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## Editorial

Part I of John Buckland's history of the State Electricity Commission of Victoria's (SECV) railway operations at Yallourn (*LR82*) has promoted widespread positive comment from readers. We are therefore proud to present Part II of the history of the SECV industrial railways in this special issue of *Light Railways*. This concluding article covers the giant Morwell project which brought open-cut mining operations on a far larger scale than previously used at Yallourn. Although the Morwell project resulted in an expansion of the SECV railway system, it also marked the introduction of conveyor belt technology for coal transport and overburden disposal.

The success of the conveyor belts meant that plans for the extensive use of railways in the Morwell open-cut were shelved and eventually the railway system at Yallourn began to be phased out. However, an interconnecting railway was constructed between Yallourn and Morwell and the system continued to carry heavy traffic through the sixties and seventies. This article provides a detailed account of railway operations to 1979.

#### Notes on LR82

p.6, bottom column A: V-class locomotives should read "Nos. 11, 143 and 145."

Additional information on the operation of the electric steep haulage system described on pages 20-21 of *LR82* is provided on page 16 of this issue.

**Cover:** Night scene on the Yallourn-Morwell interconnecting railway as loco No. 108 heading a train of 20-ton coal hopper wagons awaits a crossing, July 1962.

Photo: SECV

## BRIQUETTES AND POWER: SECV INDUSTRIAL RAILWAYS AT YALLOURN AND MORWELL by John L Buckland

#### PART II: THE MORWELL PROJECT

#### The Morwell Project

Viewed in perspective, so successful has been the electrical enterprise conducted by the SEC at Yallourn in making Victoria independent of supplies of NSW black coal and supplying virtually the entire State of Victoria and some adjacent areas of southern New South Wales with electricity, that after the conclusion of hostilities in 1945, the State Government accepted the SEC's recommendations for further brown coal production and authorised development of a huge new open cut to serve two



46-ton electric locomotive No. 39 heads an overburden train at Morwell on 27 August 1959. Overburden disposal at Morwell was taken over by a conveyor belt system in February 1968.

new briquette factories at Morwell and, besides electricity generation at Morwell, the massive power station at Hazelwood, near Morwell, with 160 MW capacity. Development of the Morwell open cut commenced in 1946 with earthmoving equipment, but an overburden railway system was planned and used during the development to transport excavated material to dumps at Morwell South and also some was hauled over the interconnecting railway to Yallourn for dumping in the open cut there.

In the light of over 20 years experience in operating the Yallourn open cut and railway system, it was decided to employ similar methods, but on a far larger scale for the Morwell project, for which equipment was ordered from Germany (West) as soon as possible after hostilities ceased in the European theatre.

The equipment included locomotives and rolling stock of greater capacity and dredgers for both overburden-stripping and coal-winning, as well as other heavy items of capital equipment for delivery in time for commencing the scheme in the early 1950's. As considerable technical progress had been made by the German brown coal industry before and during the war, most of the dredgers were designed for operation on crawler tracks, while developments in materials handling indicated use of conveyor systems instead of rail transport for coal and later overburden disposal.

Following the Government's decision to proceed with the Morwell project, orders were placed in Germany for locomotives and overburden wagons of greater capacity and in Australia for coal hopper wagons substantially larger than those in use at Yallourn, as well as bucket wheel dredgers for coal and overburden, an overburden spreader and a large dump plough as well as trackshifters of a new design. Orders for railway equipment comprised:

- 13 locomotives of 1000 horsepower from Siemens-Schuckertwerke (with carbodies by Henschel & Sohn);
- 70 overburden wagons of 32 cubic yd capacity each 30ft 10 in over buffers; 8ft 8-1/2in width and 9ft 3-1/2 in height with a tare mass of 22 tons supplied by Glaser & Pflaum on underframes made by Wagonfabrik Talbot, Aachen;
- 92 coal hopper wagons of 33 tons capacity each 31ft 0in long over buffers, 8ft ll-1/4in width (12ft 1 in with discharge doors open) and 10ft 6in height with tare mass of 18 tons from Tulloch Limited, Sydney.

Additionally, no less than six six-coupled dieselelectric locomotives similar to those then on order for Victorian Railways (*F Class*) were ordered from English Electric Co. for operation on 5ft 3in gauge and three 150 horsepower six-coupled diesel-mechanical locomotives for operation on 90cm gauge were ordered from John Fowler (Leeds) Limited, for use as shunters and track-shifting when power was unavailable. In the event four of the broad gauge diesels were leased and eventually sold to VR with the other two retained for operation at Newport Power Station, until they too were sold to VR after cessation of briquette haulage to Newport direct in 1971.

Before the Morwell open cut was commissioned, however, the success of conveyor belts for coal transport at Yallourn caused a change of plans which eliminated the proposed coal railway in the Morwell open cut and subsequently the overburden system too was abandoned in favour of the newer materials handling method. The interconnecting railway linking Yallourn and Morwell operations, however, remains in constant use, hauling Yallourn coal to Morwell for briquette production and formerly coal back to Yallourn for power station use. Despite the eventual phasing out of coal transport by rail at Yallourn, the traffic to Morwell is expected to continue indefinitely.



