NSWGR General Goods Traffic Workings

MSTS Modelling Guidelines – Version 3.0 May 2008

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This document came about as a series of notes that I wrote for my own information when creating and running trains on my MSTS NSWGR routes. As more information came to hand, I decided to make it available to the general MSTS NSWGR community, to enhance their enjoyment of running trains in MSTS over the great NSWGR routes that are available.

At present there are several NSWGR routes, generally available to MSTS users:-

- Coals to Newcastle [CTN] – By Peter Newell (co-authored by myself)
- Central West [CW] – by Chris Nelson (Chris Anderson)
- Tumulla Bank [TB] – by Chris Nelson (part of Team-Alco's 36 Class pack)
- Blue Mountains [BM] – by Mike Simpson
- Main Illawarra [MI] – by Brian Bere-Streeter
- Southern Highlands [SH] – by Chris Nelson
- Southern Mainline [SM] – by Russell Beer

The great majority of comments in this document will relate to the CTN route, but other notes relating to the other routes will be included, as appropriate. Comments will be generally restricted to the prototype situation generally centred around the 1960 period and for about five years or so either side of that timeframe.

Locomotives

Goods Locomotives

Light Goods

- 19 Class – 2 road numbers available
- 20 Class - 2 road numbers available
- 26 Class - 2 road numbers available
- 30T Class – 5 road numbers available (3 superheated, 2 saturated)

Standard Goods

- 50 Class – 5 road numbers available
- 53 Class - 4 road numbers available
- 55 Class - 4 road numbers available

Heavy Goods

- 57 Class – 4 road numbers available
- 58 Class – 3 road numbers available
- 59 Class – 5 road numbers available (3 oil fired, 2 coal fired)
- 60 Class – 2 (+10) road numbers available (+ Team-Alco payware pack)

Passenger Locomotives

Whilst passenger locomotives were generally reserved for passenger services, once the impact of dieselisation made itself felt, 'surplus' passenger locomotives were then often used for goods services. The following ignores older minor classes:-

- 30 Class – 4 road numbers available

- 30T Class – 5 road numbers available (3 superheated, 2 saturated)
- 32 Class – 9 road numbers available
- 34 Class – Not yet available in MSTS
- 35 Class – 3 road numbers available
- 36 Class – 9 road numbers available (Team-Alco 36 Class Pack - payware)
- 38 Class – 6 (+10) road numbers available (+ Team-Alco payware pack)

Diesel Era

Diesel locomotives will be restricted to those generally in service by 1965 at the latest, and in the early liveries, i.e. original Green, or Indian Red (Tuscan).

- 40 Class – 6 road numbers available
- 41 Class – 4 road numbers available
- 42 Class – 5 road numbers available
- 43 Class – 2 road numbers available
- 44 Class – 2 road numbers available
- 48 Class – 4 road numbers available

Electric Locomotives

- 45 Class – 4501 prototype, later re-numbered 7100
- 46 Class – 4 road numbers available

Privately Owned Locomotives

South Maitland Railways
- SMR 10 Class 2-8-2T – 3 road numbers available + 3 1980's era numbers

Richmond Vale Railway
- RVR Kitson Class 2-8-2T – 2 road numbers available
- RVR ROD Class 2-8-0 – 3 road numbers available

Hebburn Colliery
- HC RSHawthorns Class 2-6-2T – 1 road number available

BHP Steelworks - Newcastle
- BHP Bo-Bo Centre Cab Diesel – 1 road number available

Corrimal Colliery
- CCC Yorkshire Engine Co. 0-6-0T – 2 road numbers available

South Bulli Colliery
- SBC Avonside 0-6-0T – 2 road numbers available

AIS Steelworks – Port Kembla
- AIS Bo-Bo Diesel – 3 road numbers available
- AIS B-Class 0-6-0T – Not yet available in MSTS

Lysaghts – Port Kembla
- LYS 0-4-0ST 'Alison' & 'Marian' – 2 road numbers available
- LYS Bo-Bo Diesel 'Primrose' & 'Ann' – 2 road numbers available

Coupling Considerations

One of the constant operational annoyances that the NSWGR had during the steam era was the problem of using different coupling systems over a long time period. This required that stock be marshalled in specific ways to ensure the safe and correct coupling together of all goods wagons.

Initially, goods wagons on the NSWGR used the standard English style 'hook' type couplings with buffers on each wagon – there were two types – the three-link type, which allowed an amount of slack between vehicles, and the screw-coupling type, which allowed the wagons to be drawn-up tight with no slack between the buffers.

As wagons and loads got heavier, the standard American style 'knuckle' or automatic type coupler was introduced. As the majority of auto-coupler fitted wagons did not have buffers, the two coupling systems were incompatible.

Therefore, a number of wagon types were fitted with a special 'transition' coupler set – this was arranged so that the vehicle had normal buffers at both ends, but had a special type of automatic coupling, which also had provision to fit a three-link coupling to a special casting fitted to the top of the automatic coupler.

The way this was used, was to couple the three-link coupling at one end of the wagon to the hook on the locomotive tender, which was protected from damage by the buffers on the wagon and on the tender. At the other end of the wagon, the automatic coupler would then connect with other standard bufferless automatic coupler wagons. When used in this way, the 'transition coupled' wagon was often any suitable empty wagon to hand, and was referred to as a 'match' wagon.

In normal traffic use, the train would be marshalled with all the automatic coupler stock at the front of the train, an appropriate 'match' wagon interposed, then all the 'hook' coupler stock at the rear of the train. Pickup and trip goods trains which had to shunt at intermediate yards, often had a very varied consist, comprising several block sections of 'hook' coupled wagons and 'auto' coupled wagons separated by extra match wagons throughout the train. The common S-truck, and LCH or CCH hopper wagon was the most frequently used 'match' truck.

Passenger locomotives generally had buffers and screw-type couplers fitted at the front and to the tender – however, in later years during the 60's, a number of 36 and 38 class tenders had automatic couplers fitted. Goods locomotives were also fitted with buffers and screw-type couplers fitted at the front and to the tender, however, those goods locomotives fitted with 'Turret' type tenders had buffers and automatic 'transition' couplers as standard. The later heavy goods locomotives of the 59 and 60 classes were delivered with buffers and automatic 'transition' couplers at both ends.

