



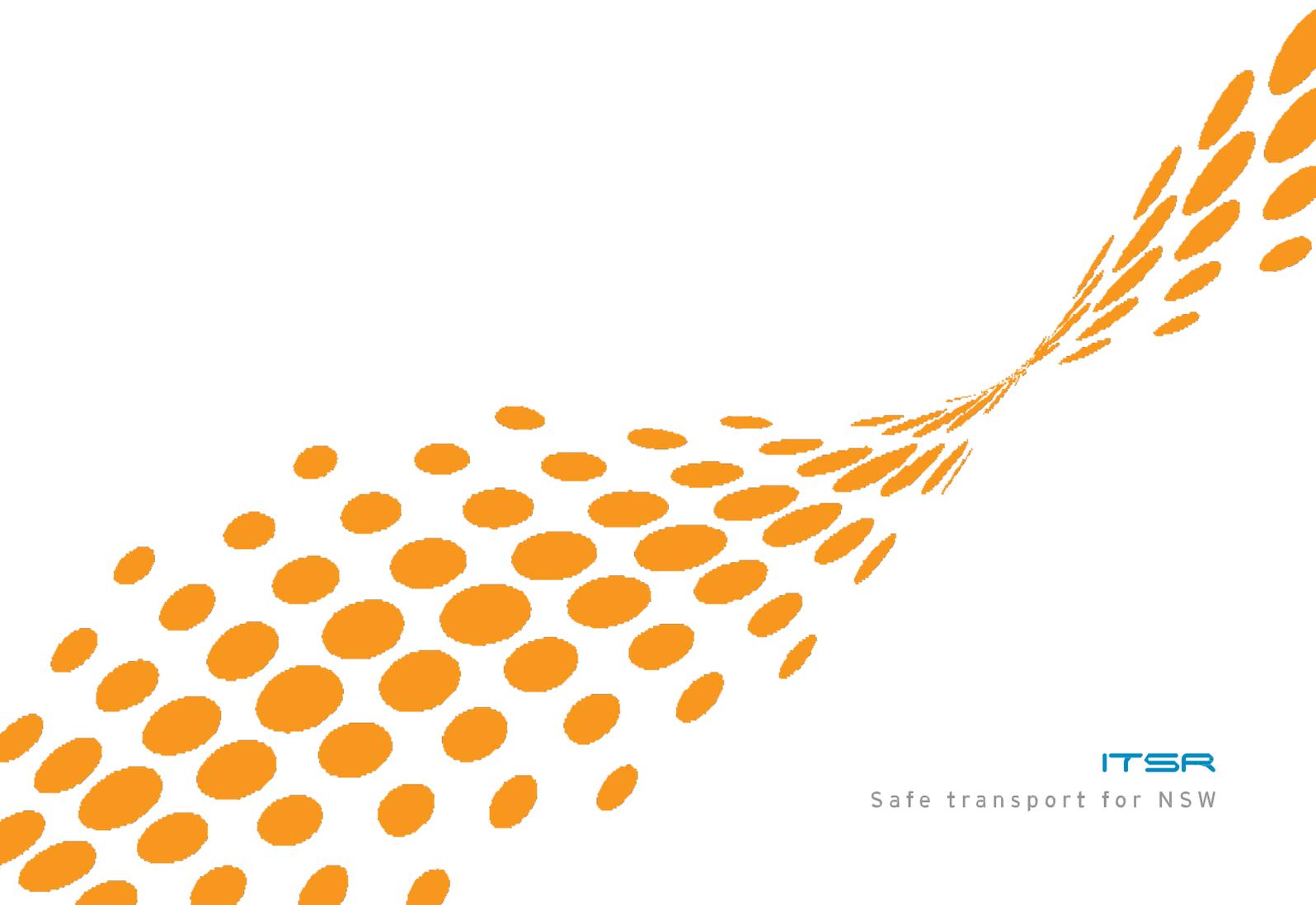
INDEPENDENT
TRANSPORT
SAFETY
REGULATOR

Implementation of the NSW Government's response

to the Final Report of the Special Commission of Inquiry into the Waterfall Rail Accident

Reporting period: April 2014 – March 2015

REPORT 35



ITSR

Safe transport for NSW

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Published by the Independent Transport Safety Regulator

© ITSr August 2015

ISBN: 978-0-9922804-1-3

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7 August 2015

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The Hon. Andrew Constance
Minister for Transport and Infrastructure
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Dear Minister

I am pleased to provide the second annual report on the implementation of the NSW Government's response to the recommendations contained within the *Final Report of the Special Commission of Inquiry into the Waterfall Rail Accident*.