62-ton locomotive No. 122 heads a train of 33ton hopper wagons at Yallourn, March 1974. Note the experimental Faiveley pantograph.



Yallourn-Morwell Area. Plan showing Relationship of Open Cuts to Power Stations and Briquette Factories.

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#### **Electric Locomotives**

Herr Klitzing's 1925 recommendations for total mechanisation of overburden-stripping and transportation and coal-winning and transportation at Yallourn resulted in adoption of standard German coal-mining and transport equipment, including electric locomotives. These had been developed in Germany specially for the brown coal industry to metric specifications, hence the selection of 90cm track gauge, for which special low-profile locomotives (known generically in Germany as *Arbraumdlokomotiven*) and specialised rolling stock were built and supplied by a number of engineering firms in the Rhineland.

The first order for equipment for the 90cm gauge electric railway at Yallourn was for three 44-ton Bo-Bo locomotives, 26 twenty-ton capacity coal hopper wagons and 36 side-dumping 20 cubic yd capacity overburden wagons placed through Gollin & Co., Melbourne in August 1926. The locomotives with a central cab were of 440 horsepower with four x 110 horsepower DC motors giving a starting tractive effort of 26,0001b (23,0001b continuous rating at 8-1/2 mph). These were supplied by A. Borsig Lokomotivwerke, Berlin, in conjunction with Siemens-Schuckertwerke, which supplied the electrical equipment. These were delivered and placed in service at Yallourn in September 1927, carrying SEC Nos. 21-23.

Repeat orders for three (later increased to four) additional locomotives were placed in March and May 1927 and delivered in May 1928, going into service as SEC Nos. 24-27. These were followed by a further order for an additional four locomotives built by Henschel & Sohn, Kassel, with electrical equipment supplied by Siemens-Schuckert, which were delivered and entered service in April 1929, carrying SEC Nos. 28-31. A further order for a single locomotive was delivered from the same source in April 1934 as SEC No. 32 which, unlike



Two 46-ton locomotives, Nos. 23 and 25, in permanent mu (note single pantograph) head a coal train at No. 6 bucket dredger in July 1962.



its predecessors, was equipped with Australianmade Westinghouse brake equipment in place of the German Knorr equipment previously supplied. Another two locomotives were received from the same source and placed in service in February 1937 as SEC Nos. 33 and 34, similarly equipped. Carbodies for Nos. 28-34 were built locally by Kelly & Lewis Pty. Ltd. Springvale, Victoria.

Proposals had been made that additional locomotives might be built locally by VR Newport Workshops, or private industry, but as orders were infrequent and usually only for a few units, specially equipped, German-built engines could be landed for less cost, and without complications as to infringing patents or payment of royalties. However, after the outbreak of World War II in 1939, the expanding demand for power and briquette supplies for industry required additional locomotives and rolling stock. So the resources of local industry were enlisted for construction of six more locomotives which were assembled in the SEC Base Workshops at Yallourn from parts supplied by Kelly & Lewis Ltd. (bogie frames, main frames and cabs, etc.); Thompsons Engineering & Pipe Co. Ltd. (wheels, axles and axleboxes); Richardson Gears Pty. Ltd. (spur wheels and pinions) and Australian General Electric Co. (motors and electrical equipment, etc.). Brake equipment was

provided by Westinghouse Brake (Australasia) Pty. Ltd.

These locos weighed slightly more at 46 tons than their German counterparts, but were otherwise identical. They entered service at Yallourn progressively from January 1942 until June 1946 as SEC Nos. 35-40. To meet pressing demands imposed by post-war expansion of production and help overtake arrears of maintenance on some of the older locomotives in the fleet, a further four 46tonners were built at Yallourn workshops and issued to traffic between July 1952 and July 1953 carrying SEC Nos. 41-44. These were the last of the 46-ton locomotives built by the SEC.

Following closure of the Yallourn briquette factories in 1971 and discontinuance of overburden haulage, many of the 46-ton locomotives were set aside and subsequently sold for scrap and cut up on site in 1975-76. Official records show that these locos were withdrawn from service as follows: Nos. 22, 26, 28, 29, 30, 31, 32, 33, 35, 36, 38 and 43 on 15 April 1970, and Nos. 21, 23, 24, 25, 27, 34, 37, 39, 40, 41, 42 and 44 on 25 June 1970. Nos. 27, 37, 40 and 41 were retained in service.

The 60-ton locomotives were delivered in 1950-51. Nine were stored at Morwell until required. The first four were issued to traffic at Yallourn between August 1950 and May 1951 as SEC Nos. 101104. They were of similar appearance to the earlier 44/46-ton locomotives but develop a starting tractive effort of 33,600lb at 25 per cent adhesion from four x 200 horsepower motors with an overload capacity in aggregate of 1020 horsepower.

