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Friday 31st October, 2014

Mining and Industry Projects
NSW Department of Planning & Infrastructure
GPO Box 39
Sydney NSW 2001

Dear Sir/Madam,

State Significant Project - Airly Mine Extension (SSD 12_5581)

Position of the Colong Foundation

The Colong Foundation does not have an in principle of objection to this mine extension but there are many matters that are of concern that should be addressed before this project could be approved.

The proposal is also misleading (e.g. cliff protection and mine water discharge standards). Several contributors to this process may have been misled by this EIS. The proposal and its EIS should be withdrawn, revised and resubmitted for public exhibition with its flaws corrected and its confusing elements clarified.

The review of this proposal (SSD 12_5581) should ensure all activities regulated under the existing development consent are reviewed, including in particular the recent modification to extend the 1993 development consent for one year. This extension allows mining in shallow areas under streams where apparently no mining is now proposed (in SSD 12_5581) due to potential stream impacts.

This new SSD proposal reveals precisely why it is inappropriate for a proponent to bring forward a proposal before all the environmental studies are done. The Department of Planning should reissue consent for the 2014-15 extension area now that the studies are done. Future consents for short-term extensions of this nature should contain such a general caveat, i.e. the departmental consent to a mine modification can be immediately varied once the environmental studies are released.

The Colong Foundation seeks consent conditions for this project that will:

- Ensure that the historical New Hartley Oil Shale Mine are defined as sensitive heritage of special significance that must protected from any subsidence movement and impacts;

- ensure that high cliffs (including those at Point Hatteras and Genowlan Point), pagodas, the Grotto and the Valley of the Kings are defined as sensitive heritage of special significance and fully protected from any subsidence movement and impacts;
- allow the angle of draw of 25 degrees to be retained so that the 'environmental protection zone' (for subsidence) in the existing consent is not reduced in width by about 50% as is currently proposed;
- minimise the toxic mine effluent by separating clean runoff from the toxic cocktail of mine water make, bore process water and runoff from the mine site;
- require the proposed coal preparation plant to use chemically polluted water stored on site in the restricted release zone until exhausted before using other water sources;
- given that this proposed project is an allegedly a dry mine, establish a 'restricted release zone' that ensures there is a neutral or beneficial effect on water chemistry and aquatic life (particularly macroinvertebrates) in the waterways of the World Heritage Area and in Capertee National Park;
- chemically treat any toxic mine effluent discharged from the mine to a level that will ensure there is no a neutral or beneficial effect on water chemistry and aquatic life in downstream national parks and the World Heritage Area;
- revise the EPL for this mine so that the key pollutants in mine dischargs that could harm the World Heritage Area downstream are regulated to ensure there is a neutral or beneficial effect on water chemistry and aquatic life;
- as the responsible land owner, assess and adequately rehabilitate the exposed mine waste dumps associated with historical oil shale mining in the head catchment of Torbane Creek to reduce pollution runoff to acceptable levels;
- ensure all arrangements between the mining company and National Parks and Wildlife in relation to Mugii Murrum-ban State Conservation Area regarding surface operations are subject to public comment and review;
- ensure any lands currently owned by Centennial Coal suitable to be transferred to the NPWS are appropriately transferred at a time that is satisfactory to both parties; and
- ensure noise levels emitted from the mine at the Airly Gap area and other important areas of quiet recreation is below background noise level to protect natural quiet.

Mining impact on cliffs and Oil Shale Heritage is unacceptable

The Colong Foundation agrees with the position put forward by the Colo Committee that the cliff falls along 10 per cent of cliffs in the so-called panel and pillar zone and 5 per cent in the cliff line zone are highly inappropriate.

There are two problems with the proposed panel and pillar zone. The void width of 61m producing recovery rates of 67% is too great, as the degree of cliff collapse generated indicates and must be reduced to prevent significant cliff damage in that zone. Secondly, this zone also needs to stand further back from the cliffs in the cliff zone to ease tilts and strains on cliff lines in the adjoining zones. This additional stand back consideration is particularly important for the very high cliffs at Point Hatteras and Genowlan Point where mining should be restricted to first workings.

In relation to standing the panel and pillar zone back from cliffs, the Angle of Draw shown in Figure 32 of Appendix D and Figure 8.5 (page 220) in the main report is shown to be 8 degrees. The width of cliff protection is far less than in the 1993 consent of 140 metres, at approximately 70 metres wide, or half the width. This is unacceptable. Cliff protection must not be reduced as it will expose cliffs to excessive tilts and stains arising from both the interior panel extraction area and the partial pillar extraction zone under the talus slope.

Reducing the angle of draw to 8 degrees will cause avoidable cliff falls resulting in the predicted collapse of 5 per cent of cliffs.

The protection generated by the 25 degree angle of draw is necessary for not only internal and external cliffs but also for the Valley of the Kings and the Grotto, as protected by the initial consent. It is not appropriate for the environmental protection of cliffs in the Valley of the Kings and the Grotto to be reduced in what is now a state conservation area. The angle of draw set the width of the original protection zone for cliffs and this should not be reduced by an argument over what is the true angle of draw.

Maintaining the angle of draw at the 25 degrees standard will eliminate the partial pillar extraction zone, simplifying the very complex mine design currently proposed and removing subsidence where it tends to have the greatest impact upon cliff falls.

In regard to the proposed mine design based upon Clarence Colliery, the Clarence mine operates in the Katoomba Seam and so is operating in different geology to the Lithgow Seam. Mining at Clarence does not generate anything like the degree of surface subsidence that is proposed at Airly, although I do not know why this is the case. If Centennial Coal wants the Airly Mine to emulate Clarence Colliery then the degree of subsidence achieved at Clarence should be its subsidence design criterion. This is not proposed, and there is no likelihood that the Airly mine will have the limited cliff and pagoda damage achieved by the Clarence Mine.

There is no analogue between Airly and Clarence mines and no empirical data can be drawn from Clarence to apply to Airly regarding possible impacts. The Airly mine will have much greater cliff and pagoda damage than the Clarence Mine. Seeing that the Airly mine is in a state conservation area, this comparison confirms that the likely outcome in cliff and pagoda damage from this proposal will be unacceptable.

Due to the anticipated amount of cliff damage it is inappropriate for the panel and pillar mining zone to operate in or close to areas with cliffs, pagodas, caves, overhangs and cultural heritage sites as indicated in the EIS.

The Colong Foundation believes that the significance of the New Hartley site is national, not local. To claim the site is of local significance is not credible given the unique character of the dwellings associated with the site and its scenic location.

The Colong Foundation finds it hard to comprehend how subsidence design criteria limited to 125mm can have up to 5% cliff damage and for six cliffs up to 10% cliff damage. Surely the proposed flexible design plan can and should ensure no damage to cliff lines in a state conservation area. The objective of mining should be to minimise or eliminate damage, not to allow 10% cliff damage. It should definitely aim for a better cliff protection outcome than that at the Clarence Colliery, not poorer outcome as proposed.

The Colong Foundation draws the Department's attention to the remarks by Golder Associates on page 77, Appendix D where four levels of impact are defined. The worst level of impact is described as significant, defined as "relatively large in quantity, size and degree." "Rock falls … affective >5% of the total length of cliffs" (page 77). So, it would seem that instead of avoiding impact, the proponent is planning for significant impacts over panel and pillar zone that covers the majority of the project area.

The Colong Foundation cannot understand why Centennial Coal should consider this to be an acceptable proposal for this zone when it is clearly stated by their subsidence consultants that it is not.

Golder Associates also recommended (which the proponent apparently ignored) that in the case of Airly, minor impacts would warrant reconsideration of setback distances from cliff lines to the extraction areas associated with panel and pillar mining (page 77). So why did the proponent ignore this advice and choose to half the barrier protection for the cliffs? The proponent is silent on this point.

The proposed subsidence of 500mm, which will produce strains of up to 8.3mm/m and tilts of 16.7 mm/m in the area of old workings is unacceptable because the area adjoins the oil shale ruins. The movements are likely to cause cliff collapses that will fall onto the New Hartley heritage area below it. Cliff collapse occurs from the base of the cliffs, not by toppling, and the inward strains and tilts will almost certainly produce cliff falls into the heritage area. The proponent should prevent this from happening by reconfiguring mining operations to minimise strains and tilts at the base of the cliffs.

The true extent of old underground oil shale workings is unknown and it is possible that large areas of the project in the panel and pillar zone will be subject to 500mm subsidence, as well as strains and tilts as mentioned above. Golder and Associates state that subsidence in the areas of multi-seam mining is unknown and there are no precedents to support the subsidence model. This is a clear warning from the consultant.

The angle of draw model is not sufficiently conservative to ensure cliff protection where mining is proposed near or to the cliff edge.