This report reflects implementation progress from 1 April 2014 to 31 March 2015.

At the close of this period, there are two open recommendations. The Independent Transport Safety Regulator (ITSR) reports publicly on open recommendations.

Recommendations that have been closed subject to implementation of an approved program or plan are monitored as part of ITSR's ongoing regulatory activities to ensure these are fully implemented.

Further information about the history and progress of the implementation of all recommendations can be found on the ITSR website. This information includes:

- copies of previous ITSR quarterly reports
- a document containing all 177 recommendations
- a summary of the 6 recommendations that have been closed subject to the implementation of an approved program or plan.

Yours sincerely

PAUL HARRIS
Chief Executive

Introduction

The Independent Transport Safety Regulator (ITSR) is responsible for overseeing the implementation of the NSW Government's response to the recommendations contained within the *Final Report of the Special Commission of Inquiry into the Waterfall Rail Accident*.

This role includes verifying that recommendations have been effectively implemented or that an approved program or plan is in place for implementation. ITSR has previously produced quarterly public reports on the progress of open recommendations (Report numbers 1 to 33).

Following the publication of the 33rd quarterly report in April 2013, the former Minister for Transport accepted ITSR's recommendation to change the frequency of public reporting from quarterly to annually given that the majority of recommendations are now either closed or subject to a long term implementation plan. This report is ITSR's second annual report covering the period from 1 April 2014 to 31 March 2015 (Report number 35).

ITSR will provide the Minister with subsequent reports on an annual basis for the same reporting period (i.e. 1 April to 31 March) for tabling in Parliament. This will detail the status of the remaining recommendations and public reporting on an annual basis will continue until completion of their implementation. All reports are published on ITSR's website.

To enable ITSR to keep abreast of progress on the two open recommendations, ITSR also requires updates on a four monthly basis from Transport for NSW. These assist in the formulation of the annual report on the progress of open recommendations.

Summary of progress

At the end of the reporting period for 1 April 2014 to 31 March 2015, the status of the 177 recommendations (including 127 recommendations and 50 sub-elements) was as follows:

- 2 remain open
- 6 are closed subject to the implementation of an approved program or plan
- 163 are closed and verified as fully implemented
- 1 is closed because it is no longer applicable
- 5 are rejected by the government and these were closed.

The methodology and taxonomy for the classification system used for the Waterfall recommendations are in Appendix 1 and 2 respectively.

The two open recommendations, which are outlined in further detail in Appendix 3, are:

- 32: RailCorp should progressively implement, within a reasonable time, level 2 automatic train protection (ATP). ATP systems provide automatic enforcement (slowing/braking) of authority (speed/location) if a train is behaving in an unauthorised way. Implementation will involve significant infrastructure change and is the subject of a major project.

In December 2014, Transport for NSW's (TfNSW) Transport Executive Committee approved an alternate strategy known as the "Advanced Train Control Migration System" (AMS) to proceed under the existing funding arrangements of stage 1, Approval Package 1 (original strategy).

TfNSW's alternate strategy involves fitting all suburban trains with equipment that supports European Train Control System (ETCS) Level 2 systems, but reducing the infrastructure works required (e.g. signalling interlocking modifications – i.e. fewer balises). The result is an ATP system that provides limited supervision including speed control, together with the continued use of train stops and ETCS Level 1 full supervision at high risk locations.

The alternate strategy will provide an accelerated safety benefit by enabling TfNSW to extend the scope of ATP to 80% of the electrified network (instead of 40%); increase ATP fleet fitment to the Millennium, V sets, C sets, and K sets, in addition to the OSCAR and Tangara fleets, and an ETCS Level 2 Pilot Trial between Arncliffe and Hurstville.

A Business Case for additional funding is currently being finalised for submission to TfNSW's Finance and Investment Committee in mid-2015. Subject to approval, this will enable TfNSW to fit the remaining 20% of the electrified network with ATP as well as the two remaining electrified train fleets (Waratah and S sets) by Q4, 2019.

