknowledgements

Australian Forest Growers would like to thank the following for their contribution to this tour.

**Landowners:**
- RMS – managed by IFARM
- Forestry Tasmania
- New Forests – managed by Forico

**Harvesting Contractors:**
- Pentarch Forestry Services

**Tour Coordinator:**
- Robin Dickson - IFARM

**Tour Presenters:**
- Robin Dickson - IFARM
- James Williams - IFARM
- Nigel Gibson - Pentarch Forestry
- Jim Wilson - Forico
- Errol Lohrey - Forestry Tasmania
<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>8:15 am</td>
<td>Depart</td>
<td>Hotel Grand Chancellor Cimitere Street, Launceston</td>
</tr>
<tr>
<td>9:00 am</td>
<td>STOP 1&lt;br&gt;NE077 – RMS property managed by IFARM&lt;br&gt;Eucalypt plantation harvesting</td>
<td></td>
</tr>
<tr>
<td>9:45 am</td>
<td>Morning Tea&lt;br&gt;On site at NE077</td>
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<tr>
<td>10:00 am</td>
<td>E. nitens 2r nitens plantation established 2016</td>
<td></td>
</tr>
<tr>
<td>10:30 am</td>
<td>E. nitens Seed Orchard</td>
<td></td>
</tr>
<tr>
<td>11:00 am</td>
<td>Depart NE077</td>
<td></td>
</tr>
<tr>
<td>11:30 am</td>
<td>Presentation from Sponsors</td>
<td>Myrtle Park</td>
</tr>
<tr>
<td>12:00 pm</td>
<td>Lunch</td>
<td>Myrtle Park</td>
</tr>
<tr>
<td>12:30 pm</td>
<td>Depart Myrtle Park</td>
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</tr>
<tr>
<td>1:00 pm</td>
<td>STOP 2&lt;br&gt;CD113L – Forestry Tasmania Native forest potential sawlog retention</td>
<td></td>
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<tr>
<td>2:15 pm</td>
<td>STOP 3&lt;br&gt;BS101A – Forestry Tasmania E. nitens pruned and thinned coupe</td>
<td></td>
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<tr>
<td>3:15 pm</td>
<td>STOP 4&lt;br&gt;BL108&lt;br&gt;Plantation establishment</td>
<td>Camelford</td>
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<tr>
<td>4:15 pm</td>
<td>Depart</td>
<td></td>
</tr>
<tr>
<td>5:00 pm</td>
<td>Arrive Launceston</td>
<td>Hotel Grand Chancellor Cimitere Street, Launceston</td>
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</table>
Tour Overview

Tour Leader: Mr Robin Dickson
IFarm
Phone: 0407 331 662
Email: robind@ifarm.com.au

Venture into some the best tree growing country in Northeast Tasmania to learn from industrial forest managers about best practices for growing, managing and harvesting trees including:

- Recently established *E. nitens* plantations.
- Hardwood plantation harvesting.
- Native forest regrowth thinning.
- Pruned and Thinned *E. nitens* plantations.
- Recently established radiata plantations.

Experience and Innovation in Agriculture

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STOP 1 – NE077

RMS Property Managed by IFARM

Eucalypt plantation harvesting

<table>
<thead>
<tr>
<th>Harvest Date:</th>
<th>Harvested 2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Area Harvested:</td>
<td>161 ha</td>
</tr>
<tr>
<td>Harvest Type:</td>
<td>Short Wood</td>
</tr>
<tr>
<td>Volume removed:</td>
<td>31,000 tonnes</td>
</tr>
<tr>
<td>Pulpwood:</td>
<td>52%</td>
</tr>
<tr>
<td>Solid Wood:</td>
<td>48%</td>
</tr>
</tbody>
</table>

NE077B

| Plan to harvest:    | 220 ha         |
| Harvest type:       | Short Wood     |
NE077 Plantation Establishment

Property Size: 449.53 ha
Previous Land Use: ex pasture
1R plantation established: 2000
1R plantation harvested: 2015/2016
2R *E. nitens* established 2016: 161 ha
2R *E. nitens* planned established 2017: 220 ha
Net plantable: 381 ha

**Summary of Operations carried out for 2R establishment to date**

1. Develop a Forest Practices Plan in conjunction with harvesting.
2. Mark out property in the field (streams reserves, exclusion zones etc)
3. Clearing of harvesting debris into small windrows, limited cultivation on compacted areas and landing sites.
4. Burning of selected windrows in areas that have been assessed as high risk if left unburnt.
5. Aerial application of residual herbicides; 100 lt water /ha, Glyphosate 2lt/ ha, Metsulfuron Methyl 20 grams/ha, Sulfometuron Methyl 60 grams/ ha, LI700 250 mls/ ha, Ammonium Sulphate 2 lt /ha.
6. Browsing management using shooting commenced 4 weeks prior to planting, browsing plots established at planting and monitored will determine the post plant shooting intensity. In high risk area seedlings have had sleeves placed on them to protect them from browsing in the first few months.
7. Planting *E. nitens* density 1300 sph on 1R mounds, seedling container stock.
8. Primary fertilising at planting with 20 grams Controlled slow release Fertiliser Multicote 8.
Seed Orchard NE077

- This seed orchard was established in 2001.