The reference on page 222 of Volume 1 to 'panel and pillar mining to the edge of the cliffs without impact because of a zero or even a negative angle of draw' is a major concern. It indicates that there is a flaw on angle of draw considerations based on earth subsidence (and upsidence) only, and not stresses and tilts as well. Stresses and tilts are more important factors for generating cliff falls than the vertical movements of subsidence. It is certain that stresses and tilts will not be zero in above instance and the angle of draw method to determine cliff protection in these circumstances is highly misleading. The Colong Foundation recommends that the angle of draw remain at least 25 degrees for cliff protection, pagodas the Grotto and the Valley of the Kings.

The proponent may be inaccurate when they claim that half a metre of subsidence in the New Hartley Oil Shale precinct 'will not generate significant additional impacts beyond those already existing' (pg iii). Surely Centennial Coal is referring to similar impacts as those arising from the 18th century cliff collapse and pagoda fractures their consultants have recorded, which seems an odd argument to make.

Further, the Colong Foundation does not accept that cliff falls happen at a rate of one every four years. It may be that these cliff falls reflect structural damage arising from past oil shale mining, which probably occurred under Genowlan Mountain, as well as Mount Airly. If that rate of attrition were a fact then surely the mesa would have eroded completely from the Capertee Valley long ago. The rate estimate is contrary to the geomorphological evidence that the Blue Mountains landform is OLD, ten times older than the Grand Canyon in the United States of America.

The proponent discounts the value of the mining heritage at New Hartley, which is disappointing as mining heritage should be protected and celebrated and offers important lessons to future generations.

There should be no further subsidence impacts in the oil shale heritage area. Mining should be limited to first workings as can be achieved by retaining the existing angle of draw.

Significance of the New Hartley Oil Shale Ruins

The EIS does not refer to the listing of this area by the National Trust in July 2014 in Appendix J or in the main report. The Industrial Heritage Committee of the National Trust of NSW finds that the 'Airly Mines and remains of the Torbane Refinery are significant in the story of oil-shale mining in NSW.' Their statement indicates that the sites have more than local heritage value, contradicting the conclusion of the proponent (see Trust listing - Attachment 1).

The Trust considers Airly township a rare example of an abandoned mining town uncompromised by later development and that the remains of the miners' houses are both technically interesting and evocative of the hardships endured by miners in these locations. The Torbane refinery was significant for its role in the development of retorting technologies in the early twentieth century and for its prototyping of retorts later used at Newnes.

Replacement of lost springs and stream flow for visitor use

Centennial should provide alternative water resources where these are lost, such as at the Village Spring in the oil shale ruins precinct. A small roofed area with storage tank should be provided at a suitable site at the ruins to provide park visitors with an alternative water source. Without water, the ability to visit the area becomes restricted.

Structure established near 'the Ruined Castle' in Blue Mountains National Park for provision of rainwater for park visitors (shown here under construction)

It is interesting that even low impact coal mining is predicted to cause a drawdown in groundwater below Gap Creek of up to 3.5 metres (pg iv), while for Angus Place and Springvale SSDs, Centennial argues that there will be no impacts on nationally significant swamps. It is hard to understand how the latter mining would not have a greater impact on surface waters than the Airly mine.

As recommended by the EIS, this indicates that there should be no mining under Gap Creek to prevent such drawdown.

Water management needs to be redesigned

The current water management system is unsatisfactory as it mixes clean surface water with site runoff water and also combines these with mine effluent from the underground workings. This is a most unsatisfactory arrangement and contrary to any standard practice for water management that I have seen in the last thirty five years. The arrangements are clearly illustrated on pages 100 and 101 of Volume 1 of the EIS. The production bore water goes into the large dirty water dam, along with the water from the CPP because of its high salinity, when it surely should instead go directly into mine process water.

Centennial Coal does not adequately explain its existing water management in section 3. Why are clean and dirty waters mixed with process water and mine effluent in the largest storage on the site? It is a better practice to minimise the dirty water and the mine effluent, so that these waste waters can be used as a first priority for operational process water.

Runoff collected from the proposed reject emplacement area is first proposed to go the 109ML large storage dam before discharge by the 35ML discharge dam. It would be better for the water collected from the REA to go to process water directly rather than being diluted with runoff water.

The water management plan needs to be rethought so that the dirty water is sorted and stored SEPARATELY and used in preference as direct feed for mine process water. Any overflows from these separate storages should then be chemically treated and then diverted to the large storage dam. This would be a far better arrangement to minimise discharge of toxic water from the site, rather than risk maximising the discharge of it, albeit in a diluted form.

If the toxic water were minimised it could then be chemically treated before being introduced into the large storage dam and then the discharge dam. This approach enables a restricted release zone to be created for the mine around the dirty process water and mine water, rather than having an open system as is currently the case.

Further, the lessons from the Clarence Colliery regarding the EPL licence reflecting the actual contaminants in the mine water make and process water have not been learnt. The EPL is defective because it does not contain the pollutants in the mine process water and production bore that can cause serious environmental harm to the World Heritage Area downstream. The EPL must be revised to ensure the downstream environment can be protected from the environmentally harmful water pollutants found the mine.

Airly Creek sample site is impacted already by Airly Mine,
and is not an appropriate background level

The pollutants contained in the mine's effluent are polluting the downstream environment of Airly Creek. The production bore water is highly saline, and has elevated nickel and zinc levels. It is undeniable that Airly Creek has received mine effluent, and this goes a long way to explain the elevated salinity levels at the sampling point. The creek is badly polluted when compared to the ANZECC trigger level and unpolluted creeks nearby. Airly Creek should not be used to derive the site specific trigger levels. This is setting water pollution standards on the pollution levels and is the wrong approach.

The Colong Foundation has serious reservations about the alleged background salinity, alkalinity and metal levels in Airly and Torbane Creeks. In the case of Airly Creek these so-called background levels seem to be significantly influenced by the existing mine and historical mine operations.

The claimed lack of impact by the proposed and the existing mine is incorrect. Cardno should thoroughly sample downstream on Airly Creek into the World Heritage Area to ascertain the extent of impact from the existing mining operation, and compared macroinvertebrate levels of more pristine equivalent streams (say Coco Creek) with Airly Creek as a background level. Water quality parameters should also be examined at these sites.

Note also that the Airly Mine does not appear to be a dry mine as stated in the Modification 3 PAC assessment report. According to this EIS, 'Airly Creek is predicted to experience a maximum cumulative increase of 14.5% in flow' (pg iv) due to the proposed mining project. This increase of toxic effluent discharge has not been minimised or, as may be possible at this site, eliminated.

Note also that Cardno Ecology Lab state on page 58 of Appendix G that initial sampling of the aquatic ecosystem indicates that the highest level of biological impairment generally occurred at sites on Airly Creek followed by Torbane Creek. Torbane Creek is believed to have large amounts of oil shale ash and coal ash dumped in its headwaters without any remediation. As Airly Creek is more polluted than Torbane Creek, these ecological results suggest that water management at the existing mine is already seriously impacting on Airly Creek headwaters, which then flows into the Greater Blue Mountains World Heritage Area.

The water management system needs to minimise and chemically treat discharge of dirty water flows and aim to achieve mitigation not by dilution alone as proposed but by treatment as well.

The water management plan in the EIS does not explain the overall water management strategy, which seems to be more about storing as much water on site in the so-called dirty water large dam than it does pollution control. It also seems to be aimed at diluting highly saline bore production water before use.

Proposed Reject Emplacement Area

The sizing analysis of the 30 metre high reject emplacement area is hard to follow, although the volumes are provided. No clear representation of the impacts of the proposed emplacement area on views from Glen Davis Road is provided or in Appendix P. Figure 4.5 and 4.6 on pages 133 and 134 respectively do not give any impression of how intrusive this REA location is when viewed from the Glen Davis Road. This is probably the most sensitive view point, yet is not considered in any detail by the proponent.

The proposed reject emplacement area and the rest of the mine area seen should be adequately screened from Glen Davis Road by appropriate bunds vegetated with native trees of local provenance so that it does not detract from the views enjoyed by those using this Road.

Noise management

The noise generated by the mining operation will impact upon the quiet enjoyment of recreation activities in the state conservation area.

There seems to be no sensible noise criteria for quiet recreation in a reserve established under the *National Parks and Wildlife Act*. A standard for noise in these areas should be 'background' at key visitor recreation sites, such as picnic grounds or camping grounds. The standard should be equivalent to noise standards established for large national parks in developed countries, such as national parks in the United States of America.

The standard applied in the noise assessment is for an area with substantial background noise, such as may occur at a commercial camping ground with facilities, and is not appropriate to be applied to most parks and reserves in NSW that are remote from facilities.