The remaining nine locomotives were commissioned eventually in 1954 carrying SEC Nos. 105-113 inc. Although ordered for, and intended to be for service at Morwell open cut, they were employed mainly in coal train haulage at Yallourn and over the inter-connecting railway to Morwell due to substitution of a conveyor system for coal handling for the planned railway. With the withdrawal progressively of most of the early 44/46-ton locomotives from the late 1960s, those remaining in service were permanently coupled in pairs and fitted for multiple unit operation from one cab.

These coupled pairs have been phased out of service by purchase of three new 62-ton Henschel-Siemens-Schuckert locomotives in 1963. These are SEC Nos. 121-123 and are of 1020 horsepower, developing 40,0001b tractive effort at 29 per cent adhesion (virtually the same as a VR X-Class *Mikado* without booster).

These have automatic controllers with three basic positions: slow drive, intermediate and full power. Depending on the load and the speed required the driver selects the controller position required and the loco notches up independently. In a subsequent order, two Japanese-built Hitachi locomotives, SEC Nos. 124 and 125, were commissioned in 1967. These 62-ton locomotives are also of 1020 horsepower, but apparently have not been as successful or popular as their German counterparts, due to lack of flexibility of their bogies on temporary tracks on the coal faces.

All SEC locomotives have air-operated sanders four for each direction and normally operate with both pantographs in contact with the overhead, to minimise arcing and loss of power. The miniature side pantographs, removed from all earlier locomotives by March 1956, were not fitted to the 62-



60-ton locomotive No. 108 on an overburden train dumping its load for reclaiming by spreader in the bottom of Yallourn open cut, June 1957.



tonners. Main pantographs are now fitted with long single pans; those on the Hitachi's being of the single-arm Faiveley type air-operated. Normally maximum speed permitted on permanent ballasted track is restricted to 30mph but on the temporary tracks on the coal faces subject to repeated lateral shifting, the levels and alignment were quite incredible and only slow speed (10mph maximum) was permitted. Locomotives are equipped with antiderailing beams on each bogie and forged bar couplings with pins are used in addition to safety chains on either side of the central buffers. Traction motors are force-ventilated and twin electric headlights are fitted at both ends, with a whistle for warning purposes. The original German-built machines had an air-operated bell initially.



Hitachi built 62-ton locomotive No. 124 in Yallourn open cut. Note single arm Faiveley pantographs.

Unlike most designs of central (steeple) cab electric locomotives, duplicate pantographs were provided at each end - a central main one for normal use flanked on either side by a miniature tilting pantograph for use on sections of temporary track where the trolley wire, supported at one side of the track centre was clear of loading chutes. These auxiliary pantographs were originally fitted to all 44/46-ton and the 60-ton post-war locomotives. They could be tilted by levers through an arc of 90 deg. from the horizontal (where they were retracted) to contact the trolley wire, causing much arcing and loss of contact due to sagging. They were eliminated from 1956 by fitting of longer contact pans on the central pantographs. These were raised by springs and retracted by a rope and pulley from the cab. **Diesel Locomotives** 

In addition to the electric fleet, the SEC register includes four diesel-mechanical locomotives of two types on 90cm gauge. Three are 0-6-0's of 150 horsepower, weighing 20 tons developing 10,585lb maximum tractive effort at 80 per cent bhp. They were built by John Fowler (Leeds) Limited and carry numbers 12,13 and 14, and placed in service at Yallourn between 1951 and 1954. They are used for shunting at the workshops where some tracks are not wired, for track maintenance and can be used for track-shifting duty if electric power is not available. At the Central Workshops, Yallourn, a shop engine, identified as No. 8 is a 10-ton Gardner-powered 0-4-0 with jackshaft drive and 102 horsepower. This was one of a number of similar machines originally built by Malcolm Moore Pty. Ltd. for operation on 3ft 0in gauge construction lines at the Kiewa hydro-electric project in north-eastern Victoria in the mid-1940's. **Rolling Stock** 

The Commission's rolling stock for operation on its railway systems at Yallourn and Morwell comprised at least 100 ropeway coal hopper wagons of 3-tons capacity for operation on 20-1/2in gauge ropeways; an unknown number of 5 cubic yd side-



Fowler built diesel-mechanical locomotive No. 14 on a train of 5 cu.yd. ballast hopper wagons, July 1962.



Gable-bottom side discharge hopper car used on the 20-1/2in gauge rope haulage-way at Yallourn. JL Buckland photo

tipping wagons on 3ft 6in gauge (numbered in the 200 series) some of which were later converted to 90cm gauge; 80 gable-bottom coal hopper wagons of 20-tons capacity, of which at least 15 were rebuilt as 26-tons capacity, numbered in the 300 and 600 series, respectively; 90 air-dumping overburden wagons of 20 cubic yd capacity (400 series) and 70 similar but larger wagons of 33 cubic yd capacity (500 series).