Goods brake vans were fitted with buffers and automatic 'transition' couplers, so they could be attached to either 'hook only' or 'automatic only' wagons at the rear of the train. The SHG type brake van was the main exception, which only had buffers and 'hook' couplers, as they were normally only attached to livestock trains, which used all screw-coupled or 'transition' coupled stock throughout.

To assist the MSTS users to arrange their goods trains in an authentic manner, the following Table of available MSTS wagons with specific couplers is shown below:

Hook Couplers – buffer fitted and hook coupler fitted		
	4-wheel types	CV – covered van
		ICV – insulated covered van
		ABV – Arnott's Biscuits covered van
		CW – covered cattle wagon
		GSV – covered sheep/pig wagon – wood underframe
	Bogie types	BBW – bogie ballast hopper wagon
		BBP – bogie ballast plough brake van
		MLV – bogie louvre van – passenger rated
		MLK – bogie milk van – passenger rated
		BMT and BMF – bogie milk tank – passenger rated
		SHG – bogie brake van – for use with livestock trains
Transition Couplers – buffer fitted and transition coupler fitted		
	4-wheel types	S-truck – general purpose open wagon
		LCH – coal hopper wagon
		CCH – coal hopper wagon
		RH – covered cement hopper wagon
		SH – covered sand hopper wagon
		PV – covered explosives van
		LV – covered louvre van
		SRC – short covered refrigerator van
		GSV – covered sheep/pig wagon – steel underframe
		CHG –brake van – for Hunter Valley and Illawarra colliery traffic
	Bogie types	LLV, HLV and TLV – bogie covered louvre van
		MBC – bogie covered box van
		MLV – bogie louvre van – passenger rated – later conversions
		MRC and TRC – bogie covered refrigerator van – passenger rated
		BE and BBE – bogie flat wagon
		MLE – bogie flat wagon
		TE and TME – bogie heavy flat wagon
		BCW – bogie covered cattle wagon
		BSV – bogie covered sheep/pig wagon
		LHG, PHG and MHG – bogie brake van
Automatic Couplers – bufferless automatic coupler fitted		
	4-wheel types	S-truck – general purpose open wagon, buffers removed
		K-truck – general purpose open wagon
		RU – covered wheat hopper wagon
		UL – covered limestone hopper wagon – 1967 converted from RU's
		KF – general purpose flat wagon
	Bogie types	BD and HGM – bogie open wagon
		GP and CG (built 1968) – bogie open ore concentrate wagon
		BCH – bogie coal hopper wagon
		BWH – bogie wheat hopper wagon
		BE and BBE – bogie flat wagon – buffers removed
		MLE – bogie flat wagon – buffers removed
		BKF – bogie double-deck motor car wagon
		CMX – bogie flat LCL container wagon
		WW – bogie heavy well wagon
		SCA – bogie 'Private Owner' petroleum tank wagon

Goods Traffic

It can be argued that the primary purpose of the railways (and being more profitable) was to move huge quantities of goods rather than passengers. For every section of track throughout the state, load limits were set that detailed the maximum load that a specific class of locomotive could haul between point A and point B.

Firstly, it must be pointed out, that the normal method of working any goods trains on any line within NSW was to load the trains to their **maximum** loading tonnage for each section of line. Only a select few fast goods trains used a 75% loading factor. This meant that both locomotives and crews were worked to their limits, i.e. basically they were 'flogged'.

Coal

Coal could be considered as the largest volume single commodity that was transported by rail. Coal was primarily sourced from the three principal coalfields in NSW – the Newcastle Area/Hunter Valley area, the Illawarra Escarpment area and the Lithgow/Wallerawang area. However, in other parts of the state, there were smaller local coal mines that also contributed to the rail transport system.

The coal output was fed into a number of different categories of destinations:

- Export coal (transported by sea) for use interstate or overseas
- Coal for use in the Steelmaking Processes at Newcastle and Port Kembla
- Coal for fuel for Power Generation at a number of principal Power Houses
- Coal for fuel in large industrial sites and processes, such as Gasworks, etc.
- Coal for domestic household heating and cooking (till the late 1950's)
- And, lastly, fuel for NSWGR own departmental purposes, primarily loco fuel.

Firstly, looking at the main sources of coal:

- <u>The Newcastle/Hunter Valley Area</u> – there were a large number of coal mines (over 40) surrounding Newcastle, some connected directly to the NSW main lines to the south and far north of Newcastle, and some connected to private branch railways, such as the Richmond Vale Railway (connecting to NSWGR at Hexham), the South Maitland Railways (connecting to NSWGR at East Greta), and the privately owned, but NSWGR worked, Belmont branch line (connecting to NSWGR at Adamstown).

The volume of coal coming from the Hunter Valley mines was so vast, that a pair of dedicated Up/Down 'Coal Lines' was laid in from just north of Maitland to just south of Waratah, to channel the output to the expansive Export coal handing facilities at Port Waratah and Bullock Island – this also fed the BHP steelworks adjacent to Port Waratah through Morandoo Exchange Sidings. Coal from mines to the south-west and south of Newcastle, had to contend with the normal goods and passenger traffic over the 'Short North' between Fassifern and Waratah. A set of exchange sidings to 'stage' bulk coal traffic from mines west of Cockle Creek, and the parallel 'third road' between Cardiff and Tickhole Tunnel, were the only concessions to improving the flow of coal from the south and west of Newcastle.

Most Newcastle/Hunter Valley coal was used for Export or Steelmaking, with Power Generation, Industrial and Household traffic at a lesser rate. Some NSWGR Departmental coal was sourced from specific mines for high-quality locomotive fuel, details of which can be found in a separate section of this document.

Full details of coal transport from the Newcastle Area/Hunter Valley mines, can be found in two other documents, so, will not be repeated here – it is recommended that you obtain a copy of both these documents and study them to understand how coal traffic was worked in this area:

MSTS Guidelines – 'Newcastle District Coal Traffic Workings', a work in progress, authored by myself – to be released in the near future, probably on the CTN site.