To ensure that the alternate strategy satisfies the intent of the Special Commission of Inquiry's recommendation for ATP as an *"acceptable alternative response"*, ITSR has requested TfNSW to provide formal advice and the safety argument to support this decision. ITSR expects to receive TfNSW's response together with key milestones and timeframes for the implementation of this strategy in the next reporting period.

- 38: There must be compatibility of communications systems throughout the rail network. It is essential that all train drivers, train controllers, signallers, train guards and supervisors of trackside work gangs in NSW be able to communicate using the same technology.

The target implementation date of 31 January 2016 for completion of the DTRS project which includes completion of the DTRS fixed network and fit out of the train cabs (on all Sydney Trains and NSW Trains) has slipped to 31 March 2016. This is a slippage of two months.

TfNSW has advised ITSR that by December 2015 (instead of July 2015), Sydney Trains' older passenger train fleets will be fitted with DTRS radios. Installation of DTRS radios on the Waratah (A sets) and Millennium (M sets) passenger train fleets operated by Sydney Trains and NSW Trains will be completed by 31 March 2016 (instead of January 2016).

These slippages are primarily attributable to TfNSW's contractor's poor performance in the completion of the DTRS software testing. To address these issues, TfNSW has established a program of independent audits. A further independent audit (mid-April to May 2015) has been commissioned by TfNSW to review its contractor's plan to close out all necessary observations in order to demonstrate that the DTRS software is safe to operate.

Completion of the DTRS software testing has also delayed the use of DTRS on the Tangara trains fitted with DTRS radios from being introduced into passenger service in the initial operating sector (Bondi Junction to Waterfall) to November 2015 (instead of February 2015).

Progress on recommendations

Recommendation 32

Original Strategy

In August 2010, the NSW Government gave in-principle funding approval for the rollout of the three stages of RailCorp's (now TfNSW) ATP program and full funding approval for the implementation of stage 1 of the program (Approval Package 1).

Expected completion dates for the three stages were:

- stage 1 – 2011 to 2017 (Approval Package 1 - funded)
- stage 2 – 2013 to 2018
- stage 3 – 2015 to 2021

The system chosen to implement TfNSW's ATP program was the European Train Control System (ETCS) Level 1 full supervision. This system supervises train speed and intervenes by applying the train's brakes should the permissible limits be exceeded.

The rollout of this program was to be in three stages. Stage 1 (Approval Package 1) involved the supply of ATP equipment onboard TfNSW's OSCAR and Tangara train fleets; the installation of ATP equipment to 40% of Sydney Trains' electrified network, and an ETCS Level 2 Pilot Trial between Arncliffe and Hurstville.

Stages 2 and 3 were to involve the installation of ATP equipment across the remainder of Sydney Trains' electrified network and onboard the Waratah and Millennium train fleets.

ETCS Level 1 involves the overlay of ATP on the coloured light signalling system to transmit authorities for trains to proceed on the network via the track mounted balises. ETCS Level 2 provides full signal protection and speed control using secure digital train radio systems to transmit authorities for trains to proceed. When all trains operating in an ETCS Level 2 area are fitted, the coloured light signalling system may be removed.

Alternate Strategy

In December 2014, TfNSW's Transport Executive Committee approved an alternate strategy known as the "Advanced Train Control Migration System" (AMS) to proceed under the existing funding arrangements of stage 1, Approval Package 1 (original strategy). TfNSW's alternate strategy, AMS, involves fitting all suburban trains with equipment that supports ETCS Level 2 systems, but reducing the infrastructure works required (e.g. signalling interlocking modifications – i.e. fewer balises). The result is an ATP system that provides limited supervision including speed control, together with the continued use of train stops and ETCS Level 1 full supervision at high risk locations.

The alternate strategy will provide an accelerated safety benefit by enabling TfNSW to extend the scope of ATP to 80% of the electrified network (instead of 40%); increase ATP fleet fitment to the Millennium, V sets, C sets, and K sets, in addition to the OSCAR and Tangara fleets, and an ETCS Level 2 Pilot Trial between Arncliffe and Hurstville. This program of work will be carried out under current funding arrangements (i.e. stage 1 – Approval Package 1).