The erosion of natural quiet is a serious matter as people visit parks to enjoy peace and natural quiet without the intrusion of noise pollution.

While outside the scope of commentary on an EIS, the EPA should establish an appropriate noise standard for reserves under the *National Parks and Wildlife Act* that protects natural quiet enjoyed by park visitors. The standard used will not protect natural quiet and is inappropriate.

Thank you for the opportunity to comment.

Yours sincerely,

Keith Muir
Director
The Colong Foundation for Wilderness Ltd

NATIONAL TRUST

NATIONAL TRUST REGISTER Attachment 1

INDUSTRIAL HERITAGE SITE LISTING REPORT

CITY/SUBURB/TOWN	NAME OR IDENTIFICATION OF SITE	ADDRESS or LOCATION
Capertee	**AIRLY SHALE MINES AND TORBANE REFINERY REMAINS**	**Glen Davis Road, Mt Airly, via Capertee**

LGA:	Lithgow City	ABORIGINAL NATION:	Wiradjuri Nation
POSTCODE:	2846	LOT/DP:	See Appendix A
COMMITTEE:	Industrial Heritage Committee	GRID:	Lat: -33.10623 Long: 150.042018
AUTHOR:	Tony Brassil	LISTING DATE:	31 July, 2014

STATEMENT OF SIGNIFICANCE:

The Airly Mines and remains of the Torbane Refinery are significant in the story of oil-shale mining in NSW. The site has relationships to most of the other significant oil-shale mining and refining sites in NSW, especially Joadja, Hartley Vale and Newnes. The remains of the transportation systems, both tramways and ropeways, provide evidence of the technologies of the period and the level of investment in oil-shale in the late nineteenth century.

The Airly township is a rare example of an abandoned mining town uncompromised by later development and the remains of the miners' houses are both technically interesting and evocative of the hardships endured by miners in these locations. The Torbane refinery was significant for its role in the development of retorting technologies in the early twentieth century and for its prototyping of retorts later used at Newnes.

DESCRIPTION:

Sites and relics are scattered throughout the overall Airly Mines area and various elements are recorded by different authors. Mills (op cit) identified nineteen discrete sites within the Airly Shales Mines area:

1. The Skipway from Airly Village to the Torbane Tunnel
2. Airly Village Precinct
3. Church
4. Ventilation Shaft
5. Stone Dwelling
6. Spring Shaft and stone house
7. 'Big Rock' cave dwelling
8. 'The Bakery'
9. Potts Point Stone and Cave dwelling complex
10. Managers House and Water Trough
11. Magazine, spring and cave dwelling
12. Brick Ventilation chimney
13. Visible skipway on dry stone wall

14. Entrance to Martin's Tunnel and Ventilation Shaft
15. Boiler and Engine
16. Flying Fox cables
17. 'Groom's House' and Incline to Torbane Tunnel
18. Torbane Retort Complex
19. Railway Cutting

Eardley and Stephens note five major relics plus the locations of the major transport routes. These are:

1. Self-acting incline.
2. Horse tramlines.
3. Site of the Winding engine.
4. Airly Gap.
5. Site of the 60 ft turntable.
6. Burnett's Farm

Remains include a brick ventilation chimney, used to ventilate the mines, ruined miners' cottages of random masonry with mud chimneys, a boiler set in English bond brickwork foundations (boiler 4' diam. x 20'4" long), miners' cave houses dug into overhanging rocks with mud walls and windows (now filled in), the Torbane tram (coal) tunnel about 1,600 yards long, abandoned wire rope cables, remnants of cable winding wheels, numerous adits, caved in, and tramway roads built up around the edge of the mountain. Generally, this listing covers all relics and physical remains of the shale mining industry surviving in the Airly/Torbane vicinity which are associated with these mines.

HISTORY:

The following historical information is largely based upon:
Mills, R; *A Preliminary Heritage assessment of Airly Shale Oil Mining Complex*; Report for IEC; 1998.

General Background

Oil shale is a fine textured sedimentary rock containing organic matter known as kerogen, from which oil can be distilled through the application of heat. The process for the extraction of oil from shale was first carried out in Great Britain in 1694, however, the first commercial plants did not come into existence until1838 in France and1850 in Scotland. With James Young's patented process for the dry distillation of coal and shale and its subsequent refining with sulphuric acid and caustic soda (patented in 1850), shale oil became the basis for a major industry for the various products which could be distilled and extracted, including kerosene, paraffin wax, ammonia, lighting oils, lubricants and, after the turn of the century, motor fuel.

The first oil shale deposits in NSW were discovered in 1815 during the construction of the first road across the Blue Mountains. In 1824, a French expedition led by Commander Duprey reported the mining of deposits of stratified lignite by early settlers who used it as fuel. Other early reports of mining activity in the area were made by Surgeon Cunningham in 1827 and Count de Strzelecki in 1840 and 1845, Buckley in 1854 and Brown in 1862. Production began on a small scale at American Creek on the south coast and at Hartley Vale, near Lithgow, in 1865 and at Bathgate (Kerosene Vale) in 1866. However, production increased rapidly and, in 1866, the Pioneer Kerosene Works mine at Mt Kembla produced more than 1000 tonnes and for the next 10 years produced more than 3000 tonnes per year. Production at Hartley Vale was substantially larger. With the opening of Joadja mine in 1873-7 4, total production was unaffected by the closure of Mt Kembla Mine in 1878. Joadja and Hartley Vale together produced between 19000 and 50000 tonnes of shale between 1878 and 1889. Joadja mine declined after 1892 when the easiest part of the seam had been mined out but production at the Glen and Ruined Castle mines at Katoomba compensated for the reduced production from Joadja.

As the Katoomba seam was waning, a rich seam was identified in Airly Mountain and Genowlan Mountains near Capertee. The Australian Kerosene Oil and Mineral Company of Joadja and Katoomba acquired the southern lease at Genowlan Mine in 1895 and the Hartley Vale Company (NSW Shale and Oil Company) leased the northern outcrop in 1896 and named the mine New Hartley. From 1896-1903, more than 144,000 tonnes were extracted from these two mines.

In the first decade of the 20th century, however, mining of shale effectively ceased at all the established mines, to be replaced by production at Newnes, where the Commonwealth Oil Corporation began mining in 1906, and Murrurundi, which started production in 1907.

By 1912, Newnes was producing up to 67000 tonnes of shale per year. However, the Commonwealth Oil Corporation went into bankruptcy in 1912 and the plant ceased production until 1914 and, despite continuing labour problems and the loss of American markets, continued functioning until1922.

With the closure of the Newnes plant, shale mining in NSW effectively ceased until the 1940s, when the wartime oil requirements encouraged the development of the torbanite seam at Marrangaroo and Barigan and the construction of an entire new processing plant at Glen Davis. The end of the War and crude oil imports from the Middle East meant that the plant at Glen Davis could not survive and the complex closed in June 1952.

Much of the equipment at any of the mining sites was reused from other mining sites that had closed. While new retorts were erected at Newnes, other equipment was being brought from Torbane, which had previously been brought to Torbane from the Glen Mine at Katoomba. Genowlan Tramway equipment had come from Katoomba and the entire Kerosene Plant at Newnes had previously been used at Hartley Vale. In 1920, a whole group of houses was transferred from Torbane to Newnes. Later, when Newnes closed, its firebricks went to the Clyde Refinery at Duck Creek. When Glen Davis was built in 1939, the retorts and steam engines were taken from the deserted Newnes site.

Not all the raw shale processing was carried out in Australia. Till 1911, up to 570,000 tonnes of raw shale had been exported to Britain, Europe and America. Joadja shale was exported to America and England from 1879; Hartley Vale shale from 1880 and Genowlan deposits were held by a German syndicate and mined exclusively for export to Germany. First grade ores from Newnes and some from Joadja were used to supply the Australian Gas Light Company.

History of the Airly Shale Mines

The Genowlan Mine

The first official report of the discovery of shale oil in the Airly Mountain area was recorded in the Under-Secretary for Mines' Report for 1883. The lease on the southern portion of the Airly shale deposit was taken up by the original prospecting party of Messrs Melliday, Massey, Bulkeley, Nicholson and Larkin in 1883. However, the group failed to meet the necessary labour conditions and the lease lapsed. A new lease of 420 acres was taken up by Mr D. Wilson in late 1890. This lease was purchased by Genowlan Shale Company a short time later.

The Genowlan Shale Company was a Sydney based firm whose interest lay in exporting shale to England and the Continent. To advertise the high quality of their product, the Company entered samples of the mineral in the World's Colombian Exposition in Chicago in 1893. During this early period of the mine's history (1892-1894), an approximately 2.4km track was cut from the mine site to the Government road to Capertee. The shale was carted from the mine in drays drawn either by horse or bullock teams along this track to Capertee Railway station, from where it was transported to Germany for gas enrichment purposes.