In the event 70 of the overburden wagons, displaced after Morwell changed over to conveyors, were rebuilt at Yallourn Central Workshops as 26ton capacity coal hopper wagons in the 600 series, which themselves have now been phased out as coal transport on the working levels in Yallourn open cut has been transferred to conveyors. All the rolling stock is bogie type with four-wheel roller bearing bogies, except for ten four-wheeled ballast hopper wagons with aluminium bodies made at Yallourn fitted to 200 series wagon chassis. Steel bangles known as 'janglers' are fitted to many wagon axles as a safety measure to warn maintenance staff working on or near the tracks and motor vehicles at some unprotected level crossings in the open cut of approaching trains. Because of the quiet running due to the cushioning effect of coal dust between rail and wheel treads, the continuous clanging of janglers when trains are running serves as an effective warning, particularly as 50 per cent of traffic involves the propelling of wagon rakes by the locomotive at the rear. Because of this and the limited visibility of the loco drivers, the terminal vehicle on each rake is fitted with flashing amber lights and the end is painted with diagonal black and yellow stripes.

Other items of rolling stock on the SEC register include 10 four-wheel ballast hopper wagons of 5 cubic yd capacity, built in the Yallourn Base Workshops in 1954, and four 40-ton capacity flat wagons. As a result of the decision to transfer overburden disposal to a conveyor belt system at Yallourn from 19 April 1963 and later at Morwell from 9 February 1968, all but four of the overburden wagons have been scrapped. Coal transport at Morwell open cut was by conveyor belt from the outset and the progressive conversion of coal transport at Yallourn open cut is expected to be completed in 1983. However, the railway link between Yallourn and Morwell will remain in existence and use for many years yet.

#### **Mechanical Track-Shifters**

Among the most interesting of the unique items of equipment on the SEC railway system were the mechanical track-shifters, two of which were imported from Germany with the first overburden dredger in 1928 and the second deep coal dredger in 1931. They were the only machines of their kind in Australia and were propelled by a locomotive for shifting the transport tracks on the working surfaces for both overburden and coal dredgers. They were also used when necessary for lifting tracks for ballasting or to improve drainage, which frequently caused problems in winter.

The original two machines were comprised of a long cantilevered steel girder, carried on a bogie on which it pivoted at the centre. This could be raised or lowered and swung up to a maximum of nine feet either side of the track centre from the operator's cab at the rear end. This was a separate item carried on its own wheels. At the outer end of the cantilever arm were four pairs of grooved rollers which were clamped over the heads of the rails to be shifted. The arm was then raised with attached sleepers and any overhead support arms and moved laterally to



Original German-built 20-ton coal hopper wagon used at Yallourn open cut railway (300 series).



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whatever side and amount necessary (normally about 9 in per pass of the machine to minimise stress and possible rail breakage). Special flat fishplates fitting the web section of the rails were used on tracks subject to shifting by this means.

Track-shifting was carried out at slow speed as both the machine and propelling locomotive both traversed the section of track being relocated. Work which would occupy a gang of men for hours, was accomplished in about 20 minutes without breaking the track or unduly delaying train movements. A third track-shifter was acquired for Yallourn followed by two more (one each for Morwell and Yallourn) imported in 1949. These were made in Germany by Lubecker Maschinenbau AG (LMG) which firm also made some of the coal and overburden dredgers. The additional machines were bridge-type shifters with the girder supported at each end on a carrying bogie. The gripping rollers were mounted on a central point in the beam with side displacement controlled by an operator in a cabin at one end. The dimensions of Nos. 4 and 5 track-shifters were 72ft 0-1/2in over buffers: 8ft 8in height and 6ft 5in wide. The girder length was 59ft 3-3/4in and the tare mass was 34 tons.

#### **Overburden Dump Ploughs**

Yet another specialised machine designed to operate on the 90cm gauge railway tracks on the

overburden dumps was a self-propelled electric dump plough designed to spread and level overburden dumped by overburden trains. This machine was not unlike a locomotive, but equipped with scraper blades at each end and adjustable mouldboards on one side for operation in either direction. There were two of these; the first built in Germany by LMG was identified only as Type GR 14/50 and weighed 52 tons, including 4 tons of ballast with an electric motor rating of 280 horsepower; the original Yallourn machine incorporated a trackshifter at one end. It was taken out of service in 1958. A similar but more modern machine was imported from Germany for Morwell in 1950, which weighed 56 tons and was 53ft 6-1/2in over buffers. It had a pair of pantographs mounted on the central cab roof. It was also made by LMG.

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Dump ploughs were used to level off and spread the material dumped from overburden trains on the earlier dumps and later, at Yallourn, for filling in the trench left by the overburden reclaimer bucket wheel on the spreading machine after spoil was dumped back in the open cut excavation.