The NSWGR's own document – 'Newcastle District Coal Traffic Local Appendix – 1951' – found on the MSTS 'Coals to Newcastle' website for download:

http://coalstonewcastle.railpage.org.au/history/operationalinformation

- The Illawarra Escarpment Area – there were a fair number of mines (around 20) along the Illawarra Escarpment extending to the north and south-west of Wollongong. Some were connected directly to NSWGR metals, some had their own small private railway from the colliery to exchange sidings with the NSWGR (e.g. Corrimal, and South Bulli) and some were entirely private railways (mostly to the south-west) connecting from the colliery direct to the AIS Steelworks complex at Port Kembla.

Apart from the direct AIS owned railways, all other coal traffic in the Illawarra had to 'inter-lace' with normal goods and passenger trains over the NSWGR metals.

Most Illawarra coal was used for Export (particularly after the Inner Harbour Coal Loader opened in 1963) or Steelmaking at the AIS Steelworks at Port Kembla, with Power Generation, Industrial and Household traffic at a lesser rate. NSWGR Departmental coal was sourced from some Illawarra collieries. However, one of the additional Industrial type traffics for Illawarra coal was the extensive Coke-Making plants in the District – see separate section of this document.

Full details of coal transport from the Illawarra mines, can be found in one other document, so, will not be repeated here – it is recommended that you obtain a copy of this document and study it to understand how coal traffic was worked in this area:

'Guidelines for Realistic Traffic Workings for the Main Illawarra Route', a work in progress, authored by myself – included with the 'Main Illawarra V3' MSTS Route.

- The Lithgow/Wallerawang Area – there were a smaller number of mines in this area, but the volume output was still significant. All mines were connected directly to NSWGR metals, and were worked by NSWGR trains.

The principal use for 'western' coal was for Export traffic and some limited power generation, which was railed to the Balmain/White Bay coal loader and White Bay Power House. In later years (after the late 1980's) the Balmain coal loader was closed, and the 'western' coal then railed down the Illawarra line to Port Kembla. In later years (the late 50's on) coal was also railed in block loads from Glenlee (near Campbelltown) to Balmain. The 'western' coal was not used for local steelmaking,

and had limited use for industrial and domestic use, but because of its strategic location, west of the Blue Mountains, served most of the north-west, west and south-west of the state for 'local' coal supplies. Some 'western' coal was sourced for NSWGR Departmental use – see separate section of this document.

Secondly, looking at the uses of coal:

- Export – Export coal was shipped by sea, from Port Waratah (exclusively from the Newcastle/Hunter Valley area mines), from Balmain/White Bay (from the Lithgow/Wallerawang area mines) and from Port Kembla (from the Illawarra area mines). Dedicated block loads direct from the colliery to the coal loader was the usual transportation mode.
- Steelmaking – Coal for steelmaking was sourced only from the Hunter Valley for BHP Newcastle steelworks, and only from the Illawarra for AIS Port Kembla steelworks. However, from time to time, some limited amounts of coal were exported by sea from Port Waratah or Port Kembla to feed the third Australian steelworks at Whyalla in South Australia. Dedicated block loads direct from the colliery to the steelworks was the usual transportation mode.
- Power Generation – Coal for power generation was sourced from all three coalfields to supply the principal Power Houses at Bunnerong, Ultimo, Pyrmont, White Bay in the Sydney Metro Area, and to a lesser extent, the smaller Power Houses at Zarra Street, Wangi Wangi, Wallerawang, etc. Coal was transported in block train loads to the main marshalling yards at Broadmeadow and Enfield, and then shunted into local 'Trip Train' workings, some exclusively conveying coal, for final delivery to the power stations. For example just after WW2, two daily trainloads in 24 S-trucks or CCH hoppers were routed direct from Stanford No2 Colliery to Bunnerong Power House.
- Industrial – For many years up to the late 1960's (when Natural Gas took over), coal was required for manufacture of 'Coal Gas' at principal Gasworks in every major city and regional principal town throughout NSW. Additionally, there were a number of other regular industrial users of coal in various parts of the state. Industrial coal was delivered in 'semi-block' loads, using any convenient goods train.
- Domestic – Up until the late 1950's the primary source of heating and cooking for domestic residences was coal, but the rapid change to electric or gas-fired heating and cooking extinguished that traffic. Most local goods yards, both suburban & country, had a siding or two where the local Coal Merchant could park his lorry beside one or more open coal wagons, and manually fill coal sacks (of one hundredweight in size) for delivery to local domestic customers.
- NSWGR Departmental use – refer to a separate section in this document.

Types of wagons used for coal traffic.

The Newcastle/Hunter Valley and Illawarra districts were relatively unique in that they predominantly used small privately owned 4-wheel wooden non-air-braked coal hopper wagons. These wagons had large alphabetic letters painted on the sides to identify the owner. The style of hopper wagon used in the Hunter Valley was different from that used in the Illawarra – the Hunter Valley wagons had a 'loose' hopper, sitting in a metal frame in the wagon chassis – the hopper only was lifted by crane over the 'drop-point' and the bottom doors released to unload the hopper – whereas, the Illawarra generally used raised 'staithes' under the track for unloading, and the coal hopper was therefore fixed to the wagon chassis. To a lesser extent, some coal

in these areas was transported in the metal bodied NSWGR equivalents, the LCH and CCH hopper wagons. The 4-wheeler wooden coal hopper trains in the Hunter Valley also had the unique distinction of being trailed by a 4-wheel CHG brakevan, rather than one of the longer standard bogie brakevans.

Most other coal traffic in the Hunter Valley or Illawarra, when not loaded into the 4-wheel wood or metal hoppers, used NSWGR bogie coal hoppers (BCH), although transport by NSWGR S-truck and K-truck was quite common, particularly for Departmental loads.

As there was no facilities for unloading bottom-discharge hopper wagons west of the Blue Mountains, all coal transport throughout the north-west, the west and the south-west was done in S-trucks or K-trucks.

Coke

Some industrial processes, and the steelmaking process, required the use of coke rather than coal. The BHP steelworks in Newcastle relied only on the delivery of coal direct from the mines, as it had its own coke-making plants internal to the steelworks, and did not require coke supplies to be railed-in.