TfNSW has advised ITSR that a Business Case is currently being finalised for submission to its Finance and Investment Committee in mid-2015, to obtain approval for additional funding to:

- Fit the remaining 20% of the electrified network with ATP;
- Fit the two remaining electrified fleets (Waratah and S sets);
- Extend the alternate strategy to provide the cumulative equivalent level of safety as the original strategy through the addition of controls to mitigate for those locations where the risk is high:
 - Deficient overlaps,
 - Level crossings with interlocked signals, and
 - Catchpoints protecting signals;
- Provide ETCS Level 2 compliant onboard equipment which supports the interface between the Digital Train Radio System and a future ETCS Level 2 system (i.e. aerials, radios and supporting conduits and cabling).

TfNSW's engagement with ITSR regarding its proposed alternate strategy for the delivery of this recommendation has been ongoing and will continue. To ensure that this strategy satisfies the intent of the Special Commission of Inquiry's recommendation for ATP as an "*acceptable alternative response*", ITSR has requested TfNSW to provide formal advice and the safety argument to support this decision. ITSR expects to receive TfNSW's response in the next reporting period.

Subject to the approval of TfNSW's Business Case for additional funding, ITSR will require TfNSW to provide key milestones and timeframes for the implementation of the alternate strategy. These milestones and timeframes will be reported in ITSR's next annual Waterfall report.

Status

During the reporting period there have been some slippages in the key milestones for the ATP program from the original target implementation dates. This is primarily due to the implementation of TfNSW's alternate strategy which has a significantly larger scope than the original strategy.

The first OSCAR train fitted with ATP equipment was to be commissioned into passenger service and operate between Berowra and Wyong in September 2015. As a result of TfNSW's alternate strategy, this will now occur in July 2018. This is a slippage of 2 years and 10 months from the previously reported milestone. However, the scope of the alternate strategy is considerably larger than previously planned (i.e. ATP fitment to 80%, instead of 40% of the electrified network as well as additional train fleets being fitted with ATP) utilising current funding.

Rollout of the installation of ATP equipment on the OSCAR train fleet is scheduled to commence in October 2015 and will be completed in January 2017. Installation of ATP equipment on the Tangara train fleet will be carried out under the Tangara Technology Upgrade (TTU) program in order to minimise the time this rolling stock is out of service. The contract award is scheduled to commence in Q2, 2015 with installation to be completed in June 2018.

Under TfNSW's alternate strategy, the installation completion dates for the additional fleets to be fitted with ATP equipment are:

- V sets - September 2016
- Millennium train fleet - May 2018
- C sets - November 2018
- K sets - November 2018

TfNSW expects that by the end of July 2018, all OSCAR, Tangara, Millennium and V-set rolling stock will be commissioned into passenger service together with the ATP fitment to 80% of the electrified network. By the end of November 2018, all C and K sets will be commissioned into passenger service.

Subject to the approval of TfNSW's Business Case for additional funding and based upon fleet availability, the Waratah train fleet and S sets are scheduled to be commissioned into passenger service in Q4, 2019. ATP fitment to the remaining 20% of the electrified network is also anticipated to be completed by Q4, 2019.

Type Approval with restrictions for the lineside electronic units version 5.1 (i.e. only to be used on signals that don't have flashing aspects – 97%) was achieved in April 2014. Lineside electronic units are a key component of the trackside equipment which acts as the interface between the existing signalling system and the ATP system.

Full Type Approval for the installation of the remaining lineside electronic units version 7.0 (i.e. signals that have flashing aspects – 3%) is on schedule and expected to be achieved as planned in June 2015. TfNSW commenced testing in late 2014 with additional testing to occur in mid-2015.

Type Approval for the lineside electronic units (version 7.0 with no restrictions) is no longer considered by TfNSW to be critical, given the revision of the milestone for the first passenger train into service from September 2015 to July 2018.

TfNSW has advised that the ETCS Level 2 Pilot Trial between Arncliffe and Hurstville is on schedule for completion in September 2015 as planned. Progress is underway to ensure that the necessary engineering approvals required to commission the trial are achieved.

As a result of the implementation of TfNSW's alternate strategy, the overall completion date for the ATP program is anticipated to now occur in Q4, 2019 (subject to fleet availability and approval for additional funding).