#### **Train Operation Practice**

All trains are operated by one man - the locomotive driver - and empty trains are propelled to their destinations and hauled when loaded. When the electric railway system was inaugurated over-



Overburden spreader dump plough on subsidiary overburden dump, Yallourn, c.1930.



Rear end of an overburden train at Yallourn open cut showing identification lights under the cowl of trailing wagon. The outer rails were for the original overburden dredger.

JL Buckland photo.

burden trains comprised rakes of ten 20 cubic yd wagons; coal trains were restricted to six wagon rakes, possibly on account of the capacity of the steep haulage system from No. 2 working level. Incidentally, when first delivered the coal hopper wagons were numbered 1-36, but soon renumbered in the 300 series. Wagons were originally painted in a shade of red lead with white numerals. Locomotives were unrelieved black with small white numerals on the cab sides. For many years now all rolling stock and locomotives have been painted silver aluminium with large black numerals; the 62ton locos even have their numbers painted on the cab roof.

Until comparatively recently coal train consists were comprised of three standard-sized trains:

- (a) Rakes of 15 x 20-ton capacity wagons = 556 tons gross (or 570 tons with a 60-ton locomotive);
- (b) Rakes of 15 x 26-ton capacity wagons = 765 tons gross (or 797 tons with two 46-ton locomotives in multiple unit);
- (c) Rakes of 13 x 33-ton capacity wagons = 725 tons gross (with 62-ton locomotive).

Occasionally mixed rakes of wagons of different

capacities as well as short rakes when vehicles were unserviceable, were used to meet coal transport requirements. All trains on the interconnecting railway to Morwell were in 600 or 700 series sets. As the locomotives were single manned, special provision is made for operating the brakes from either side of the cabs, which can be totally enclosed in cold or wet weather.

The controller in the newer locos is placed centrally to make operation easy from either side, with a large hand wheel in place of a handle. Current for traction supply to the overhead trolley wire is from mercury arc rectifiers conveniently placed along the track supplied by the 6,600 volt AC supply mains in the field.

In order to distinguish the 26-ton coal wagons from the 33-tonners, the former have two red bands longitudinally on each side. Unlike the earlier 20ton wagons, in which the whole of each side formed the discharge door, both 600 and 700 series wagons have two doors in the lower section of each side to

Opposite: No.4 bucket chain coal dredger loading a double-headed coal train on No. 1 level, Yallourn in February, 1961.



speed up unloading at the ditch bunkers. These are under-track hoppers equipped with a bucket-wheel reclaimer which picks up the dumped coal and feeds it to the conveyor system in a continuous flow for delivery to the power station bunkers at Yallourn and the briquette factories at Morwell.

Yallourn coal is preferred for briquette-making as it has a lower moisture content than the Morwell coal with which it is blended to make a uniform high quality briquette. These are rail-hauled in bulk to SEC sidings at Paisley (near Newport) for road delivery to the older sections of the Newport power station, as well as to bulk supply depots in various parts of the State and to industries for fuel.

# THE ELECTRIC STEEP HAULAGE SYSTEM

The diagram shows the location of the original Electric Steep Haulage System employed to minimise haulage distance from the No. 2 (low level) coal dredger to the power station terminal bunker. The cycle of operations was as follows:

At the end of the haul, a full train of six loaded wagons with a gross weight of 200 tons, is at the top station and an empty train of six wagons weighing 78 tons, is at the bottom station, both trains resting against their respective pushing 'dummy' trucks. At the upper station a locomotive immediately coupled to the train, which it hauled to the terminal bunker for unloading, then returned the empties to the dummy after which the loco was uncoupled.

At the bottom station, simultaneously with these operations, another loco was attached to the empty rake which was propelled and hauled to the dredger; a reversal being necessary en route. A full train was then pushed and hauled to the bottom station and shunted on to the waiting dummy. The locomotive was then uncoupled and moved to the siding on to the waiting dummy. The signals were then given to the hoist winch driver and the hoist commenced; the trains being raised and lowered simultaneously at a speed of 500ft per minute. The haulage was phased out of use after 1956.



Diagram of electric steep haulage system: courtesy Kieth Buckland.

Opposite: Locomotive No. 39 hauls an overburden train being loaded at Yallourn open cut by the newer rail mounted bucket chain overburden dredger, August 1967.

Education Dept. of Victoria



#### **Centralised Traffic Control System**

As previously mentioned, the colour light signalling system was developed and expanded into a modern train control centre, established on the No. 1 working level at the South Pivot in 1961/62. This featured an illuminated track diagram which indicated the passage of all trains in operation of the system, including the interconnecting railway to Morwell, which is basically single track with signalled passing loops arranged for uni-directional working. Besides crossing the Morwell River on a steel viaduct, it spans the divided Princes Highway (East) and the electrified VR Gippsland mainline just west of Morwell before passing under the former VR Mirboo North branch line (now closed and dismantled) before entering the Morwell open cut area. It terminates not far beyond a crossing loop (No.12) at the No. 11 Ditch Bunker (Morwell). This line previously continued to link up with the Morwell overburden transport railway, which was discontinued in 1968 (see diagram).