There were no coke-making plants, or coke consumers, in the western areas beyond the Blue Mountains, but the Illawarra District had extensive coke-making facilities spread along the escarpment adjacent to collieries. This served two purposes – whilst the AIS steelworks at Port Kembla did have some of its own coke-making plant internal to the steelworks, it did contract-out supply of coke from several local Illawarra coke producers, in fact in later years AIS purchased some local collieries and their attendant coke-making plants to secure regular supply of coke.

The second purpose for coke - was a number of industries in the Sydney and Newcastle Metro Areas, needed some supplies of coke for their manufacturing processes. This was generally supplied from the large cokeworks at Coal Cliff, with a limited amount from Corrimal. A secondary source of coke for use throughout the state, was that coke was produced as a by-product of the 'coal-gas' manufacturing procedures – however, this was only in relatively small quantities, and the gasworks contracted to sell this coke to other local users, sometimes delivered by road, sometimes delivered by rail.

As coke was a lighter load per volume than coal, it was normally delivered in the 4-wheel high-sided wood and metal bodied CCH hopper wagons. Although, sometimes S-trucks or K-trucks were used when CCH wagons were not available – however, this was not a regular occurrence.

Wheat and other Grains

The western parts of the state beyond the Great Dividing Range, to the north-west, the west and the south-west, were the principal areas for the growing of wheat and other grain foods. There were no wheat farms along the North Coast or Illawarra lines, so grain wagons were rarely seen on these lines.

Until bulk grain handling became common, grain transport was performed by the farmer filling a large number of grain sacks, which were carted to the local railhead. At the railhead, the sacks were loaded directly onto wagons, or if insufficient wagons were available, and the grain harvest substantial, bagged grain was often stored on

the ground, covered over by tarpaulins, or stacked in large open sheds (simply a roof on posts).

Bags of grain were carefully stacked in S-trucks and sometimes K-trucks, but for the main harvest areas, bags were stacked on bogie flat wagons, to specific loading instructions that detailed the number and layering that each wagon was allowed to convey. All these wagons were covered over with tarpaulins after loading, to secure the grain from weather. Loading was done by the 'blood, sweat and tears' of manual labour, only sometimes assisted by a small local wheeled conveyor belt loader.

A good proportion of the grain harvest was for local domestic consumption and was railed to flour mills located in various areas throughout the state. Significantly, major flour mills were situated on the Metropolitan Goods Lines in Sydney, at Dulwich Hill (Great Western Milling), Lewisham (Mungo Scott), Darling Island (Gillespie's Anchor Flour Mills), and several located along the Down Relief road between North Strathfield and Rhodes, as well as Love's at North Enfield. Once the domestic market was satisfied, most surplus grain was sold to overseas interest and exported by sea from Darling Harbour or Bullock Island.

The grain was normally sent in dedicated block load trains, and Export grain was initially sent to Darling Harbour / Darling Island, where the grain bags were slung by wharf-side cranes into the holds of waiting ships. Once unloaded, the empty open trucks or flat wagons were sent back for the next load of grain, often accompanied by a tarpaulin covered open wagon or a covered van to house the return Tarpaulins and empty grain bags for the next reloading cycle.

Other types of grain, such as, barley, oats, rice, etc. were handled similarly – in fact the rice traffic was sufficient enough, that Darling Harbour had a dedicated 'Rice Shed' to handle this traffic.

From the late-1920's onwards, new large bulk-storage concrete silos started to spring up on dedicated sidings all over the grain producing areas, to hold the locally carted grain until it could be loaded onto the grain wagons. When this program of building bulk storage silos in the country was being done, a new Bulk Grain terminal was also built at Johnstons Bay (White bay area), ready for the changeover from bagged wheat to bulk wheat, to store the grain before loading into ships for export. A second bulk grain terminal was built at Wickham Basin (Bullock Island area) to accommodate the north-western harvest. During the later war years and the immediate post-war period, the whole grain industry achieved significant mechanisation, and 650 4-wheel RU covered bulk grain hopper wagons were constructed.

At Johnstons Bay, dedicated sidings were built beside the bulk grain silos, where the grain could be discharged directly into below-ground hoppers, and the grain taken by conveyor systems to the bulk storage silos. Further conveyor systems, moved the grain from the silos to the waiting ships.

In later years (after the late 1980's) the Johnstons Bay silos were closed, and the grain export traffic moved to Koorangang Island, and a new grain terminal built at Port Kembla Inner Harbour. The original silos at Johnstons Bay remained, and for a time were used for storage of Portland cement and sugar.

Later, in the mid-1950's a number of bogie coal hopper wagons of BCH type, were converted to bogie grain hoppers of BWH type, with a covered roof, roof loading hatches and a roof catwalk for loading staff (additionally, at the same time, a number of other BCH's were also converted for bulk cement traffic as BRH type).

Even though the main grain traffic was now in covered hoppers to the main grain terminals at Johnstons Bay and Wickham Basin, the bagged wheat traffic continued, in parallel, to Darling Island until the mid-1960's.

Special Note: as all the bulk grain hopper wagons, both RU and BWH, were only built with automatic couplers, unless the train was hauled by a D59, AD60, or standard goods with a Turret tender, a 'match' truck, usually an S-truck, was always coupled between the locomotive and the rake of grain wagons – if the grain train was expected to be reversed at certain main line junctions, a second 'match' truck was usually provided between the rake of grain wagons and the brakevan.

Wool

In a similar manner to the proliferation of grain cropping farms west of the Great Dividing Range, sheep grazing and wool production was also a huge industry; however, this was generally seasonal traffic. After each seasonal 'wool clip', the wool was packed into large bales for transportation. A variety of wagon types were used, but principally S-trucks, K-trucks and bogie flat wagons: specific loading diagrams were posted at the railheads to get the maximum amount loaded into each wagon type, once loaded, the wool bales were usually covered by tarpaulins to protect them from inclement weather. During the wool season, almost all goods trains coming from the 'west' had large numbers of wagons, piled high and covered with tarpaulins, bringing the 'wool clip' to market. Only for shorter trips in fine weather, would wool bales be transported without tarpaulin protection. An almost continuous string of loaded and empty return wagons cycled from the farms to the wharves and back each season, until all the 'wool clip' was 'in store'.