- The orchard was planted with 350 seedlings at a spacing of 7m x 3.4 m.

- The planting stock was clonal grafted *E. Nitens*.

- The clones were derived from genetic material established by Fletcher Challenge (Norske Skog), Dr Wayne Tibbits, Boral, APP (HVP) and Derford orchard at Bream Creek.

- It is a high altitude cold site and has the potential to produce good numbers of high quality genetically improved seed.

- It is prone to insect attack and needs to be monitored regularly over the insect attack period.

- Small amount of seed collected in 2006.

**The following maintenance work is in the process of being carried out:**

- Apply Fertiliser DAP/ Nitrogen.

- Apply paclobutrazol to promote flowering.

- Apply Shield to protect trees from insect attack.

- Plan to collect commercial quantities of seed in 2017.
• This coupe is designated as Permanent Timber Production Zone land (PTPZ) located at 700m asl and is approximately 100 ha in area.

• Forest type is wet *E. delegatensis*.

• Original PI typing indicated E2C/TW and E+3C/TW. This indicates a good stand height and density with an understorey of Silver Wattle.

• Selectively harvested in 1946 for sawlogs.

• Selectively harvested in 1964 for sawlogs.

• Selectively harvested in 1975 for sawlogs.

• The coupe was broadcast burnt and sown in 1976.

• In 2005 this Coupe was identified as being suitable for partial harvesting.

• Pre harvest assessment conducted in 2006 with the aim of establishing suitability for harvest.

• Assessment results indicated the following parameters:

  1. **Total standing Volume = 299m³/ha (Eucalypt).**
  2. **Total standing volume = 95m³/ha (Wattle).**
  3. **Total average dbh = 36.0 cm.**
  4. **Total average height = 25.4 m.**
  5. **Total average stems/ha = 275 (Eucalypt).**
  6. **Total average stems/ha = 205 (Wattle).**
  7. **Total average piece size = 1.0m³ (Eucalypt).**
  8. **Total average piece size = 0.3m³ (Wattle).**


• The management objective was to thin the stand to a pre-determined stocking.
The following prescriptions are from the Forest Practices Plan (FPP).

4. Felling prescriptions for CD113L

*The prescription is for Potential Sawlog Retention (PSR) | Silver Wattle removal and Shelterwood Retention*

- Retain eucalypt potential sawlogs to a basal area retention of 12 m² - 13 m² between retained trees (a spacing of approximately 8 metres +/- 1 metre tolerance). Preference should be to retain potential sawlog trees 20 – 60cm whilst removing wattles, poorly formed trees and mature trees > 60 cm diameter.

- Damaged 20 – 60cm diameter stems should be removed before spacing retained sawlogs to a basal area of 12m² - 13 m².

- Retained trees should be evenly spaced across the coupe.

- Retain all advance growth <20cm diameter. Leave advance growth undisturbed where possible by directionally felling away from clumps to minimise damage.

- Remove all wattle stems and eucalypt stems >60 cm diameter.

**Quality Requirements of PSR operations**

- A representative of Forestry Tasmania will carry out, on a regular basis, quality assessments for the period of this operation.

- Damage should not exceed 10% of retained stems. Wound (damage) size should be less than 3.5cm² (ie. egg size).

- Where damage levels exceed the tolerance level, as mentioned above, an officer of Forestry Tasmania has the right to suspend the operation until the cause of the damage is identified and rectified.

- Stump heights are to be retained as low as possible.

- Trees will not be felled into or out of a WHC (Wildlife Habitat Clump) or any SSR (Streamside Reserve) unless for safety reasons as determined by the harvesting contractors risk assessment.

**Monitored Outcomes of PSR operations**

- Post harvest Sawlog BA (80% of stand BA with 10% tolerance).

- Post harvest Stand BA 12m² -13 m²/ha (10% tolerance).

- Post harvest Stand Damage (less than 10%).
Shelterwood Retention

- Retain evenly spaced shelterwood trees to an approximate spacing to achieve a basal area of 10 - 12 m$^2$ using the table below as a guide to spacing requirements.

- Retained shelterwood trees should be of sawlog potential if available, with large healthy crowns, with a preference for trees closer to 60cm DBHOB.

- Retain all regrowth up to 20 cm Diameter at Breast Height Over Bark (DBHOB).