With the gradual contraction of the coal transport rail movements in the Yallourn open cut, a new train control centre has been established away from the railway and this has superseded the earlier control system. Essentially it is a Centralised Traffic Control (CTC) system with transistorised track/signal diagram push-button operation of signals and points on the interconnecting railway and its connections at the Yallourn end.

#### Accidents

The daily operation round-the-clock of such a large and complex railway system as that at Yallourn, however sophisticated, is not entirely free of accident potential, being basically a single tracked system with conflicting movements. Some spectacular accidents have occurred, mainly on the former overburden system, some of which may be summarised as follows:

- Accident to overburden dump plough due to collapse of overburden dump at Yallourn on 13 November 1939;
- Collision at east end of No. 1 dredger track (loco 34) on 18 November 1943;
- Derailment following collision of loco 22 on overburden train on 29 January 1944;
- Runaway and derailment of overburden train on 1 in 40 grade (loco 37) on 28 September 1944;
- 'Head-on' collision with leading vehicle of an empty coal train ex Morwell (loco 113 written off account damage) on 24 August 1980.

Apart from derailments, which were to be expected due to the irregular track geometry on the coal working faces and the flooding of the open cut by the Latrobe River in November 1934, previously mentioned, a fire in the open cut which raged for two days in February 1944, damaged and put out of commission two power shovels and two dragline excavators and destroyed No. 1 coal loader. Fire in the coal seam is extremely difficult to extinguish and generates enormous temperatures.

#### **Recent Developments**

So deep is the Morwell seam that the coalwinning already carried out on three levels, will eventually be extended to five or more, with an aggregate working depth of 320ft. Associated with the Morwell briquette production industry initially was the Gas and Fuel Corporation's Lurgi gasification plant nearby, using Morwell briquettes as feed stock. Following the discovery and development of natural gas from offshore sources in Bass Strait, however, the Morwell gas plant was in turn phased out. It may, however, eventually be incorporated in a large-scale plant to produce brown coal char (carbon) for industrial purposes from briquettes.

Development of natural gas and its reticulation by pipelines serving Melbourne and the provincial cities of Geelong, Ballarat and Bendigo as industrial fuel, led to closure of the original briquette factories at Yallourn, and their subsequent demolition, in order to extend the Yallourn open cut westwards through the site of the now abandoned model town of Yallourn to recover the underlying coal.

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Notes of Observations by the author during numerous visits to Yallourn and later Morwell Projects between 1946 and 1975.

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Acknowledgement is also due to Keith Buckland for provision of the diagram of the tracks currently remaining in use on the SEC Railways as at 1979. The other maps and diagrams reproduced are from official sources.

Electricity - Installed Generating Capacity (MW) inc. hydro-electricity									
1924-25	1929-30	1939-40	1949-50	1959-60	1962-63	1965-66	1968-69	1978-79	
94	148	308	522	1460	1898	2395	3337	3861	
Brown C	Brown Coal Production ('000 tons)								
347	1767	3945	6404	10912	12892	13766	11890	14975	YOC
168	44	Nil	764	1324	478	429	459	255	YNO
Nil	Nil	Nil	Nil	1013	3874	6872	10117	15701	MOC
515	1811	3945	7168	13249	17244	21067	22466	30931	Totals
Briquettes Production ('000 tons)									
37	162	428	589	975	1805	1883	1471	1565*	
* Yallour	* Yallourn briquette factory ceased production from 14/12/1971								
Source: SECV Reports									

General Statistics for State Electricity Commission of Victoria

YOC = Yallourn Open Cut

YNC = Yallourn North Open Cut

MOC = Morwell Open Cut



Number	Gauge	Type	Cylinders	D. Dia.	Weight	Origin
V.10	3ft 6in	0-4-4T	(0) 9-1/2 x 15in	36in	15.65 tons	SAR (hired)
DDE.255	5ft 3in	4-6-2T	(0) 18 x 26in	61in	69.00 tons	VR
3	3ft 6in	0-4-2ST	(0) 10 x 15 in)	31in	14.00 tons	Wallaroo & Moonta
5,12	3ft 6in	0-4-2ST	(0) 11 x 15 in)			M & S Co. Ltd.
69, 70, 71	3ft 6in	0-4-0ST	(0) 10 x 16in	33-1/2in	13.00 tons	Robt. Hudson & co.
						Leeds
66, 67	3ft 6in	0-4-0T	(0) 10 x 16in	30in	14.00 tons	SR & WSC
						Hume Dam Constn.
75, 76,)						
77,78)	3ft 6in	0-4-0T	(0) 10 x 16in	30in	14.00 tons	M & MBW Silvan
						Dam Constn.

#### STATE ELECTRICITY COMMISSION OF VICTORIA Specifications of Steam Locomotives formerly used at Yallourn



V-class locomotive No. 10 on hire for bank making during the early construction period preceding open-cut excavations, c1921.