Between 1892 and 1894, approximately 10,000 tons of high-grade shale was extracted and sent to market. During financial difficulties experienced by the company in 1894, Andrew Anderson, the largest shareholder in the Genowlan Shale Company, obtained a six months option of purchase on the leases. Anderson formed a company registered as the Australian Shale Syndicate with a group of English investors and, on 3rd December 1894, Anderson purchased the mine on behalf of the new company.

By the mid 1890's, the supply from the Joadja deposits controlled by the Australian Kerosene Oil and Mineral Company (AKO&M) was beginning to tail off and, after the Australian Shale Syndicate offered the lease of Genowlan mine on a tribute basis, a five year contract was signed in 1896. Although AKO&M had an option to purchase the property, this was not taken up.

The small private village of Airly was surveyed on 28th June 1897 by James Dawson, Surveyor. Public buildings were constructed adjacent to the tramway and remains of the Church, hotel and post office are still present, however, it appears that few houses were actually built. Many mine workers appear to have chosen to live closer to the sites of the mining adits. Their houses, constructed from local stone within rock overhangs, do not appear to conform to any recognised street alignment but were placed wherever a level patch of ground or a convenient rock overhang could be found.

The Genowlan shale seam was a dangerous place to work, as shale at the site exhibited a tendency to explode horizontally from the working face when the breaking irons were hammered in. Miners countered this dangerous situation by wearing protective breast boards fashioned from bark. More formalised protective clothing was developed over the years (strong wooden breast plates and full wire-gauze masks).

AKO&M's strategy for Genowlan mine was to ship only export grade shale from the mine, thereby partially relieving Joadja from this role. This was reflected in the marked drop in the dispatch of shale by rail form Joadja from 1894 onwards, which was almost entirely compensated for in volume by an equivalent increase of dispatches from the Capertee siding.

Initially, AKO&M used the road cartage route installed by the Genowlan Shale Company. To cut costs, an alternative route was surveyed which reduced the distance to be traversed to about 5 km and eliminated the steep and dangerous road descent by means of a self-activating, inclined way from the crest of the Airly Gap ridge to the level of the main road to Capertee Railway station.

The section from the Genowlan mine to the start of the tunnel operated as a single-line horse tramway. It then changed to a double line cable tramway and passed west through a tunnel cut in the mountain, a little west of the Airly Turret, down the valley and up the other side to the Torbane Railway station. The rope tramway was clearly a formidable piece of engineering. Details of the engines and drive mechanisms of the tramway are not known. It is thought that the cable tramway became operational towards the end of 1897, as railway shipment figures for that year are large and all shale for the following year was recorded as having passed through Torbane siding.

As the mine's focus was to meet export orders, which tended to be rather intermittent in nature, large reserve stocks were often built up. This policy of stockpiling gave the company great flexibility in fulfilling the irregular foreign orders while keeping the miners working on a reasonably regular basis.

In September 1900, the miners demanded an eight hour day in line with above-ground workers. This dispute appeared to be settled quickly, however, the resultant changed working conditions resulted in a decrease in working hours and an associated cut in wages. Miners' representatives requested an increase in rates but the board of AKO&M would have

no part of it and this resulted in at least a quarter of the work force leaving the site. A new rate was finally negotiated in mid-November and work resumed. Towards the end of 1902, declining profits from the Genowlan mine led to a further reduction in the wages of shale cleaners and miners. Shortly thereafter, operations ceased and AKO&M gave up further attempts to extend their lease.

The Australian Shale Syndicate took up additional property on the southern side of the Genowlan leases towards the boundary of New Hartley in April 1907. Some exploratory work was done in an adit which became known as Dogtrap Tunnel in mid 1908. It is unclear whether or not this was a new lease or part of the existing Genowlan complex and no information is available to date on this tunnel.

King's Mine

This mine on Airly Mountain was named after its lease holder, Frances William King, who took up the original Nicholson and Larkin lease which had expired in 1883. The lease holder, along with his brother, Mr R.J. King, developed the Airly shale mine to produce a moderate output of export shale. Little is known of these activities, which continued until at least the early part of 1896. Between April and September 1896, the mine was leased for an indefinite period to NSW Shale and Oil Company.

The New Hartley Shale Mine

At Hartley Vale, the shale mines operated by the NSW Shale & Oil Company were running towards the end of their useful lives and the Airly seam appeared to offer good quality export shale which retorted at an average yield of 52 gallons to the ton. The retorting shale at Airly, however, was significantly different from that at Hartley Vale, as it held a much greater concentration of extractable nitrogen suitable for the manufacture of fertiliser. The Airly shale also required more prolonged heating during the retorting process; consequently, a new retort design was required.

When NSW S&O took over the Airly lease in 1896, they renamed it the New Hartley Shale Mine. Access was an acknowledged problem at the time of purchase and the manager, William Hall, assessed a new movement route for raw material at the site. Hall proposed to move the shale to the proposed Torbane retorting works by a light railway which passed through a tunnel in the narrow central section of Airly Mountain. At Torbane, the shale and crude products would be transhipped to the standard gauge line, which ran to the newly created Torbane Station on the Government railway. The haulage skipway from the mine to Torbane was completed in 1898 and the standard gauge railway branch line to Torbane Railway Station completed in 1900. A telephone line was added to assist management in coordinating the activities of the company.

Mining at New Hartley was suspended in the early months of 1900 pending completion of the oil shale retorts and Torbane and extension of the rail connection. When miners returned to work in September 1900 an industrial dispute rapidly developed over the issue of weighing shale produced. This dispute closed the operation until 29 October after proceedings were brought against the company under Section 28 of the Coal Mines Regulation Act.

The Torbane retorts provided a steady minimum demand for shale but the peak work force of 80 miners was sometimes on half time only and occasionally ran down to as few as twenty men. However, a contract with the Australian Gas-Light Company guaranteed a minimum throughput. Coal found with the shale seam was not exploited commercially.

Poor export demand and good reserves led to a progressive shut-down of the mine in mid 1902 and only a small work force was retained. The miners declared this to be a lockout and went on strike. They held out for 21 weeks, receiving only minimal strike pay raised from union reserves and a 5% levee from the Genowlan miners and some outside donations. The shale stocks were depleted and the directors agreed to the pay demands of the miners,

allowing work to recommence. Between 1904 and 1907, the miners' wages were restricted and, from 1905 to 1907, intermittent strikes occurred. By 1907, the miners' case was stronger, as shale prices were high. A demand for a 25% pay rise was rejected by management and the subsequent strike was long and bitter. In February 1908, a few non-unionists commenced working, under continuous police guard to dodge the angry picket line. The dispute was finally settled in a special Arbitration Court convened at Torbane on May 16th 1908. The new mining agreement was for a three year period and was honoured by both parties. After this period, Federal industrial legislation came into existence and there were no industrial stoppages at Torbane after May 1908.

When the mines at Newnes entered full scale production in approximately 1908, the quantity of shale exported from Torbane dropped to a mere trickle. In June 1912, the Commonwealth Oil Corporation announced it was closing the New Hartley Pit, as the supply of shale from the mine was showing signs of rapid decline as the seam approached exhaustion. After closure of the pit, there was only some sorting of surface heaps to meet Government orders for gas-making shale. This was consumed by various railway workshops including Eveleigh and Newcastle. Commonwealth Oil Corporation went into liquidation in 1913 and its interest in Genowlan mines was purchased by Commonwealth Oil Federation. The mines continued working on an intermittent basis until August 1918 when a formal notice of discontinuance was provided to the Department of Mines. In 1930, the Airly-Torbane haulage system was dismantled by Albert Lamb and the adits in the Genowlan Valley had their portals "blown down" to prevent access to the underground workings.

In the 1940's, some prospecting took place within the Tramway Tunnel near the crest of Airly Ridge. A short length of wooden-railed tramway was laid along the tunnel floor so that the spoil could be dumped over the cliffs at the portal. However, no further mining was commenced.

The Torbane Retort Complex

The Torbane site was chosen for the retorts because it was a relatively flat area which was located between the mine site and the proposed rail siding on the main Wallerawang-Mudgee Line. This was significant as it allowed the crude oil and benzene to be transported from the retorts to the Hartley Vale refinery. Once the location had been confirmed, the construction of the transport link was commenced immediately and completed by 1900.

This transport link involved the construction of a single-track railway from the Torbane retorts to Torbane siding, a distance of 1 mile and sixty eight chains. From Torbane siding, the track curved over an embankment to the north-east, traversing the gentle lower slopes of the Airly Creek valley. After passing through a cutting excavated to a maximum depth of 15m in the clay shale, the track crossed the embankment which supported two 400 gallon square shaped ship's tanks which supplied water to the Company's locomotive. A small steam driven pump was mounted at the base of the tank structure to elevate water from the dam to the tanks. From here the track ran in a northerly direction into the retort complex where it terminated beneath an elevated staith devoted to the loading of export shale.

