

PART E

SCOPE OF SERVICES

PART E – SCOPE OF SERVICES

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E1 GENERAL

The Contract provides for the 15,000 Hour (TOP) overhaul and 30,000 Hour (MAJOR) overhaul of up to twenty-two (22) Paxman VP185 12 cylinder Diesel Engines, used in the XPT Fleet. The work under the Contract also includes the overhaul of Delphi Automotive Systems type KCVOT Unit Pump Injectors fitted to each engine when supplied for overhaul.

Engines will be supplied at approximately 6 weekly intervals for the duration of the Contract. To service Railcorp's entire stock of 22 engines through a complete 30,000 hour cycle will take approximately 5 years at the current utilisation.

E1.1 The Plant

RailCorp New South Wales (the Purchaser) owns a fleet of XPT rail vehicles which provide high speed passenger services in rural NSW and to Melbourne and Brisbane. The XPT fleet is operated by Countrylink and maintained and serviced by Railcorp's Asset Maintenance, Rolling Stock Division.

The XPT fleet consists of 60 Trailer cars of varying configurations and 19 diesel engined Powercars.

Each XPT Powercar is fitted with one Paxman VP185 12 cylinder diesel engine which drives a dual wound alternator providing both traction and auxiliary power for the train.

The Contractor is to provide services for the scheduled overhaul of the engines over the next overhaul cycle. The work under the Contract required are the 15,000Hr top overhaul and 30,000 Hr major overhaul.

Overhaul of the engines requires specialised staff and equipment as well as extensive knowledge of diesel engines in general and the Paxman VP185 engines in particular.

The XPT engine and alternator are treated as modular units which can be removed from the vehicle for servicing. Each modular unit is removed from the vehicle and mounted to a travelling frame by the Purchaser's staff, prior to removal from site by the Contractor.

The weight of a Paxman VP185 engine, including alternator and travelling frame is is approximately 15,300 kg.

E1.2 Plant Servicing

The engines are overhauled as part of the fleet major periodic maintenance program.

The Paxman VP185 engine overhaul schedule are based on hours run. The work under the contract are listed below

- Top overhaul 15,000 Hrs
- Major Overhaul 30,000 Hours.

The engines are always removed from the powercar for both Major Overhaul (Part E, clause E3) and Top Overhaul and the bulk of the work under the Contract will be performed at the Contractor's premises. The Contractor shall be required to carry out a pre-lube service at the Purchaser's premises after installation of an overhauled engine in a powercar but prior to its first start. The Contractor may also be required to attend to warranty work at the Purchaser's premises or elsewhere on the rail network under certain circumstances.

The objective of any work on the engines is to:

- i. Maximise (and increase) the life expectancy of the engine.
- ii. Maximise life expectancy of the XPT.
- iii. Optimise availability and reliability of the XPT fleet for the delivery of country passenger services.

From time to time there shall be out of course work required to be carried out.

From time to time there may be modifications required to be carried out.

E1.3 Interpretation

In this Specification words and expressions will have the meanings assigned to them below:

overhaul overhaul used on its own refers to both top overhaul and major overhaul.

E2 SCOPE OF WORKS UNDER THE CONTRACT

The work under the Contract is the servicing of 22 XPT engines as per Clause E1.2 for one 30,000 Hour cycle (a period of approximately 5 years).

E2.1 Work Included

The Contractor shall:

- a) maintain and manage a suitable stock of the mandatory and on condition spare parts at his works
- b) Supply and maintain all tools and equipment required to carry out the works
- c) transport the engines from the Purchaser's nominated premises to the Contractor's workshop mounted on a travelling frame. (which remains the property of the Purchaser).
- d) Remove travelling frame and store until required by the Engineer. If not required by the Engineer earlier, reattach to a completed Engine and return to the Purchaser's Nominated Service Centre.
- e) Carry out services as required, included overhaul of all rotatable parts, in accordance with this specification. Supply all labour, parts and materials, as required for the relevant service.
- f) Carry out all inspections required by the specification and recommend to the Purchaser any additional works required as a result of inspections. Carry out any additional works as directed by the Purchaser.
- g) Provide engineering support to the Purchaser as required
- h) Provide all written reports as required by the specification, including stripdown, build and commissioning reports .
- i) On completion of overhaul works, carry out all prescribed tests and provide certificate of completion.
- j) Refit the Overhauled engine to a travelling frame and return to the Purchaser's nominated premises.
- k) When each overhauled engine has been installed in a powercar, attend at XPT Maintenance Centre, inspect and test the installation of the Principal's engine protection systems. Supply all labour, parts and materials, as required.