- Where large mature trees occur in patches of dense regrowth all mature trees (>60cm DBHOB) should be felled. Where possible mature trees should be felled so that heads land outside of the regrowth patch. Where this is not possible due to the density of regrowth, trees will be felled so that the heads land in the one area as far as practicable.

The following table is to be used to achieve the planned retention

<table>
<thead>
<tr>
<th>Average tree diameter (centimetres)</th>
<th>Average retained tree spacing (metres)</th>
</tr>
</thead>
<tbody>
<tr>
<td>40</td>
<td>10</td>
</tr>
<tr>
<td>60</td>
<td>15</td>
</tr>
<tr>
<td>80</td>
<td>20</td>
</tr>
<tr>
<td>100</td>
<td>26</td>
</tr>
<tr>
<td>100+</td>
<td>30</td>
</tr>
</tbody>
</table>

- Retention should ensure that the original species composition is maintained on the site ie. 1 tree in 10 retained should be *E. Dalrympleana*.

- Damage to retained trees during felling and snigging operations shall be minimised. Bump trees are to be used on the edge of snig tracks where possible. Bump trees and cull trees are to be felled at the completion of operations on each section of the coupe.

- Two stages of harvesting occurred.

- The first operational phase occurred in July 2007. The objective was to remove the larger, more mature stems using standard ground based conventional machinery.

- The second operational phase occurred in June 2009 and utilised mechanical harvesters and forwarders with the objective of thinning the area of regrowth.

- Post harvest assessment completed in July 2010.
• Overall results as follows:

1. Retained ha = 12.6m³/ha
2. Retained stems/ha = 91
3. Damage = 4%
4. % of trees containing sawlog = 97
5. Advance growth stems/ha = 52

• CD113L achieves the objectives as planned and subsequently achieves the standard with respect to Forestry Tasmania's Quality Standard outcomes.

• Discrete Operational phases (DOP) signed off through the FPP.

• Forest Practices Plan expired in July 2012.
Background

Forestry Tasmania manages approximately 38,000 hectares of hardwood plantation forest and approximately 3,300 hectares of softwood in its own right, or with joint venture partners. This plantation estate is distributed across PTPZ land.

Since 1990, significant areas of hardwood plantation have been established with the intention of them playing an important role in the future production of wood products from PTPZ land. The majority of these plantations are still maturing and not yet being harvested. Only 13 per cent is aged older than 20 years, while 38 per cent is younger than 10 years. However, by 2027, Forestry Tasmania expects to be able to produce about 78,000 cubic metres of logs per year that meet the specification for high quality sawlogs from these existing plantations. These statistics are reflected in Forestry Tasmania’s estimated sustainable yield projections.

The primary management objective for Forestry Tasmania’s hardwood plantation estate is to grow high-value, pruned logs. Forestry Tasmania aims to apply appropriate management regimes to as many stands as possible in order to achieve this objective. In some cases, historical stand management, site factors and location may lead to a stand being managed to produce lesser-grade products, such as pulpwood. Forestry Tasmania currently has approximately 28,000 hectares of hardwood plantation managed under pruned log regimes.

This particular coupe was developed as part of a Joint Venture Agreement between three participants namely the Plantation Platform of Tasmania, Forestry Tasmania and Gunns Ltd, each with a percentage interest in the development of the project. The Plantation Platform of Tasmania was made up of three Japanese interests who included the Daio Paper Corporation, Nissen Corporation Ltd and the Kawasho Corporation.

The Joint Venture was managed through the establishment of a Joint Venture Committee with the appointment of a Project Manager.

Forestry Tasmania was appointed Project Manager to establish the plantations in the north eastern area of Tasmania with the aim of planting approximately 500 hectares per year to reach a total of 7,500 hectares over a period of 15 years. The land was required to comply with the following characteristics.

- Capable of being harvested by ground based equipment.
- A land value of $1500.00 per hectare with a 5% variance either way.
- Land must be of Site Quality 3 (defined as reaching a mature height of at least 31m) over the majority of the planted area.

The Joint Venture arrangement was disbanded in 2013.

Operational detail

The coupe was established as a conversion from native forest to a *Eucalyptus nitens*. The coupe has been managed on a typical sawlog regime where the coupe has been both pruned and thinned. A typical sawlog regime is comprised of the following:

Site preparation

The standard method is to produce a cultivated spot mound by using an attachment on an excavator. Where larger slash windrows are necessary, line mounding is often undertaken using a mounding plough drawn by tractor. Ripping with a tyne may also be necessary on shallow soils.
Fertilisation
Forestry Tasmania now uses controlled-release fertiliser for primary fertilising. This granular product is inserted into the planting hole at the time of planting. This fertiliser is a significant improvement on the previous product, with less chemical input, leaching and volatilisation losses. The product also results in improved growth response, reduced labour cost and less weed issues.