During 1899, the land was cleared and the first dwellings erected for employees. However, no further work took place until a contract was signed with the Australian Gas Light Company at the end of the year. From January 1900, large quantities of bricks were burnt at Torbane to supplement the supply from NSW S&O kilns at Hartley Vale. Construction of the industrial plant and the immediately adjacent township of Torbane proceeded simultaneously. The Torbane retorts were built in a single bench, twenty units long by two wide. Construction of the brickworks was well advanced by the time the principal castings arrived in July 1900. The retorts were first fired on 16th November, 1900 and oil was dispatched to Hartley Vale a fortnight later.

The Torbane plant was purchased by Commonwealth Oil Corporation (COC) in April, 1906. Operations continued throughout 1906 and 1907 but ceased during the New Hartley miners strike of 1908. COC also had a financial interest in the untapped shale deposits at Newnes in the nearby Wolgan Valley, where mining was due to begin. Purchase of the Torbane complex provided the opportunity for low-cost testing of new technology and making any necessary modifications to the equipment prior to installation at Newnes. The Torbane retorts were expanded to incorporate a half-bench of Scottish Pumpherston retorts alongside the existing improved Hall and Palmer Units. All other plant was modified to the standards planned for Newnes. Overall improvements cost $30,000, which was nearly as much as the purchase of the Torbane works but a mere 2.75% of the estimated profits from Newnes.

The selection of the Scottish retorts was significant for three reasons:

- It was the first importation of plant since the English retort bodies had been purchased for Joadja almost 30 years earlier.
- The bench was the first in NSW to be intentionally and exclusively heated by combustion from its own waste gases.
- The combustion of permanent gas eliminated all industrial use of solid fuel.

The plans were drawn up by Mr David Sutherland, who had an international reputation and a sound background in the Scottish shale oil industry. The architecture and design for both the extensions at Torbane and the Newnes Complex are virtually identical to that of Scottish Shale plants.

Extensions to the Torbane works were completed in 1907. The retorts required approximately 350,000 ordinary and 150,000 fire bricks. The total output of crude oil increased to 140,000 gallons per month and the quantities of ammonia and benzene also increased proportionally. Each retort bench had its own ammonia and benzene scrubbing towers. The crude oil and benzene were both dispatched in tank wagons to the Hartley Vale refinery and the ammonia went to the manufacturers of anhydrous ammonia for the refrigeration industry.

Following an accident in which a tanker of crude benzene caught fire and exploded upon arrival at Hartley Vale, it was decided to build a separate benzene refining plant at Torbane. This was built to the east of the main engine house and became operative in 1909. Other additions to the complex in 1909 included an engine shed and workshops at the end of the siding near the site of the export shale exchange and the installation of an acetylene-gas generating plant for lighting the retorts.

By 1913, it had become clear that the supply of shale from New Hartley Mine was coming to an end. In June 1913, the receivers and managers of COC decided to close the plant and cease trading. The Torbane retorts were shut down on 3rd June 1913. Salvageable items were removed to Newnes. Railway records indicate that, by April 1920, the various company houses were being dismantled and their components sent to Newnes for re-erection. Further dismantling of the plant occurred in 1925-26, when a large quantity of fire bricks and other material were loaded into the company's "Dreadnought" bogie high-sided wagons and sent to the oil refinery near Duck Creek at Clyde. By 1930, dismantling activities at the retorts had been completed, including removal of the rails from the Torbane private railway.

In 1924, a Victorian firm known as the Torquay Anglesea Company was formed and a plant based on a Schultz Retort was erected at Torbane siding. Shale was conveyed from the Airly site to the retort by tramway. Work on this project did not continue for long and the plant was subsequently stripped and sold.

In July 1925 an aerial ropeway was constructed from Torbane siding to the coal mines at New Hartley. A large loading staith was erected to the north of Torbane Station, where the coal was graded for size and quality. In December 1926, the project was purchased by the

"Renown" Company, however in the following year, production ceased and the ropeways were demolished.

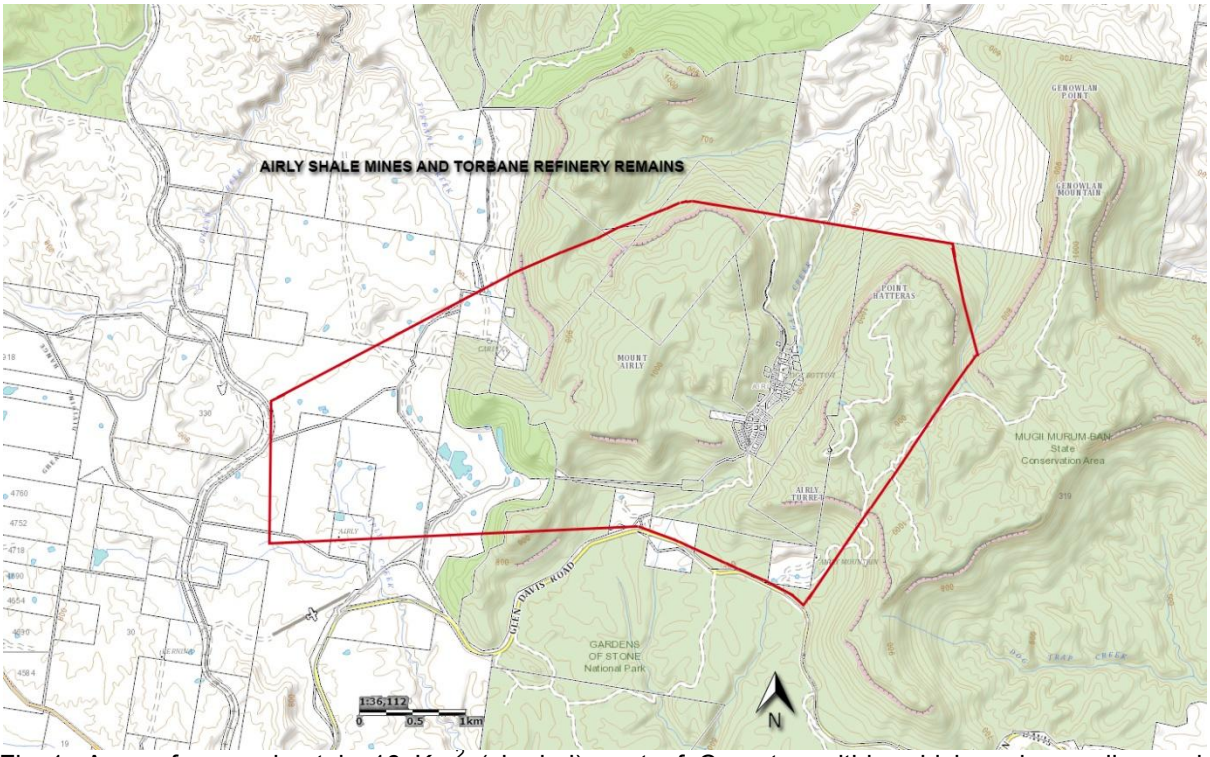

Fig 1. Area of approximately 16 Km^2 (shaded) east of Capertee within which various relics and evidence of the Airly Shale Mines occurs.