E2.2 Work Excluded

The following works are excluded

- a) Supply of travelling frames

E2.3 Reference Documents

The services, and any additional services required after approval by the Engineer, shall be carried out in accordance with the Contract, relevant Australian Standards, industry codes of practice, Statutory Authority requirements the manufacturer's Operating and maintenance Instructions and the following documents

- Repair and Overhaul Manual for Paxman VP185 engines ("the manual").
- Illustrated Spare Parts List for Paxman VP185 Diesel Engine

The Contractor shall purchase copies of the documents listed above and maintain them for the duration of the Contract. The Contractor shall keep their manuals up-to-date with all advices issued by the OEM and provide copies of all manufacturer's advice to the Principal.

E3 DETAILED SPECIFICATION

E3.1 Services

The services to be provided by the Contractor are:

E3.1.1 Standard Services

E3.1.1.1 Top Overhaul

The Top Overhaul is the D (TOP) service as described in the VP185 Operators Handbook, Section E, as qualified or further detailed in Appendix EC to this Specification.

NOTE: All works from the C service are also included in the D service.

E3.1.1.2 Major Overhaul

The Major Overhaul is the E (MAJOR) service as described in the VP185 Operators Handbook, Section E, as qualified or further detailed in Appendix EB to this Specification and including the replacement of all mandatory parts listed in Tables 2 and 3.

NOTE: All works from the D (TOP) and C services are also included in the E service.

E3.1.2 Alternative Services

Some engines have had a bottom end rebuild at top overhaul - that is they have been fully overhauled with the exception of valve operating gear - camshafts and cam followers. These engines require an Extended Top Overhaul at 30,000 Hrs and a Reduced Major Overhaul at 15,000 Hrs.

E3.1.3 Extended Top Overhaul

The Extended Top Overhaul is the Top Overhaul as described above together with

- removal of sufficient equipment to expose the cambox cover as per the VP185 Operators Handbook, Section C1, Items 1-6, 9, 11, 12, 17, 20 and ONE top coolant jacket as per Item 31.
- the disassembly and inspection of camshaft and cam followers as detailed in the VP185 Operators Handbook, Section C8
- Removal of the torsional damper cover and the torsional damper as per the VP185 Operators Handbook, Section C1, Item 24 and 25.
- Overhaul or replacement of the torsional vibration damper (refer Appendix EA, Item 5 - there are two types of damper fitted)
- reassembly using all mandatory parts listed in Tables 1 and 3 and generally as described below

E3.1.4 Reduced Major Overhaul

The Reduced Major Overhaul is the Major Overhaul as detailed above less the disassembly and inspection of camshaft and cam followers as per the VP185 Operators Handbook, Section C8 and the overhaul or replacement of the torsional vibration damper.

E3.2 General

The services, and any additional services required after approval by the Engineer, shall be carried out in accordance with the Contract and its reference documents, relevant Australian Standards, industry codes of practice and Statutory Authority requirements.

E3.3 Configuration Control

A number of modifications have been made to the plant since their original purchase. These modifications are listed in Appendix EL to this Specification.

On the first occasion any item of plant is received by the Contractor for Overhaul, the Contractor shall inspect the plant and provide a report listing the items current modification status.

E3.3.1 Outstanding Modifications

Not all of the modifications listed in Appendix EL have been completed.

Any outstanding modifications shall be carried out by the Contractor at the scheduled rates or subject to Clause E9 as applicable.

E3.4 Replacement Parts

The replacement parts (items) used in the overhaul shall be genuine replacement parts obtained through an accredited agent in Australia for the engines described in this Contract. The accredited agent shall supply back-up, advisory and support services acceptable to the Purchaser.