Recommendation 38

This recommendation requires implementation of TfNSW's new digital train radio system (DTRS) and the development of a national communications standard by the Rail Industry Safety and Standards Board (RISSB).

The new DTRS currently being designed will enhance communication between trains and network control in an emergency as well as enable communication between other staff for rail operations on the Sydney Trains' network.

It should be noted that all rail safety workers are currently able to communicate with each other but not using the same technology.

The Australasian Railway Association, in consultation with operators and rail safety regulators, developed a national approach on communications systems to ensure that agreed functionality and compatibility requirements were included in the national railway communications standard developed by RISSB. In December 2010, RISSB published the *Railway Communications Standard – AS7660* for implementation.

The target implementation date of 31 January 2016 for completion of the DTRS project which includes completion of the DTRS fixed network and fit out of the train cabs (on all Sydney Trains and NSW Trains) has slipped to 31 March 2016. This is a slippage of two months.

TfNSW has advised ITSr that by December 2015 (instead of July 2015), Sydney Trains' older passenger train fleets will be fitted with DTRS radios. Installation of DTRS radios on the Waratah (A sets) and Millennium (M sets) passenger train fleets operated by Sydney Trains and NSW Trains will be completed by 31 March 2016 (instead of January 2016).

Therefore, the revised target completion date for the DTRS project is 31 March 2016.

TfNSW has advised ITSr that these slippages are primarily attributable to its contractor's poor performance in the completion of the DTRS software testing. While the rate of progress for software testing is of concern, the software testing regime is now in its final stages. New software versions are undergoing regression testing to ensure issues identified in previous tests are resolved.

To address these concerns, TfNSW has established a program of independent audits. These audits have continued to demonstrate that the contractor is on a path to success provided it continues to enhance its processes. An independent audit has been commissioned by TfNSW to review its contractor's plan to close out all necessary observations in order to demonstrate that the DTRS software is safe to operate. This audit will commence in mid April 2015 with a further stage planned to be completed in May 2015. The final stage to assess the adequacy of the implementation of the plan will be completed later in the year.

TfNSW has also supplemented its technical resources with additional support from Sydney Trains to witness contractor test and regression test events to expedite the closure of observations.

The fixed network now comprises a total of 266 DTRS base station sites, consisting of 216 base transceiver station sites, 28 outdoor tunnel sites, 21 tunnel sites and one repeater site. During the reporting period, an additional seven sites (South West Rail Link – (six sites) and Clarendon on the Richmond Line) were added to the scope of works. Planning approval has been obtained for all of the 248 sites requiring community consultation.

Of these sites at 31 March 2015, 258 sites have commenced construction with 203 base transceiver station sites built and ready for commissioning and optimization. TfNSW expects that the fixed network will be completed in August 2015.

As at 31 March 2015, all of the 225 cabs in the Tangara fleet have been installed with dual fitted radios (i.e. a new DTRS radio in addition to the existing analogue MetroNet radio). This will enable Tangara trains in the initial operating sector (Bondi Junction to Waterfall) to be able to switch between the DTRS and MetroNet radio systems as required during the transition period. Completion of the DTRS software testing has also delayed the use of DTRS on the Tangara trains fitted with DTRS radios from being introduced into passenger service in the initial operating sector to November 2015 (instead of February 2015).

Preliminary on-train fit out work involving the external antennas for the cab radios and other pre fit work to train cabs in readiness for final fitment of the DTRS radios have been completed on 88 of the 111 OSCAR train cabs. All of the 80 K sets, 28 C sets 106 V sets and 36 out of the 96 S set train cabs have also been completed. Overall, pre fit work is 89% complete. Installation of DTRS radios on the K, C, V and S set trains operated by Sydney Trains can only occur once the full DTRS network is in operational use.

The completion of all detailed designs for the fixed network, on-train installations and systems was met in June 2014 as planned with all designs achieving either a 'Not Rejected' or 'Not Rejected Subject to Comment' status. The design process is now in the 'As Built' stage. So far, 'As Built' drawings have been submitted for 15 out of the 265 sites to the Sydney Trains Plan Room. 'As Built' drawings will also be submitted for 7 train types and 11 other sites (comprising 8 Edge Nodes, 2 Core sites (Central and Homebush) and the Wynyard Communications Room).