For reproduction, please contact the Society

SEC No.	Туре	Builder	Date built	Date in service	Source	Disposal
3	0-4-2ST	Hudswell Clark & Co. No. 394	1892	1/1925	Wallaroo & Moonta No. 3	Scrapped
5	0-4-2ST	Hudswell Clarke & Co No. 609	1902	4/1925	Wallaroo & Moonta No. 5	Scrapped by 12/1929
12	0-4-2ST	Hudswell Clarke & Co No. 803	1907	1/1925	Wallaroo & Moonta No. 12	Scrapped
69	0-4-0ST	Hudswell Clarke & Co No. 1569	1925	3/1926	Robt. Hudson & Co Leeds, England	Scrapped
70	0-4-0ST	Hudswell Clarke & Co No. 1570	1925	3/1926	Robt. Hudson & Co Leeds, England	Scrapped
71	0-4-0ST	Hudswell Clarke & Co No. 1571	1925	3/1926	Robt. Hudson & Co Leeds, England	Scrapped
66	0-4-0T	Perry Eng. Co. No. 266	1926	9/1941	Bingle Mach'y Co ex Hume Dam	Sold Aust. Cement Co
67	0-4-0T	Perry Eng. Co No. 267	1926	10/1941	Bingle Mach'y Co ex Hume Dam	Sold Aust. Cement Co
75	0-4-0T	Perry Eng. Co No. 275	1928	3/1942	M & MBW Silvan Dam No. 1	Scrapped
76	0-4-0T	Perry Eng. Co No. 276	1928	4/1942	M & MBW Silvan Dam No. 4	Scrapped
77	0-4-0T	Perry Eng. Co No. 277	1928	4/1942	M & MBW Silvan Dam No. 5	Scrapped
78	0-4-0T	Perry Eng. Co No. 278	1928	4/1942	M & MBW Silvan Dam No. 7	Scrapped
Stea	m Locon	notive 5ft 3in gauge			2 um 1101 /	
255	4-6-2T	Newport Shops VR	1909	9/1926	Vic. Railways DDE 255	Scrapped 7/1938
Elec	tric Loco	motives 90cm gauge				
21	Bo-Bo	Siemens-Schuckert) A. Borsig AG)	1927	9/1927	Bought new OOU 25/6/1970	Scrapped
22	Bo-Bo	Siemens-Schuckert) A. Borsig AG)	1927	9/1927	Bought new OOU 15/4/1970	Scrapped
23	Bo-Bo	Siemens-Schuckert) A. Borsig AG	1927	9/1927	Bought new OOU 25/6/1970	Scrapped
24	Bo-Bo	Siemens-Schuckert) A Borsig AG	1927	5/1928	Bought new OOU 25/6/1970	Scrapped
25	Bo-Bo	Siemens-Schuckert) A Borsig AG	1927	5/1928	Bought new OOU 25/6/1970	Scrapped
26	Bo-Bo	Siemens-Schuckert)	1927	5/1928	Bought new OOU 15/4/1970	Scrapped
27	Bo-Bo	Siemens-Schuckert)	1927	5/1928	Bought new, set aside	25/6/1970
28	Bo-Bo	Siemens-Schuckert) Henschel & Sohn	2562/ 1928	4/1929	Bought new	Scrapped
29	Bo-Bo	Siemens-Schuckert) Henschel & Sohn)	2563/ 1928	4/1929	Bought new OOU 15/4/1970	Scrapped
30	Bo-Bo	Siemens-Schuckert) Henschel & Sohn)	2564/	4/1929	Bought new	Scrapped
31	Bo-Bo	Siemens-Schuckert) Henschel & Sohn)	2565/ 1928	4/1929	Bought new OOU 15/4/1970	Scrapped