Planting (Plant Date: 2002)
The standard stocking for planting is 1,100 stems per hectare, which optimises early site occupancy, controls branch development, and provides for adequate selection of the final crop trees for pruning and retaining through to the end of the rotation. Forestry Tasmania has developed specific seedling quality and planting method specifications to maximise the chances of establishment success.

Pruning
2005 1st lift prune 0 - 2.9m 320sph.
2007 2nd lift prune 2.9 - 4.8m 400sph.
2008 3rd lift prune 4.8 - 6.7m 342sph.

Pruning is usually undertaken in three ‘lifts’, pruning to a height of 6.4 metres. These stages allow the trees time to rebuild leaf area (canopy), and to heal over the stem to subsequently produce knot-free timber. Trees that have good form, healthy crowns and that are growing vigorously are selected for pruning. Up to 300 stems per hectare are treated on suitable sites. The unpruned trees are left to grow alongside the pruned trees until they are removed in subsequent thinning operations.

Thinning
2013 Commercial thin to 307sph (207 pruned, 100 unpruned) Yield 125T/ha pulpwood.

Thinning removes unpruned and lower quality trees so that the pruned trees can be retained to grow on to the end of the rotation. The treatment allows for more space, light, water, and nutrients to be made available, which increase the retained trees’ growth. Thinning operations can also improve wood quality by reducing the occurrence of tension wood. Thinning occurs at various stages during the life of a stand, which may include early non-production thinning, mid-rotation production thinning, or production thinning only. Early non-production thinning is usually applied between ages four and seven years, and is useful in high-productivity coupes where maximising the diameter of pruned logs at the end of the rotation is the main objective. Non-production thinning can be undertaken manually using machines, hand tools or targeted chemical applications. When production thinning is undertaken in mid-rotation (seven to 12 years of age), it is normally a commercial thinning operation that produces pulpwood and small logs for sale. Production thinning uses ground based machinery, including processors that fell, debark, de-limb and cut each tree to length.

Final Harvest
Most hardwood plantations that are grown for high-quality products will be of sufficient size to harvest between the ages 25 to 35 years. Stands managed on pulpwood-only regimes are usually harvested earlier, between the ages 15 to 18 years. Plantations are harvested by clearfelling, and the products produced include pruned and unpruned logs for sawing and peeling, pulpwood for paper, and posts and poles. Clearfelling operations in plantations are invariably machine based, featuring various combinations of processors, skidders and excavators.
Forico Pty Limited was created in September 2014 following the acquisition of forestry assets by fund manager New Forests. Forico is Tasmania’s largest plantation manager, and is managing a fully integrated forestry business from ‘seed to ships rail’. This involves an advanced Tree Improvement program, a world class Containerised Forestry Nursery, a world class Fibre Technology Laboratory, approximately 174,000 ha of Freehold Land, approximately 100,000 ha of Plantations, two Woodchip Mills, one Export Facility, and access to Burnie Port.

Forico is focused on providing the best possible return for investors from a sustainable and certified forest resource and to this Forico has developed quality, healthy, innovative and sustainable plantation forestry practices. Forico harvests only plantation forests, and manages the balance of the forest estate for conservation via a formal and informal reserve system.

Forico is also strongly aligned to third party landowners whom form a critical part of the Tasmanian plantation industry. Forico has many hundreds of Joint Venture Agreements with landowners for plantation growing, and provides supply chain and market services for third party plantation fibre grown by landowners. Forico has a strong interest in supporting growth strategies for plantations on private land.

**Camelford**

2016 Spring Planting of *P. radiata*. This will be the second rotation to be planted on this site. Originally it was planted to *E. nitens* by the previous forest manager following acquisition from agricultural uses. The original species selection of *E. nitens* was defined by both the commercial structures of the previous owner and strategic intent to build feedstock for a domestic bleached kraft pulp mill. The decision to plant *P. radiata* in 2016 reflects Forico’s strategic intent to plant the ‘best species to the right site’. Under current modelling *P. radiata* provides the best economic return from the site, primarily due to lower site quality and proximity to a domestic pine sawmill. The site is not suitable for *E. globulus* due to severe cold, and did not perform well under the previous rotation of *E. nitens*.

The volume recovered from the previous *E. nitens* rotation was approximately 175 GMT/ha.

The site has been cultivated using a new approach for Tasmania, adopted from the Green Triangle. The approach here was to systemically place harvest residue in windrows as part of the long wood harvest system, and then to re mound over the existing stump lines. This approach is very cost effective and minimises soil profile mixing by avoiding stump removal or spot use of rippers. The coupe has been treated with herbicide pre planting via helicopter. It is not planned to provide any further herbicide treatments. However, it is possible that herbicide use may be required sometime during year 1 to avoid competition from improved grasses. Planting is at 1,100 stems / ha and is scheduled for completion in September.

Specific management issues on the property are protection from arson, and browsing by fallow deer and domestic livestock.