Alternative supply of replacement parts may be approved for use by the Engineer's Representative, subject to evidence being produced by the Contractor that the replacement parts are equal to or superior to the genuine replacement parts and that back-up, advisory and support services, acceptable to the Purchaser, are available from the alternative spare parts supplier.

From time to time the Purchaser may elect to provide genuine replacement parts from its own stocks. The Contractor shall use the Purchaser's replacement items if they are suitable for inclusion in the Works.

For each part of the services listed in Clause E1.2, replace all items in Table 1, "Mandatory Parts" with new items conforming to the Contract.

E3.5 Inspection and Reuse of Components

All engine components that are removed during engine disassembly, and are to be reused in Engine overhaul, shall be inspected in accordance with the Workshop Manuals.

Inspection sheets shall be completed and supplied to the Engineer's Representative on completion of the overhaul. Inspection sheets shall show condition, dimensions, clearances and tolerances of components.

Inspection sheets shall indicate components that exceed manufacturer's tolerances and/or cannot be reused.

Replacement of components which cannot be reused shall be in accordance with Clause E9, REPAIR RECLAMATION.

Engine components that have been serviced/overhauled shall be noted on assembly inspection sheets.

E3.6 Rotable Parts

At the start of the works, the Purchaser shall supply one set of rotatable components to the Contractor, consisting of

- one set of twelve (12) cylinder heads
- one set of twelve (12) 'KCVOT' Unit Pump Injectors

- one set of six (6) turbocharger cartridges
- one (1) water pump
- one (1) starter motor

The Contractor shall be responsible for the safe and satisfactory storage and protection of the pool of rotatable components for the duration of the Contract.

Upon completion of the services, the rotatable pool of refurbished components shall be:

- protected and packed in a condition suitable for 6 months storage in the XPT Maintenance Centre warehouse in Sydenham.
- Delivered to the XPT Maintenance Centre.

E4 DOCUMENTATION

E4.1 The Documentation Provided by the Purchaser

The Purchaser shall provide a delivery advice with each component made available for servicing under the contract. The delivery advice shall indicate

- the component serial number
- description of the service required
- a brief condition report, including any known faults or abnormal operating conditions experienced in service.

E4.2 The Documentation Supplied by the Contractor

The Contractor shall provide the following documentation with each item of overhauled plant

- list of parts replaced;
- delivery docket, clearly showing the serial number;
- list of reconditioned parts installed, identified where possible by serial numbers;
- list of reconditioned parts removed from the item of plant, identified where possible by serial numbers;
- a condition report including any measurements taken and details of any non-mandatory part which was replaced;
- details of any parts replaced because replacement was due before next overhaul.
- certificate of completion confirming all works have been carried out in accordance with the Contract , and as directed.
- any documentation or reports as required in other parts of the Contract;

All documentation generated by the Contractor in relation to works carried out under this Contract, shall remain the property of the Purchaser and may not be copied or distributed in any form to any other party, including the original equipment manufacturer, without the prior, written approval of the Purchaser.

E5 REPLACEMENT PARTS LISTS

The Contractor shall supply and install the items listed in the tables of “Mandatory Items” for each service type (Refer Appendix EB and Appendix EC).

The Contractor shall supply and install any other items which must be replaced, as required and as directed by the Engineer.

E6 SPECIAL TOOLS

The Contractor shall obtain and maintain in good working condition for the duration of the Contract all special tools and fittings listed in the relevant sections of the Reference Documents.

E7 ENGINEERING SUPPORT

OEM Support

The Contractor shall supply to the XPT Depot Engineer all Technical Service Bulletins or correspondence issued by the replacement parts manufacturer relevant to the work under the Contract for the purpose of updating this specification and for performance monitoring of the Equipment.

Modifications are only to be carried out by the Contractor after receipt of an update of this Specification to cover such work.

Other Engineering Support

The Contractor shall provide engineering support for the duration of the Contract. The Contractor shall manage with and / or on behalf of the Purchaser engineering issues including

- a) Identification of parts and equipment faults and investigating suitable solutions;
- b) develop and implement systems to monitor and track components;
- c) review and investigate component performance and trends;
- d) review failure modes and options for repair and improvements;
- e) monitor and implement improvement initiatives; and
- f) identify, implement and monitor rail safety improvements and initiatives.