All the 'wool clip' was railed to Sydney, generally in whole train block loads, to Darling Harbour, where huge multi-storey 'Wool Stores' were built around Ultimo and Pyrmont to store the vast quantity of wool arriving each season, and these were sufficiently large enough to allow a steady volume of wool sales throughout the rest of the year, until the new season's clip replenished the reducing stocks again. Wool in bales was used for local domestic sales, but export from Darling Harbour was also a huge undertaking.

Livestock

As well as wheat and wool, the lands west of the Great Dividing Range, were the breeding grounds of most of the state's livestock. In many large regional towns local abattoirs or meat packing houses were built to serve the local populace, but the bulk of the livestock was brought down to market sales at Flemington, Hanbury Junction and Telarah. Large abattoirs were located near the saleyards, at Homebush (adjacent to Flemington) and at Mayfield West (adjacent to Hanbury Junction). Cattle, sheep and pigs were the principal traffics, but it could also include goats, horses, camels and other types of animals.

Markets were held on specific days of the week – Flemington on Mon & Thurs (plus pigs at Homebush on Tues), Hanbury on Thurs and Telarah on Mon. Stock traffic working was substantial on the Up lines, on the day before each market. As well as

some local stock traffic being conveyed in regular scheduled goods trains, the Working Timetable provided for a significant number of 'Fast Stock Trains' – these were usually scheduled into the timetable as being 'Conditional' trains – that is, if there was insufficient loading, the train could be cancelled. Once unloaded, the stock wagons were sent to adjacent sidings to be cleaned, and then sent to Enfield or Broadmeadow to be made into empty return workings to the country stock centres. Livestock traffic down the Illawarra and North Coast lines was minimal, as it was only localised traffic, and did not warrant dedicated fast stock trains.

The Coaching and Goods Instruction book had a large number of pages detailing the workings of stock trains - as these instructions covered many topics, it is beyond the scope of this MSTS document to repeat all this detail – refer to the 'Coaching and Goods Instructions Book – 1964' which can be found on the CTN website.

Wagons used for transporting livestock always had buffers, to minimise 'travel shocks' being transmitted to the travellers, and used either screw-couplers or transition couplers. The most common type of brakevan fitted to the rear of stock trains was the SHG type, as they had two passenger compartments, and therefore could accommodate up to 16 drovers accompanying the train.

Petroleum and oil products

There were only two oil refineries in NSW, both in Sydney – the large 'Caltex' refinery at Kurnell, and the smaller 'Shell' refinery at Clyde.

The 'Caltex' refinery was not connected to any rail lines, and mainly delivered the refined products to tanker ships; however, a submarine pipeline system was laid under Botany Bay to a large Oil Terminal at Banksmeadow near Botany, which distributed 'Caltex' brand and associated 'brand' products, both by rail and by road. The 'Shell' refinery was connected to the Clyde-Carlingford branch line, through the complex of industrial sidings around Rosehill, Camellia and Sandown – this refinery distributed 'Shell' brand and associated 'brand' products, both by rail and by road.

A third refinery, for the production of Bitumen, was built by 'Boral' adjacent to Bunnerong Power House, and the Boral sidings were worked, by agreement, by the privately owned Electricity Commission steam locomotives, between the Boral sidings and the Bunnerong branch exchange sidings adjacent to Botany Goods yard. The Boral refinery was later upgraded to manufacture and distribute LPG (liquefied petroleum gas), and a number of special 'pressure-vessel' bogie tank wagons were built, branded as 'Speed-E-Gas'.

Some other oil companies built their refineries in other States, and established their NSW oil distribution terminals around the inner foreshores of Sydney harbour, where their products were brought in by tanker ships. However, few of these were connected by rail, and their products were mainly distributed by road tanker. Oil and petrol tank wagons were moved between the refineries/oil terminals and Enfield marshalling yard, by regular 'trip trains', where the tank wagons would be shunted into scheduled goods trains going to the required destinations.

Many of the large oil companies created a regional network of local 'distributors' throughout country NSW – many large towns had private sidings connected to the local NSWGR goods yards to accommodate incoming oil and petrol tankers. The NSWGR 'Local Appendix to the Working Timetable for the Northern Division – 1961',

recorded details of specific traffic working to/from private sidings in rural towns owned by the following oil companies: Ampol, Atlantic Union, BP, Caltex, Shell, Sleigh's, Union Oil Company, and Vacuum Oil Company. Similar details would be recorded for those distributors on the Main West, Main South & Main Illawarra lines.

Rail tank wagons operating in NSW, conveying petrol and oil products, were privately owned by the oil companies, but registered for use over the NSWGR metals. In the early 1970's, the following oil companies owned rail tank wagons: Ampol, Amoco, BP, Caltex, Esso, Golden Fleece, Mobil, Shell and Total – some other differently branded rail tank wagons were used before this timeframe, but the particular brand names were discontinued from public sale - see the history notes below.

Distribution of oil and petrol products by rail was a highly cyclic operation – loaded tank wagons were regularly sent out all over the state in scheduled goods trains to the distributors private sidings – once unloaded, the empty wagons were returned promptly to Sydney for reloading. Most distributors only ordered their products in small quantities, generally between one and four tank wagons at a time at the most, to match the capacity of their customer needs, but the frequency of orders for follow-up product was high.

Loaded tank wagons were always separated from the locomotive and brakevan, and any other wagons containing flammable products, by a minimum of one wagon, but two or more was the normal practise – this was to minimise fire risk. Oil and petrol tank wagons were normally coupled together near the centre of the train, except where a 'pick-up' goods train was required to pick-up/drop-off at frequent sidings along the way, where oil tank wagons would be conveniently marshalled in blocks to suit other wagons going to the same destination.

Oil and petrol tankers were restricted to the same slow speeds as normal 4-wheel stock, either 30mph or 35 mph to suit the line conditions. These vehicles were prohibited from attachment to fast goods trains; however, empty bogie tank wagons could be attached to Fast Stock trains to build up the load to maximum tonnage.