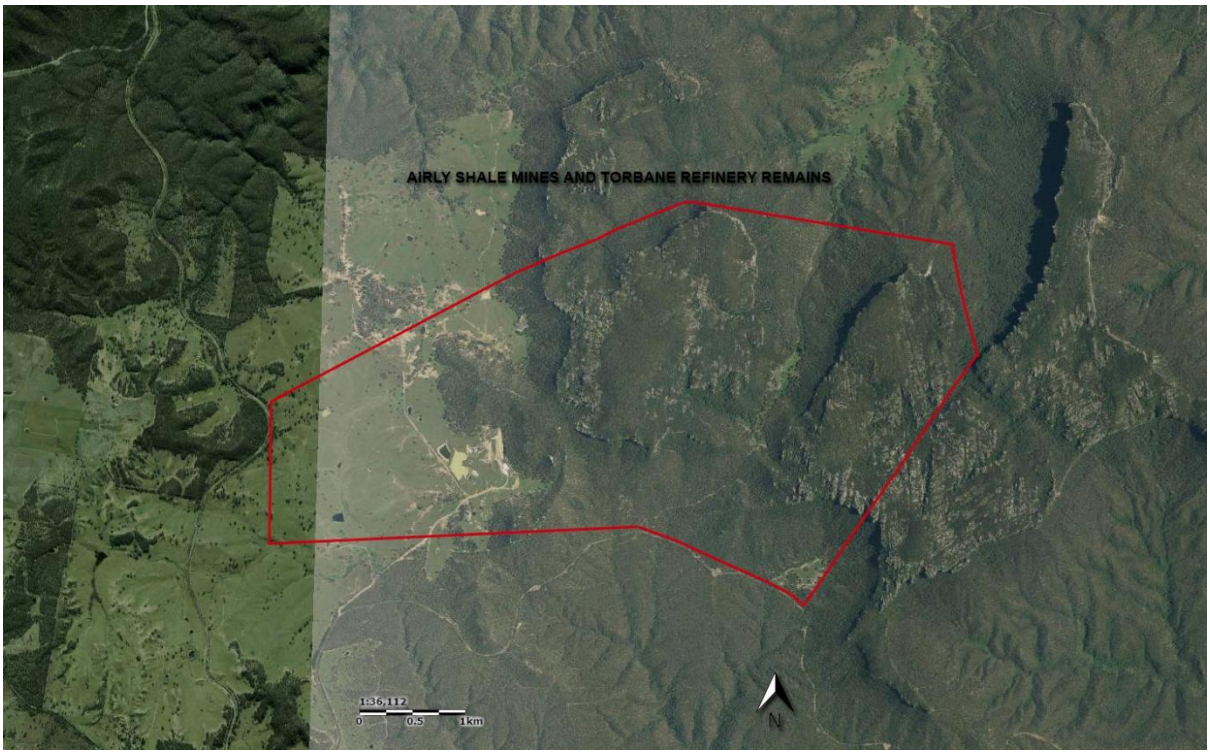

Fig 2: Aerial Photograph of the area east of Capertee (shaded) within which various relics and evidence of the Airly Shale Mines occurs

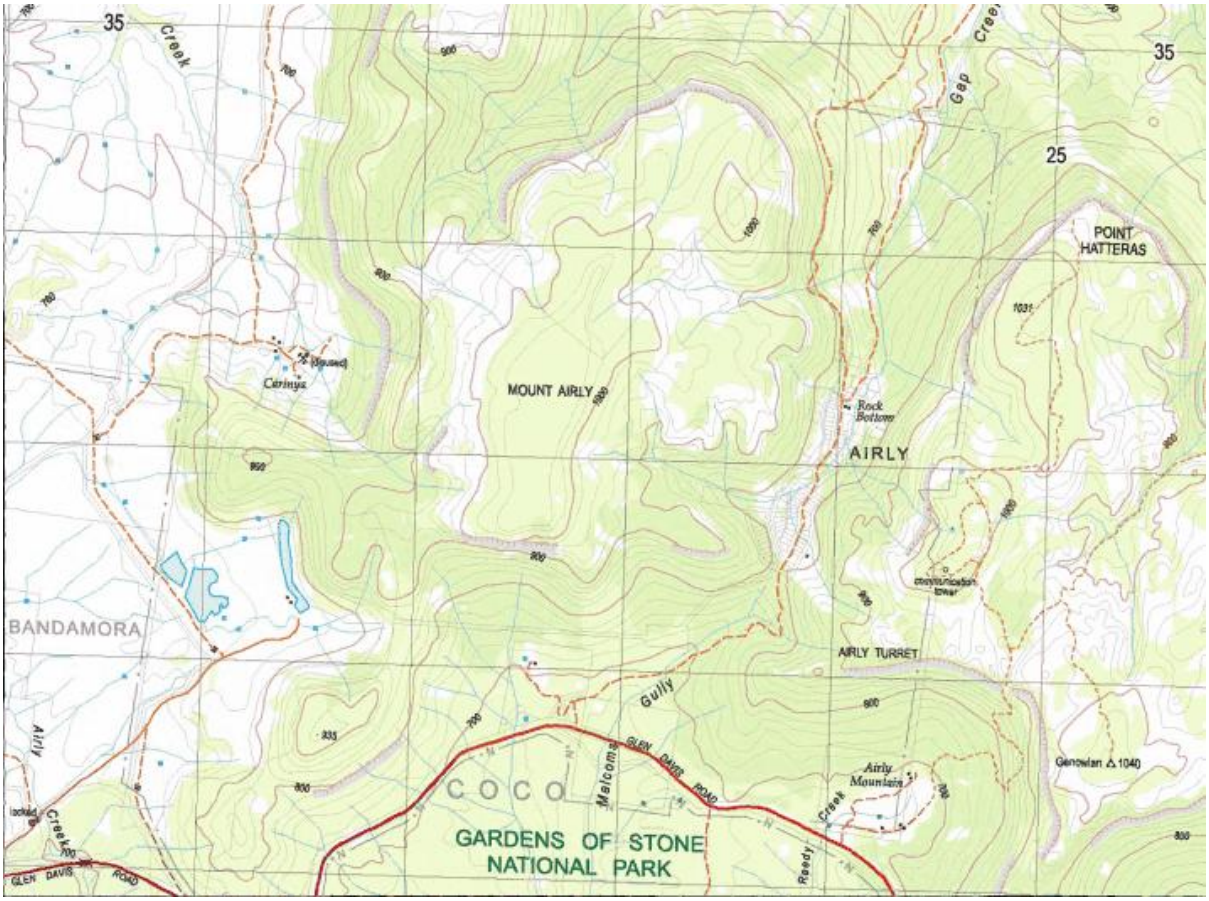

Fig 3: Extract from Topographic Map Glen Alice 89314N showing the area east of Capertee associated with the shale Mines at Airly. The '*Carinya*' Homestead at the centre left occupies the site of the former Torbane Refinery

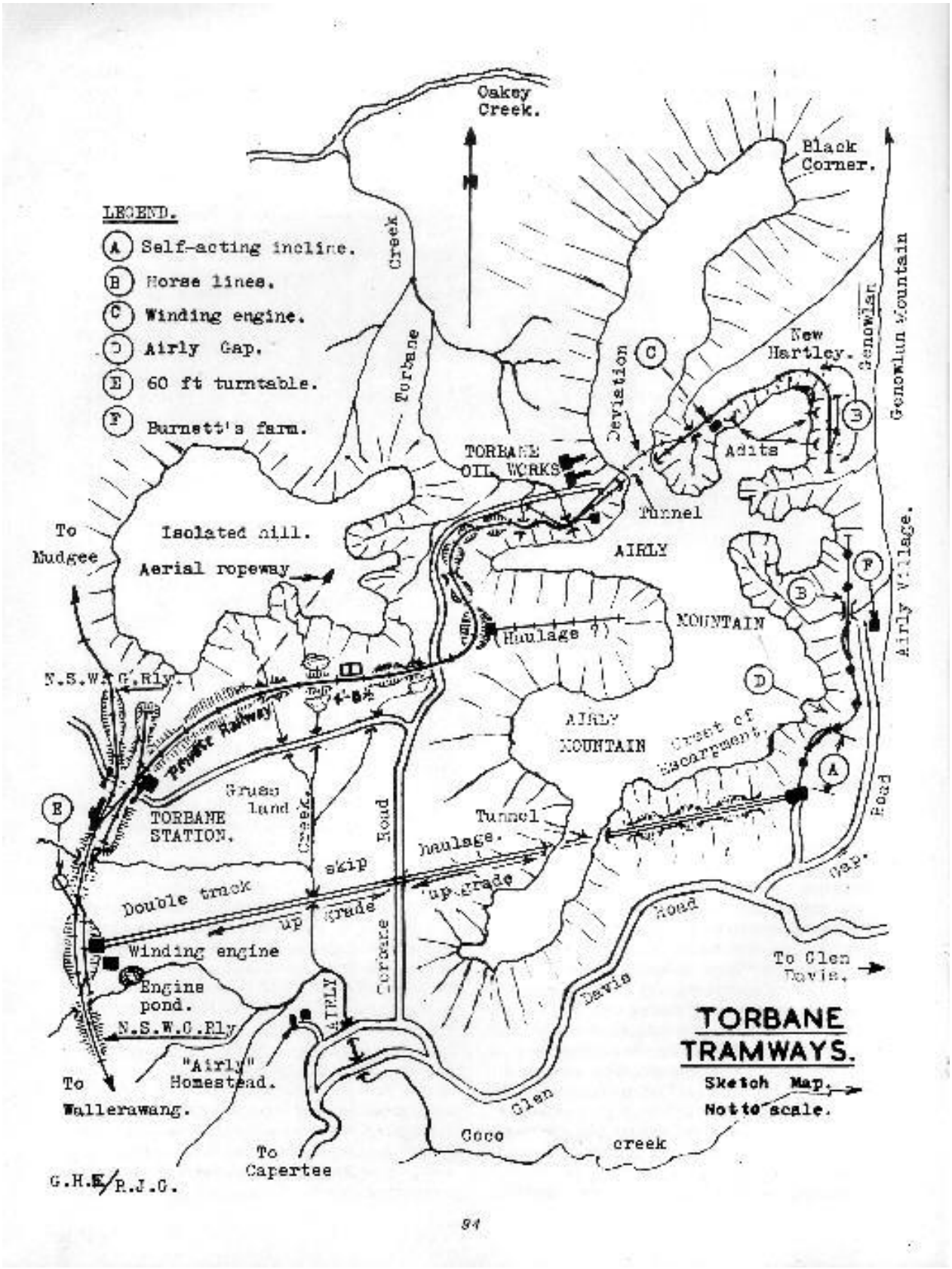

Fig 4: Map of the Torbane Tramways, from: EARDLEY, Gifford H. & STEPHENS, E. M; *The Shale Railways of New South Wales;* Australian Railways Historical Society; 1974.