#### STATE ELECTRICITY COMMISSION OF VICTORIA Steam Locomotives 3ft 6in gauge

LIGHT RAILWAYS

SEC No.	Туре	Builder B/No	Date built	Date in service	Disposition
32	Bo-Bo	Siemens-Schuckert 2944 Henschel & Sohn	1933	4/1934	Scrapped 15/4/1970
33	Bo-Bo	Siemens-Schuckert 3160	1936	2/1937	Scrapped OOU 15/4/1970
34	Bo-Bo	Siemens-Schuckert 3161 Henschel & Sohn	1936	2/1937	Scrapped OOU 25/6/1970
35	Bo-Bo	SEC Base Workshops, 1 Yallourn*	1942	8/1/1942	Scrapped OOU 15/4/1970
36	Bo-Bo	SEC Base Workshops, 1 Yallourn*	1942	17/6/1942	Scrapped OOU 15/4/1970
37	Bo-Bo	SEC Base Workshops, 3 Yallourn*	1'942	27/10/1942	
38	Bo-Bo	SEC Base Workshops, 4 Yallourn*	1943	6/1/1943	Scrapped OOU 15/4/1970
39	Bo-Bo	SEC Base Workshops, 5 Yallourn*	1946	25/1/1946	Scrapped OOU 25/6/1970
40	Bo-Bo	SEC Base Workshops, 6 Yallourn*	1946	21/6/1946	Scrapped OOU 25/6/1970
41	Bo-Bo	SEC Base Workshops, 7 Yallourn*	1952	7/1952	Set aside OOU 25/6/1970
42	Bo-Bo	SEC Base Workshops, 8 Yallourn*	1952	11/1952	Scrapped OOU 25/6/1970
43	Bo-Bo	SEC Base Workshops, 9 Yallourn*	1952	11/1952	Scrapped OOU 15/4/1970
44	Bo-Bo	SEC Base Workshops, 10 Yallourn*	1953	7/1953	Scrapped OOU 25/6/1970
101	Bo-Bo	Henschel & Sohn 28583) Siemens-Schuckert 5136)	1949	15/8/1950	
102	Bo-Bo	Henschel & Sohn 28586) Siemens-Schuckert 5139)	1949	16/10/1950	NB Builder's Nos. for Nos. 101-11
103	Bo-Bo	Henschel & Sohn 28585) Siemens-Schuckert 5138)	1949	11/1950	checked personally by author. No explanation for discrepancies.
104	Bo-Bo	Henschel & Sohn 28584) Siemens-Schuckert 5137)	1949	8/5/1951	
105	Bo-Bo	Henschel & Sohn 25540) Siemens-Schuckert 5206)	1950	17/3/1954	
106	Bo-Bo	Henschel & Sohn 25542) Siemens-Schuckert 5208)	1950	29/3/1954	
107	Bo-Bo	Henschel & Sohn 25541) Siemens-Schuckert 5207)	1950	2/4/1954	
108	Bo-Bo	Henschel & Sohn 25543) Siemens-Schuckert 5209)	1951 1950	6/5/1954	
109	Bo-Bo	Henschel & Sohn 25539) Siemens-Schuckert 5205)	1950	3/6/1954	
110	Bo-Bo	Henschel & Sohn 25544) Siemens-Schuckert 5210)	1951 1950	21/6/1954	
111	Bo-Bo	Henschel & Sohn 25547) Siemens-Schuckert 5213)	1951 1950	8/7/1954	
112	Bo-Bo	Henschel & Sohn 25545) Siemens-Schuckert 5211)	1951 1950	9/9/1954	
113	Bo-Bo	Henschel & Sohn 25546) Siemens-Schuckert 5212)	1951 1950	16/9/1954	OOU 24/8/1980

SEC No.	Туре	Builder B/No	Date built	Date in service	Disposition				
121	Bo-Bo	Henschel & Sohn 29858)	1962	6/1963	1000hp OOU 1982				
		Siemens-Schuckert 6108)							
122	Bo-Bo	Henschel & Sohn 29859)	1962	9/1963	1000hp				
		Siemens-Schuckert 6109)							
123	Bo-Bo	Henschel & Sohn 29860)	1962	9/1963	1000hp				
		Siemens-Schuckert 6110)			-				
124	Bo-Bo	Hitachi Ltd. 101	1967	9/1967	1000hp				
125	Bo-Bo	Hitachi Ltd. 102	1967	9/1967	1000hp				
Diesel-mechanical Locomotives 90cm gauge									
					(Workshon shunter				
8	-R-	Malcolm Moore/Gardner 36	10/10	11/105/	(Fy SEC Kiewa 102hp				
12	-D- C	John Fowler & Co 4210050	1051	27/7/1951	150hp				
12	-C-	John Fowler & Co 4210030	1051	2//7/1951	(Set aside OOU				
15	-C-	John Fowler & Co 4210049	1951	24/7/1931					
14	-C-	John Fowler & Co 4210051	1951	14/ //1954	ISUNP				

B/Nos not known for Nos. 21-27

\* Nos. 35-44 inc. assembled at SEC Base Workshops, Yallourn from components from various outside suppliers (see text).

#### Rolling Stock Coal Hopper Wagons

300 Series — 20-ton capacity — total = 80 No. (15 rebuilt for 26-ton capacity)
700 Series — 33-ton capacity — total = 92 No.
600 Series — 26-ton capacity — total = 85 No. (inc. 70 rebuilt from 32 cubic yd overburden wagons) **Overburden Wagons** (Side Dumping)
400 Series — 20 cubic yd capacity overburden side-tipping wagons - total = 90 No.
500 Series — 32 cubic yd capacity overburden side-tipping wagons - total = 70 No. (rebuilt as 26-ton coal hopper wagons) **Ballast Wagons** (Hopper type) total = 10 No. **Track-Shifters** Nos. 1-5 **Flat Wagons** (40-ton capacity bogie) - 4 No. **Maintenance Wagons** (ex 400 Series) - 4 No.

JLB Revised to 17/3/83

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