Not all oil and petrol products were distributed by tank wagon, specialised lubricants and oils in smaller quantities were delivered in the standard 44-gallon drums – on the outward delivery journey they would be loaded standing vertically on the floor of S-trucks or K-trucks with appropriate packing to prevent movement – on the return empty journey, they would be loaded on their sides longitudinally in the wagons and carefully roped down. Photographic evidence shows that wagons returning empty 44-gal drums were generally coupled immediately behind the locomotive.

To assist MSTS users, in running authentic labelled oil tank wagons, the following is a brief history of different petrol brand names used between the 1940's and 1970's:

'Caltex' – was sold from 1936 onwards, up until 1936 it was sold as 'Texaco'.

'Ampol' – Australian Motorists Petrol Company was formed in 1936 – in 1949 it changed its name to Ampol – in 1982 Ampol acquired Total, and sold their products under the 'Ampol' name – in 1995 Ampol merged with Caltex.

'Plume' – Vacuum Oil Company (and its later ownership) sold its petrol under the 'Plume' name from 1916 to 1954, when it changed the name to 'Mobilgas'.

‘Mobilgas’ – Vacuum Oil Company merged with the Standard Oil Company of New York in the 1930’s to become, Socony Vacuum, later Socony Mobil, and later still Mobil Corporation. It introduced its famous ‘Flying Red Horse’ logo into the Australian market in 1939.

‘Neptune’ – the Neptune Oil Company was bought by the Anglo-Dutch Shell Company in 1926, but the ‘Neptune’ brand petrol, with the famous ‘King Neptune’ logo, was only sold from 1952-1959, when Shell dropped the name from public sale.

‘Golden Fleece’ – H.C. Sleigh (pronounced Slee) sold petrol from 1913 to 1981 under the ‘Golden Fleece’ name – in 1981 H.C. Sleigh was bought by Caltex.

‘Shell’ – ‘Shell’ was marketed by the Anglo-Dutch Shell Company since the 1920’s.

‘Atlantic/Union’ – Atlantic/Union sold its oil and petrol products from the mid-1920’s, by 1962 the name ‘Atlantic’ was replaced by ‘Esso’ – in 1991, Esso was taken over by Mobil.

‘COR’ – In 1920, the Commonwealth Government in conjunction with British Petroleum, created the Commonwealth Oil Refineries, which marketed their petrol as ‘COR’ – in 1952 BP bought all remaining shares, and sold both ‘COR’ and ‘BP’ together at the same service stations until 1959, when the ‘COR’ name was dropped.

‘BP’ – British Petroleum sold petrol, in conjunction with COR from the 1920’s, but did not use their own brand ‘BP’ until 1952, and in 1959, the use of the ‘COR’ name was discontinued.

‘Total’ – the French owned Total Oil Products Company established its sale of petrol under the ‘Total’ name from 1954, until bought by Ampol in 1982.

Timber – to be advised

Blue Metal/Minerals – to be advised

Water – to be advised

Milk – to be advised

Fruit and Vegetables – to be advised

Miscellaneous Traffics – to be advised

Special Traffic

Ore Concentrates – Broken Hill to Sulphide Junction
The ore concentrate train was known under two different train numbers - W44 from Broken Hill to North Strathfield - once it ran around the North Strathfield curve onto the Main North, it became N645 to Cockle Creek/Sulphide Junction. The return empty ore wagons to the west were worked as W349.

Diesels were used from Broken Hill to Parkes, but the second part of the journey from Parkes to Molong was run with a single Garratt (chimney first), piloted by a 36 Class - once it reached Molong the train required heavier assistance over the steep grades to Orange East Fork. In many cases the assist engine was a second Garratt (cab first) coupled in front of the original train engine - photo evidence also shows use of 36 class in front as assist engine, and one photo even shows a non-streamlined 38 class as assist engine. [Side comment - photos show Garratt hauled heavy normal goods trains from Molong to Orange were mainly 36 class assisted].

When using two Garratts nose-to-nose, after arrival at Orange East Fork, the original train engine (chimney first) was cut out of the train, and the Molong-Orange assist engine then became the sole train engine for the next sections of the journey to Lithgow. This was done to relieve the loco crews (but not the poor Guard!!!) of smoke and heat through the Marangaroo Tunnel.

Whilst I do not have any photo evidence specifically of W44 over the Blue Mountains area – other evidence points to the use of double-headed 46 Class electric locomotives. Once W44 reached Homebush/North Strathfield the train would become N645.

At Gosford, the electric locomotives gave way to a Garratt engine as the main train engine used over the undulating sections (Hawkmount and Fassifern) to Sulphide Junction. In many cases the assist engine was a second Garratt (but this time also running chimney first), but the use of the 36 class was common, and other photos show a 38 or in some cases a Standard goods assisting N645.

In the earlier years, GP wagons were used, without tarpaulin covers, but in later years the newer CG wagons were used, and tarpaulins were fitted to minimise any dust from the ore, or rain contaminating the load. The return empties generally only used a single locomotive, but sometimes an extra locomotive was attached to save a ‘traffic path’ over the heavily congested mains.

Ore Concentrates – Cobar to Port Kembla

There was a lesser known ore concentrate working; however this did not require a dedicated train like W44. A single-line branch extended out to the west of Cobar to the CSA mines. The local goods train locomotive would run out to the mines and attach a number of GP wagons loaded with ore (usually four or six in number - although I have one photo of a 32 class, and water gin, on the Cobar branch with around 10-12 loaded GP’s in tow). These wagons would be worked via the normal scheduled goods trains along the line to Dubbo, where they were put into a main goods train going to Enfield. At Enfield the loaded GP’s were shunted into a main goods train heading down the Illawarra line. At Thirroul they were shunted into a local goods train serving Port Kembla, where they were then shunted into the ERS sidings for unloading. The return empties were worked back to Cobar in a similar fashion.

NSWGR Departmental Traffic

Locomotive Coal and Departmental Coal

Coal for use as fuel for locomotives was sourced from all three major coalfields. The Department had contracts with specific collieries to supply varying grades of coal for

their departmental uses, mostly for locomotives, but also to fuel stationary boilers, at workshops, and for carriage-warmer heating plants, as well as for general use to fuel heating and cooking stoves in lineside signal boxes, station buildings & waiting rooms, and residential housing for railway staff. Locomotive coal was generally supplied in large lumps, but most other departmental coal for buildings, etc. was supplied in smaller lumps to ease local staff handling.