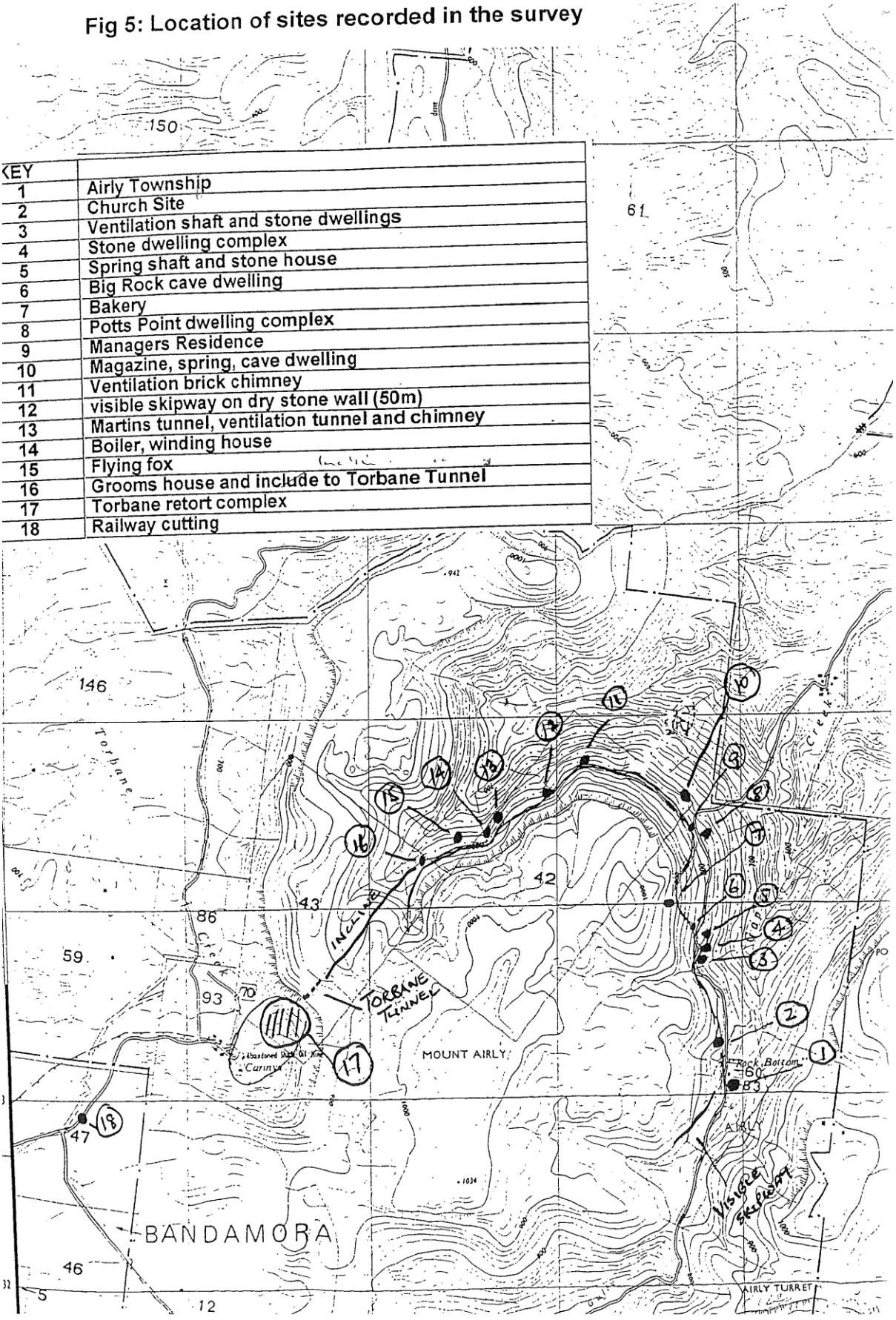

Fig 5: Map of Sites recorded by Robynne Mills (1998), from: Mills, R; *A Preliminary Heritage assessment of Airly Shale Oil Mining Complex*; Report for IEC; 1998

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BOUNDARY OF LISTING:

The various relics, sites and remnant landscapes associated with the shale mines in the vicinity of Airly are scattered across a wide area (approximately 16 Km^2) east of Capertee (see approximate area in Figures 1 & 2 above). This listing is not of a discrete area of land but of the evidence of the shale mines where it occurs within this overall area. Parts of the land encompassed within this area are privately owned and permission must be sought from the owners prior to any attempt to visit the site.

Appendix 1 - Airly Shale Mines and Torbane Refinery Remains – Land Title Details

Part Lot 2		DP 577478
Lot 3		DP 577478
Part Lot 22		DP 650039
Lot 9		DP 655050
Part Lots 158/159		DP 722293
Lot 11		DP 755757
Lots 33/34		DP 755757
Part Lots 42/43		DP 755757
Part Lot 59		DP 755757
Lot 60		DP 755757
Lot 70		DP 755757
Lot 78/83		DP 755757
Part Lot 86		DP 755757
Lot 87		DP 755757
Lot 89/91		DP 755757
Part Lot 93		DP 755757
Lots 94/110		DP 755757
Lot 112/121		DP 755757
Lot 123/126		DP 755757
Lot 139		DP 755757
Part Lot 8		DP 755758
Part Lots 45/47		DP 755758
Part Lot 55		DP 755758
Lots 1/10	Section 1	DP 758011
Lots 1/6	Section 2	DP 758011
Lots 15/17	Section 2	DP 758011
Lots 1/9	Section 3	DP 758011
Lot 5		DP 986083
Lot 7020		DP 1029319
Lot 7025/7026		DP 1050399
Lot 7022/7024		DP 1050402
Lot 7021		DP 1050431
Lot 7019		DP 1050747
Lot 7018		DP 1051447
Lot 7001		DP 1057060
Lot 7013		DP 1057515
Part Lot 7014		DP 1057712
Lot 7015		DP 1057714
Part Lot 7002		DP 1058210
Part Lot 7016		DP 1114802
Lots 7033/7034		DP 1116073
Part Lot 7031		DP 1116097
Lot 7032		DP 1116097
Part Lots 7035/7036		DP 1117631
Lot 7038		DP 1117632
Lot 7037		DP 1117633
Lot 10		DP 1118781
Lots 7/14		DP 1118784
Lot 18/24		DP 1118800
Lots 12/15		DP 1118801
Lot 7300		DP 1130282
Lot 7303/7304		DP 1130566
Part Lots 1/2		DP 1152312
Lot 1		DP 1190721
Lot 1688		DP 1191655