E8 QUALITY ASSURANCE

The Contractor shall supply proof of accreditation to an ISO9000 series Standard .

The Contractor shall be subject to regular quality audits by the Engineer’s Representative at which the Contractor shall make available all equipment calibration certificates, documentation of parts authenticity, proof of adherence to this specification, quality of workmanship and any other information required by the Engineer.

E9 REPAIR RECLAMATION

Any or all repair or reclamation outside the scope of or not covered by this specification is subject to approval of the Engineer prior to commencement of repair. (This includes the supply and installation of any additional replacement parts not included in the Mandatory Parts list.)

All discarded and/or used components remain the property of the Purchaser and shall be retained by the Contractor, suitably tagged for the attention of the Depot Engineer, until advised by the Engineer that the parts may be disposed of.

The Contractor shall dispose of all discarded and/or used components in a manner which satisfies all applicable legislation and regulations.

Should any of the Purchaser's components be sold, any proceeds of the sale shall be credited to the Purchaser.

The Engineer's Representative will check discarded and used components to ensure that such components should have been replaced. In the event that, in the opinion of the Engineer's Representative, a component should not have been replaced, payment for the new component shall be withheld.

E10 WARRANTY

The Contractor shall provide a 12 month warranty for each item of plant overhauled for both workmanship and parts, both from date of completion of the service.

The Contractor shall be responsible for all repair or replacement costs required to rectify any fault .

Should the plant need to be returned to the Contractor's works to effect repairs, the Engineer's Representative will organise for the removal and replacement of the defective equipment and transport to the Contractor's nominated workshop for repair/replacement at the Contractor's cost.

E11 SAFETY MANAGEMENT

Plant serviced under the Contract is to be installed in a rail vehicle, the operation of which is governed by the Rail safety Act 2002, as amended.

To assist the Purchaser in the execution of its obligations under the Act the Contractor shall ensure that its procedures effectively manage and control the way in which the Contractor

- receives safety related information from the Purchaser and ensures that it is actioned appropriately.
- collects information, including condition reports on components and inspections of work in progress, and ensures that any defects or faults are reported to the Purchaser promptly and expeditiously, irrespective of cause.
- manages spare parts and other material supplies to ensure compliance with the Contract
- manages work carried out by any sub-contractors to ensure compliance with the Contract.

The Purchaser shall from time to time conduct audits and/or inspections of the works to ensure compliance with the Contract.

E12 REPORTING, MONITORING, INSPECTION, MODIFICATION and RECORDS

E12.1 Reporting:

The Contractor shall have regular formal liaison with the Engineer. These shall be every month in the first year of the Contract. Then every two months for the remainder of the Contract.

Issues effecting or potentially effecting delivery of services and works shall be notified to the Engineer within 14 calendar days of the issue becoming identifiable. This period shall be no more the period remaining of the allowed time to effect the overhaul, to a maximum of 14 calendar days.

E12.2 Monitoring:

The Engineer's Representative shall have the right at any time to inspect any part of the Work as it is being performed. The Contractor shall provide sufficient safe and proper facilities for such inspection. No such inspection shall relieve the Contractor of any of his responsibilities or liabilities hereunder.

E12.3 Modification:

From time to time the Purchaser may introduce modifications to equipment to improve service life, to rectify a design fault or change the design to maintain a long-term supply of spare parts. When this occurs the Purchaser will request the Contractor to supply a price for the modification in accordance with Clause 20 of Part C.

The Purchaser will amend and re-issue the references documents as required to reflect any changes

From time to time the Contractor may identify an alternative way of managing the overhaul of individual components of a plant item. The Contractor shall initially discuss the proposed modification with the Engineer's Representative. If the modification is considered feasible (i.e. improved service life, reduced overhaul costs, reduced spare part usage. etc.), the Contractor will formally present the proposal to the Engineer's Representative who will respond within 30 days of the request.