The best coal, and most highly regarded, called 'Newcastle' or 'dynamite', came from several of the Hunter Valley collieries (eg Pelaw Main, Abermain No1) – as this was a considerably more expensive coal, it was used exclusively for the C38 class express locomotives and the heavy D57 and D58 class goods locomotives, as they had wide fire-boxes and performed poorly on coal from the other regions. Any locomotive depots that serviced C38's, D57's or D58's had a separate section in the coal stage to hold the 'dynamite' coal separate from the other locomotive coals, this coal being specifically railed in small (generally 5-10 wagons) semi-block loads of S-trucks in regular goods trains passing those depots.

Some lesser-quality coal from other Hunter Valley collieries was sent north to supply the locomotive depots on the Main North line beyond Maitland and the Main North Coast line beyond Telarah.

The next type of coal, called 'bullswool', came from the south coast collieries, and was used generally throughout the Main Illawarra & Main South lines, although it could be railed to other areas as needed. However, an inferior type of 'bullswool' came from Kirton's colliery, near Thirroul loco depot, this coal was not liked by crews.

Other coal specifically for passenger locomotives, other than the C38 class, came from Metropolitan Colliery near Helensburgh, and was 'staged' to waterfall, where semi-block loads were sent to the principal passenger loco depot at Eveleigh.

The last type of coal, the 'western' coal, called 'blackjack', had a lower heat content, but higher ash content, and was generally used only in goods locomotives – this was railed to nearly all locomotive depots throughout the state.

Any locomotive depot that had elevated coal stages (i.e. Broadmeadow, Port Waratah, Hawkesbury River, Enfield, Eveleigh, Thirroul, Demondrille, Lithgow, etc) was usually supplied in NSWGR (rather than private owner) bottom discharge metal hoppers of type LCH, although supply in S-trucks or K-trucks was also common practise. All other locomotive depots were supplied in S-trucks or K-trucks, and were manually unloaded onto low-set wooden coal stages, or sometimes manually shovelled direct into locomotive tenders and bunkers from a slightly raised adjacent siding, or in some depots, a small steam-powered 'grab' crane loaded direct from the open coal wagon to the locomotive tender or bunker. Other smaller quantities of departmental coal, for signal boxes, station buildings, etc. were usually delivered in S-trucks and manually shovelled into small coal storage bins adjacent to the building. As the quantities required were small, a single S-truck load could supply up to a dozen or so building storage bins.

Photographic evidence suggests that the semi-block rakes of locomotive coal wagons, being delivered to the depots around the state, were generally coupled between the locomotive and the remainder of the goods train.

Ballast

The two main sources of ballast for track use on the NSWGR, were at Bombo on the Illawarra line, just north of Kiama, and at Martin's Creek, approximately half-way between Maitland and Dungog, on the North Coast line.

Prior to building the BBW bogie ballast hoppers, NSWGR used 16T MH 4-wheel hoppers; a total of 105 MH's were built in 1931 and 1938 (metal bodied equivalents to the typical wooden LCH wagons used by most coal mines), for transporting ballast.

Photos showing Ballast Trains in use on NSWGR, generally show a typical consist of six or nine bogie ballast hoppers and a bogie Ballast Plough Van, which would be within the typical 550 ton loading capacity for a Superheated Class D50 2-8-0.

Another common ballast train consist would comprise a set of BBW bogie ballast hoppers, then a bogie plough van, following behind these would be a small number of S-Trucks (maybe 4 or 5) loaded with `fines' for use on pathways and other paved areas around yards and stations, all this was then tailed by a normal LHG goods brake van.

The Bogie Ballast Plough Vans, as well as having normal accommodation for the train Guard, also had additional seating accommodation for the Ballast Train crew. The twin centre-mounted ploughs under the floor would be wound down to track level by a set of winding gear inside the van. The plough van had two sets of ploughs, so that track ballasting activities could be carried out in either direction to suit conditions at the work-site.

Watching a ballast train in action was fascinating - the train would pass slowly over the worksite at about walking-pace. The ballast train crew would walk alongside the BBW's using the control wheels to deposit a long inverted triangular strip of ballast between the rails; just enough to prevent the new ballast from fouling the wheels and causing a derailment. When the plough van reached the new ballast, with the plough lowered to working position, it would spread an even layer between the rails; the angle of the plough ensured the surplus ballast was directed over the head of the rail to the outside and also ploughed in an even layer. Once a suitable section was covered, the train would stop, and the fettling gangs ‘dress' the ballast in the normal manner.

Normally loaded ballast trains would be worked over the Down (outbound) lines to all parts of the state, with the return empties being worked in Up (inbound) trains.

Ballast from Martin’s Creek, was normally worked as block trains to either Telarah (for running around the triangle connection to the Main North [and North-West] line via Farley), or alternately to Broadmeadow, where the trains would be re-marshalled into work trains for the required maintenance services, throughout the North, North-West and North Coast regions. Ballast for the North Coast line was often worked directly North from Martin’s Creek.

Ballast from Bombo was normally worked directly to Enfield Marshalling Yard, where it would be re-marshalled for required work trains throughout the West and South regions. Local ballast services on the Illawarra line, and for working over the Unanderra-Moss Vale line, were normally worked to Wollongong yard for re-marshalling into the required work trains.

Welded rail
Welded Rail trains were made up of 9 type BE 40ft bogie bolster wagons modified for Civil Engineers use. The trains were a total of 360ft long (plus the buffers and couplings), but the lengths of continuously welded rail were only 330ft long. This was done to ensure an adequate safety margin at the ends of the wagon set, if the rails shifted longitudinally in transit.

The lengths of continuously welded rail were made in the Chullora Workshops, so all welded rail trains originated from Chullora, the rail wagons set was stored at Chullora when not in use. Transport of lengths of rail to the work site, was often done by coupling the Welded Rail set into normal scheduled goods trains passing through the area – they were then shunted into a convenient siding for use by the civil engineers when they took possession of the line for maintenance work.