Methodology

This section outlines the processes ITSR has instituted to develop and monitor the implementation plan for the NSW Government's response to the *Final Report of the Special Commission of Inquiry into the Waterfall Rail Accident* (SCOI final report).

Implementation plan

ITSR has reviewed the SCOI final report and determined action required to implement each recommendation in line with the government's response and which company or agency has responsibility for that action. These expectations then formed the basis for determining whether the response put forward by a company or agency is appropriate to meet the recommendation and/or satisfy the safety objective of the recommendation. Responsible agencies have assigned indicative timeframes for each safety action and ITSR will review the appropriateness of each. Timeframes agreed with responsible companies or agencies have, to the greatest extent possible, been made realistic and achievable. Details of the implementation plan for outstanding issues and progress against it may be found in Appendix 3.

Classification system for recommendations

In order to provide a graduated view of progress against the implementation plan, ITSR has developed a classification system to indicate the relative status of each recommendation. The taxonomy for the classification system has been drawn from accepted international practice and is listed in Appendix 2.

The process for assigning status to a recommendation is as follows:

- Step 1** The government's response to the SCOI final report determined which recommendations were accepted. ITSR has articulated its expectations in regards to all remaining recommendations.
- Step 2** All accepted recommendations are assigned the status *open – await response*. These recommendations are then referred by ITSR to the relevant company or agency to prepare a response to the recommendation(s) and submit it to ITSR.
- Step 3** ITSR reviews the response and determines whether it is acceptable or not. If it is acceptable then the status of the recommendation is assigned either *open – acceptable response* or *open – acceptable alternative response*. A recommendation would be assigned an *open – acceptable alternative response* status when the intent of a recommendation will be met but will be implemented by alternative means. If the response is not acceptable then the recommendation is assigned the status of *open – response rejected by ITSR*. In this case, the company or agency is informed of the decision and requested to re-submit a revised response taking into account ITSR's concerns. This process continues until the response to the recommendation is accepted by ITSR.
- Step 4** ITSR monitors progress of all accepted responses to ensure a company or agency is meeting agreed implementation timeframes. This is done through both desktop reviews of reports received by agencies and in-field inspections to verify progress claimed.

Step 5 Once a company or agency has completed a required action it will submit to ITSR a claim for closure of the recommendation. This application indicates that the company or agency believes it has completed the required action. The status of the recommendation is changed to *open – company claims closure*.

Step 6 In most cases, ITSR will verify closure through an in-field compliance inspection or audit. Once verification has taken place the recommendation status is changed to indicate it is *closed – action verified*.

Notes:

1 Some recommendations may be verified by examination of documentation submitted by the agency that claims closure rather than through an in-field inspection. In these cases, recommendation status is indicated by *closed – action not verified*.

2 Some recommendations may be verified *closed – subject to the implementation of an approved program or plan*. In these cases, ITSR agrees to closure if the chief executive of the organisation has approved the program or plan and ITSR is of the view that it meets the government's response to the recommendation. This categorisation is used generally when implementation may take place over a prolonged period of time and/or capital expenditure is involved.

This process will continue until all recommendations are closed.

Taxonomy for classification system

Status		Definition
Open	Await response	This status is automatically assigned to an accepted recommendation. Affected parties will be asked to submit their response for implementing the recommendation to ITSR.
Open	Response received	ITSR has received a response from an affected party and this response is under review by ITSR. It has not yet been accepted by ITSR.
Open	Acceptable response	ITSR agrees that the planned action, when completed, meets the recommendation.
Open	Acceptable alternative response	ITSR agrees that alternative action, when completed, satisfies the objective of the recommendation.
Open	Response rejected by ITSR	ITSR does not agree that the planned or alternate action meets the recommendation. The company or agency is advised of the rejection and requested to provide a revised response.
Open	Company claims closure	The company or agency claims that the planned or alternate action has been completed. The action has not yet been verified by ITSR. ITSR has not yet agreed that the item is closed.
Closed	Recommendation rejected	ITSR has determined through further analysis and review that the recommendation is not appropriate (i.e. will not achieve the desired safety outcomes) and has rejected the recommendation. It is therefore closed.
Closed	No longer applicable	The recommendation has been overtaken by events and action is no longer required. For example, a new technology has eliminated the reason for the recommendation, it has been superseded by other recommendations issued, or the operator affected has gone out of business.
Closed	Action verified	Completion of the planned or alternate action has been verified by ITSR through a compliance inspection or audit.
Closed	Action not verified	ITSR accepts that the planned or alternate action has been completed following a review of documentation submitted. Field verification is not necessary.
Closed	Subject to the implementation of the approved program or plan	A long term implementation plan has been approved. ITSR will monitor reported progress against the plan to ensure compliance with delivery schedule.