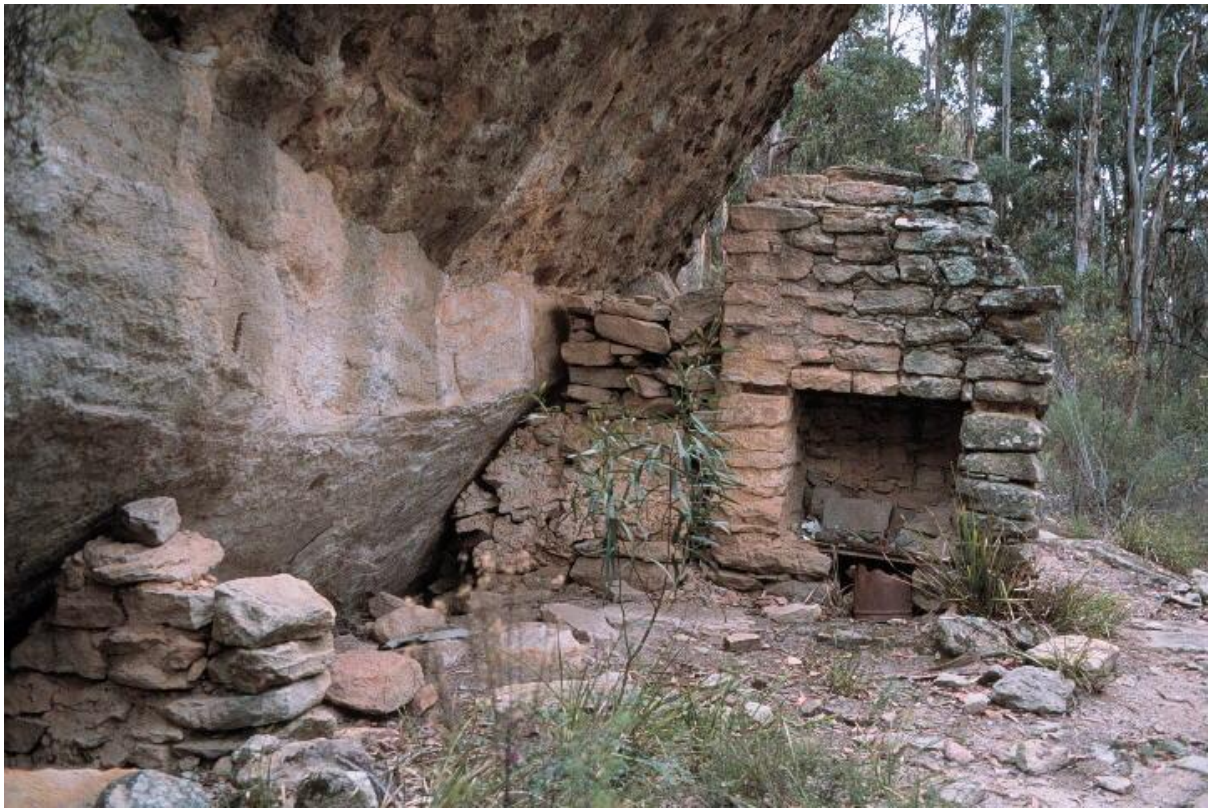

Figure 6: Remains of a Miners Hut under a cliff overhang at Airly Gap (Source: Ayling, B op cit)

Figure 7: Remains of the Mine Managers House at Airly Gap (Source: Ayling, B op cit)

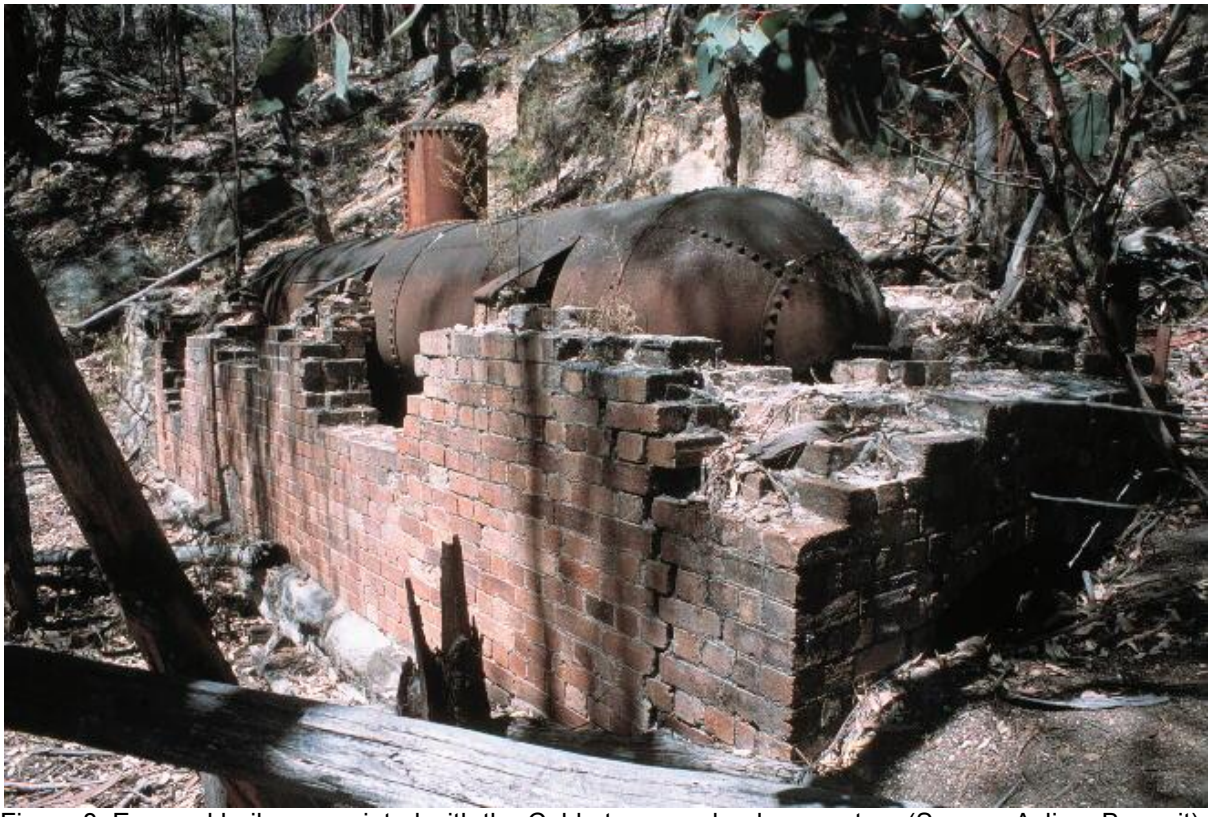

Figure 8: Egg-end boiler associated with the Cable tramway haulage system (Source: Ayling, B op cit)

Figure 9: Remains of the Torbane Refinery and transport terminal. The Works Managers House at centre is now privately owned and occupied. (Source: Ayling, B op cit)

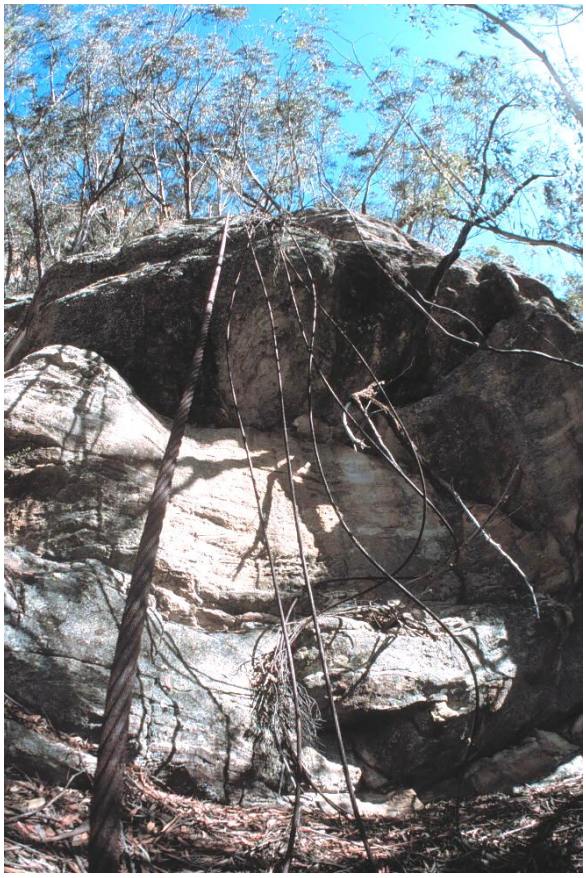

Figure 10: Remains of a Haulage Cables
(Source: Ayling, B op cit)

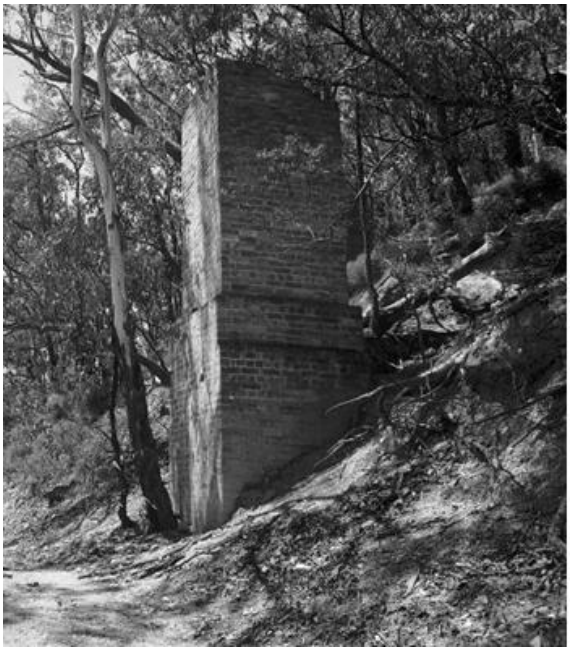

Figure 11: Mine Ventilation Chimney
(Source: Ayling, B op cit)

Figures 12 & 13: An abandoned skip (left) and overgrown winding drum (right) (Source: Ayling, B op cit)