Overhead Wiring Maintenance
The NSWGR maintained several special Overhead Wiring trains – these were used not only to construct any new wiring for new track, but to perform regular maintenance of existing wiring, and to carry out any special line testing required of overhead wiring.

The trains were formed of several old carriages, converted into OHW vans, which carried all the tools and equipment and any required electrical fittings needed to perform the wiring job. These carriages were stripped of all internal fittings, most of the windows and doors boarded up with flush plywood sides, and a flat 'work platform' fitted along the full length of the roof. Ladders fitted to both sides of the vans near the centre doors, enabled crews to climb up to the roof work platforms. At each end of the roof, a 'cable roller' was fitted to allow easy drawing of cables over the roofs of all the vans, prior to erection of wiring. The OHW wiring set was completed by a modified flat wagon fitted with several special cradles to hold cable drums containing the overhead wiring.

The wiring trains were normally stored in the departmental sidings at Petersham and Clyde, but when working in a specific area could be temporarily stabled, out of work hours, at places like Hornsby, Gosford, Penrith, Mount Victoria, and Lithgow.

After the initial new OHW construction was finished over the Metropolitan lines, Main West and Main North lines, any new overhead wiring work on new track was fairly rare – in these cases a couple of additional work trains would be assembled as needed – one to prepare the foundations for new support masts, and one to fit and erect the new support masts.

The first train would generally contain a couple of flat wagons with one or more petrol-powered 'builders style' cement mixers, a supply of cement, sand and aggregate, either in bags on flat wagons or in bulk in S-trucks, a portable 'post-hole digger', and all the equipment needed to dig the foundations, fit the required reinforcement steel and foundation bolts, along with an old coach or two to transport the work crews.

After a few days, to allow the concrete foundations to harden, a second train would work the section, erecting the overhead masts – this train contained a number of flat wagons carrying the new overhead masts, along with a van or two to hold all the

tools and equipment, and an old coach or two to transport the work crews. The train was finished off by attaching one of the departmental Breakdown Cranes to lift the masts off the flat wagons and place them on the prepared foundations for bolting down (these cranes were not just for accidents or derailments, they were regularly used for any civil construction works that the department undertook).

Water Supply
Bogie tankers, known also as water gins, were used either as supplementary water tenders for locomotives (being placed between the locomotive's tender and the train), or could be used for general water supply purposes by the Civil Engineers when performing works along the 'right of way'. When used by the Civil Engineers department, bogie water gins were usually coupled directly behind the tender, but could be marshalled in any part of the train as required to suit the work program.

On most lines throughout the State, a chain of lineside water tanks was located at regular intervals – these lineside tanks were for the use of fettlers and other lineside maintenance crews needing a good supply of water for both drinking and work purposes. Additionally at selected locations on some of the main lines, small tented 'camps' were provided to house railways staff, both temporary and on a semi-permanent basis. Each of these 'camps' had several water tanks to supply water for those who lived there. Water supply to the tanks was carried out by any convenient local goods train, which would have a 4-wheel tanker coupled next to the engine (either a specially converted K-truck or a 4-wheel semi-circular water gin). The train would stop with the water tanker beside the lineside tank and refilled from the train.

In the late 40's and early 50's, after the war, there was a shortage of suitable housing for some of the railway workers, who were 'billeted' in these lineside 'camps'. The Main Northern line between Hornsby and Cowan was a particularly popular place to house these workers – as a result, a special 'water train' No.289 was run in the early hours of each Monday morning to replenish the large number of tanks along this line.

Weed Control
NSWGR had two basic types of Weedkilling trains:

- In urban areas generally, and where work trips were relatively short, a train with a small 4-wheel tank was used. The 4-wheel tanks dated from 1955, as a conversion from old 2,500 gallon oil tank wagons. There were 7 tanks in use by 1961. Sometimes when used in outlying areas where water was not readily available, additional plain water only tanks were added to maintain water supply to the spray tanker without having to return to selected locations to refill the tank.

- In country areas generally, and where work trips were much longer, a train with a large capacity bogie D-Tank was used. The bogie tanks dated from around 1959, as conversions from 7,000 gallon bogie water 'gins' that were becoming surplus due to dieselisation in the western part of NSW. An operator's control cabin was mounted at one end, so the tank was cut back to a capacity of 6,500 gallons. When trips over longer runs of up to 100 miles were required, additional 7,000 gallon bogie water tankers were added to increase the total water capacity.

Weedkilling trains were generally run at slow speeds of around 8-15 mph maximum: this was to help prevent the spray being blown beyond the immediate track areas, with consequent waste. An additional tarpaulined S-truck or covered van was usually

attached, to hold reserve supplies of bagged poison chemicals, so the poison tank could be re-plenished during the journey.

After 1968, some old ‘Turret’ type goods locomotive tenders were converted to auxiliary water tanks, permanently coupled in pairs ‘front-to-front’, this gave an extra capacity of around 10,000 gallons per set.

Until 1977 each separate Way and Works division ran its own weed control program, and the types of vehicles used often varied to suit the local conditions. During the 80’s the old spray tankers were superseded by hi-rail road-rail vehicles with spray tanks, pumps and adjustable booms.

Rubbish Trains

Throughout the Sydney Metropolitan Area, every station or yard had one or more ‘kibbles’ – these were open-topped rectangular steel bins, holding around one hundredweight, with a hinged bar across the top for lifting, placed adjacent to the running lines. A regularly scheduled ‘rubbish train’ visited each station and yard to collect the rubbish and remove it to the main tip at Homebush. As well as emptying the ‘kibbles’, the train also picked up any large abandoned rubbish items found dumped inside railway boundaries, like broken furniture, whitegoods, refrigerators, washing machines, mattresses, etc.

A typical consist for a rubbish train was – train locomotive, brakevan, an S-truck, a 10 Class luffing-crane locomotive, another S-truck and a trailing brakevan. The crane locomotive was manned, and maintained in steam, but only for crane operating purposes, lifting the ‘kibbles’ or large rubbish items for emptying into the S-trucks - it did not provide traction to the work train. Several other general labour workmen accompanied the train and often rode in the S-trucks or brakevans, as the rubbish train slowly worked along the line.