Appendix 3

Implementation plan: outstanding recommendations

The following section provides information only for recommendations that were closed in the last quarter or remain to be implemented. Those recommendations closed in previous quarters do not appear. A complete list of all recommendations is available on ITSR's website.

The government response and ITSR expectation sections of this table are the formal responses to the SCOI final report announced in February 2005.

Recommendation 32			
RailCorp should progressively implement, within a reasonable time, level 2 automatic train protection (ATP).			
Agency	Status	ITSR assessment	Target date
RailCorp	Open	Acceptable response	*30/06/2015

Government response

Requires further detailed review. The government supports the implementation of additional train protection systems. Implementation of level 2 ATP as detailed in the recommendation would involve the replacement of all line-side signalling on the RailCorp network with on-train control systems. In addition every intra- and inter-state train accessing the network would also need to be equipped with level 2 ATP technology.

RailCorp has already retained consultants to undertake evaluation and risk assessment regarding implementation of additional automatic train protection systems on the RailCorp network. RailCorp will work with the Australian Rail Track Corporation (ARTC) – which operates the interstate network – to develop, in conjunction with ITSR and interstate rail regulators, a national standard for an automatic train protection system.

RailCorp will also undertake a comprehensive review which will include a risk assessment, technical feasibility and cost benefit analysis of introducing level 1 ATP as well as level 2 ATP, as recommended by the Commission. Consistent with recommendation 34, any future options will need to be assessed by independent verification of acceptable risk.

ITSR expectation

A detailed technical review of available options.

This project was originally led by RailCorp until June 2012. On 1 July 2012, responsibility for the delivery of the ATP program was transferred to the Transport Projects Division (now Transport Projects Office) within Transport for NSW (TfNSW).

The major outcome of the project is to be implementation of ATP including a trial of level 2 ETCS.

Accordingly, ITSR has deemed that the status of recommendation 32 continue to be classified as *open – acceptable response*.

* This is an indicative timeframe which has been agreed to by the agency responsible and ITSR.

+ This indicates a slippage with a revised date.

This indicates closure – subject to the implementation of an approved program or plan.

Recommendation 38

There must be compatibility of communications systems throughout the rail network. It is essential that all train drivers, train controllers, signallers, train guards and supervisors of trackside work gangs in New South Wales be able to communicate using the same technology.

Agency	Status	ITSR assessment	Target date
ITSR	Open	Acceptable response	+31/03/2016

Government response

Supported and being implemented. The National Standing Committee on Transport endorsed the Australasian Railway Association (ARA) working with operators and regulators, including RailCorp and ITSR, to develop a national approach on communications systems, which has agreed minimum functionality requirements for train radio systems.

RailCorp plans to implement a digital train radio system. An objective of this system is for it to be interoperable with existing analogue radio systems. Because of the technical complexities associated with achieving inter-operability, this has been a longer-term initiative and the first stage of its implementation will commence in 2005.

ITSR expectation

ITSR to ensure functionality and compatibility requirements are included in the national standard developed by the ARA.

This project was originally led by RailCorp until June 2012. On 1 July 2012, responsibility for the delivery of the DTRS project was transferred to the Transport Projects Division (now Transport Projects Office) within Transport for NSW (TfNSW).

ITSR to ensure TfNSW/ARTC radio functionality for next generation technology meets compatibility requirements.

All rail safety workers are currently able to communicate with each other but not using the same technology.

Accordingly, ITSR has deemed that the status of recommendation 38 continue to be classified as *open – acceptable response*.

* This is an indicative timeframe which has been agreed to by the agency responsible and ITSR.

+ This indicates a slippage with a revised date.

This indicates closure – subject to the implementation of an approved program or plan.