The Purchaser will amend and re-issue the references documents as required to reflect any changes

E12.4 Records

The Contractor shall maintain a log in an electronic format (*MS Office product. eg. Excel or MS Access*) of all works and modifications to the plant item or its components. This log is to match the plant item or component serial number against the work or modification description, including date of work done or extra works as requested by the Purchaser, including the specification number or instruction that the work was done to. The Contractor shall prepare an initial record for each item of plant as it is received for a service. This initial record will detail the initial modification status of the item of plant.

This log will also include those parts replaced *on condition* or items that are required to be replaced at intervals greater than between each overhaul.

This log is to be forwarded to the Purchaser on a 6 monthly basis and the complete log handed to the Purchaser on completion of the Contract period.

E12.5 Inspection:

The Engineer's Representative shall have the right to reject any item of Work found in his opinion to be of inferior or faulty workmanship or in any way not in accordance with the specification and may order the Contractor to remedy or replace any such items.

Any work to be performed by the Contractor resulting from inspection and rejection shall be carried out at the Contractor's own cost and without delay.

Note: The Works are complete on delivery of an overhauled engine. There is no maintenance program by the Contractor

APPENDIX EA

SERVICING SCHEDULE RAIL TRACTION - XPT
(Extract from VP185 Operators Handbook)

APPENDIX EE

SPECIAL TEST SCHEDULE

APPENDIX EF

PROCEDURE FOR PRESERVATION OF MAN B&W ENGINES FOR EXPORT AND HOME ORDERS BEFORE DESPATCH

APPENDIX EG – NOT USED

APPENDIX EH

PROCEDURE FOR REPLACING VALVE GUIDES AND SEATS

APPENDIX EI – NOT USED

APPENDIX EJ – NOT USED

APPENDIX EK

NAMES AND CONTACT DETAILS OF AUTHORISED AGENTS IN AUSTRALIA FOR VARIOUS COMPONENTS

Component	Australian Agent	Contact Details
PAXMAN 12VP185L Engine VULKAN Coupling	MAN B&W Diesel Australia Pty Ltd	PO Box 734 North Ryde NSW 1670 396 Lane Cove Rd North Ryde NSW 2113 Tel: 02 8874 0700 Fax: 02 9889 5337
Simpson Industries (formerly Holset) Torsional Damper	Spiers Engineering Pty Ltd	P.O. Box 210 Fairey Meadow NSW 2519 40 Pringle Rd Fairey Meadow NSW 2519 Tel: 02 4285 2966 Fax: 02 4284 9723
Woodward (formerly Lucas/Bryce/Varity/Delphi) Unit Pump Injectors	Baileys Diesel Fuel Injection Pty Ltd	36 Investigator Drive Unanderra NSW 2526 Tel: 02 4272 2600 Fax: 02 4271 7587

APPENDIX EL

MODIFICATIONS MADE TO PAXMAN VP185 ENGINES USED IN XPT's

- 1 Modifications to the top deck in accordance with PAXMAN specification Ref XXXXXXXXX
- 2 Insertion of seats in the cylinder bores at the level of the bottom liner seal ("E-Bores") in accordance with PAXMAN Specification Ref XXXXXXXX
- 3 Modifications to cam valley cover to better control thermal expansion effects in accordance with Manufacturer's PAXMAN Specification.
- 4 Modification of Vulkan coupling to allow insertion of jacking bolts to aid in-situ removal.
- 5 There are two types of torsional vibration damper fitted. Early engines have a servicable damper; later engines have a non-servicable damper.
- 6 2 engines had the bottom end rebuilt at Top overhaul (due to premature failures). Cam followers which are normally replaced at Overhaul but not at Top were retained. These engines are now out of synch and will require replacement of cam followers at Top and not at Major Overhaul.
- 7 Tab washer securing primary coolant pump impeller has been replaced with a belleville washer
- 8 Some exhaust manifold water jackets are showing fretting damage at 30,000Hrs and have been reclaimed in accordance with the Manufacturer's Specification.
- 9 8 bladed turbocharger impellers are being progressively replaced with 7 bladed impellers.
- 10 Lube oil pump to oil cooler manifold and lube oil relief valve o-rings change to viton.

Engine	Modification											
	1	2	3	4	5	6	7	8	9	10	11	12
70601												
70602												
70603												
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