Vigilance safety system Training Handout

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Vigilance Safety System Status

The Vigilance Safety System is fitted to all suburban electric trains.

This booklet will provide a summary of key points that will assist you in identifying and responding to Vigilance related questions or issues.

Drivers are not required to fault find and / or trouble shoot the Vigilance System. If a System failure is detected, the system is to be isolated. Drivers must contact Train Control & Mechanical Control and operate the train as directed.

System Overview

- Vigilance is designed to detect a lack of driver activity.
- The Vigilance System is energised by moving the Master Controller Reverser Handle out of the Isolate position.
- The system is task-linked to the master controller, brake controller, headlight switch and horn.
- Acknowledgment of the Vigilance System by operating the acknowledgment button (hand or foot - where fitted) can only be made once warning stage is reached.
- The Vigilance timing cycles are speed related. As the speed of the train increases a shorter Vigilance Timing Cycle occurs, resulting in a more frequent acknowledgment request.

Vigilance System Cycle

- The system operates over a 4 stage cycle:
  Stage 1: **Timing Cycle**
  Reset timing by operating a task-linked control to activate a task.
  Stage 2: **1st Warning Cycle.**
  Activation of Red Flashing Light.
  Stage 3: **2nd Warning Cycle**.
  Continuation of the Red Flashing Light and activation of the Vigilance Bell.
  Stage 4: Vigilance Penalty Brake Application
  Emergency brakes applied. System can only be reset once the light in the hand acknowledgment button ceases flashing.

The Vigilance hand acknowledgment button(s) can only be used to acknowledge Vigilance after the system has entered the warning stage.

Continuously pressing the Vigilance button will not reset the Vigilance System and will not acknowledge the system prior to warning stage.

The button must be pressed momentarily and released for the request to be registered.

Vigilance Control Cycle Times

Speed	Light	Bell	Penalty
0-75 km/h	45 sec	50 sec	60 sec
75-90 km/h	35 sec	40 sec	50 sec
90-110 km/h	30 sec	35 sec	40 sec
over 110 km/h	25 sec	30 sec	35 sec

Vigilance Foot Switch

Continuously pressing the foot switch will not acknowledge the Vigilance System prior to a warning stage being reached. Only after the warning stages are reached, can the footswitch be used to acknowledge Vigilance.

The foot switch must be pressed momentarily and released for the request to be registered.

NB: Resting a foot on the Vigilance foot switch will result in the system advancing to warning. This will continue to occur unless the foot is removed from the footswitch and kept off. Please note that this functionality is also present on the hand acknowledgment button(s).

Vigilance Task-Linked Controls

Brake Controller

Movement of the brake controller during EP brake operation only, resets the timing cycle for vigilance, irrespective of the braking notch selected.

Horn

The operation of either Town or Country horn (or both together) resets the timing cycle for vigilance.

On some trains where a country horn is not fitted, the Vigilance System only detects and responds to the fitted horn control (ie. Town horn).

When operating the horn to reset Vigilance, a full application of the horn control is required (ie. full blow of the horn) to ensure that the Vigilance System detects that the horn has been operated.

On L, R and S sets the backward operation of the horn control may not be detected by the Vigilance System. The Town Horn operation must be in a forward direction on these sets to reset vigilance.

Headlight Switch

Note: L, R and S Sets – only where fitted

The Vigilance System is task linked to headlight controls for both High and Low beam operation.

The headlight switch will reset the timing cycle in the On and Off positions for High beam and Low beam.

After resetting the timing cycle with the headlight switch (either on or off) the next reset of the timing cycle must occur with another task-linked control.

Master Controller

The Master Controller is Speed-Dependent.

Movement of the master controller handle through the correct power notch for the current speed resets the timing cycle for vigilance.

During any warning stage, any movement of the Master Controller will reset Vigilance.

Note: The master controller will not continue to reset the vigilance of speeds above 110 km/h

Refer to the following tables for further information on this topic.

Master Controller movements that Reset the Time Cycle

Tangara Trains

Notch		Notch		SPEED
Off	to	1	speed below	10 km/h
1	to	Off	speed below	10 km/h
1	to	2	speed below	25 km/h
2	to	1	speed below	25 km/h
2	to	3	speed below	80 km/h
3	to	2	speed below	80 km/h
3	to	4	speed below	110 km/h
4	to	3	speed below	110 km/h

Suburban DD Trains

Notch		Notch		SPEED
Off	to	1	speed below	25 km/h
1	to	Off	speed below	110 km/h
1	to	2	speed below	35 km/h
2	to	1	speed below	13 km/h
2	to	3	speed below	70 km/h
3	to	2	speed below	N/A
3	to	1	speed below	30 km/h
3	to	4	speed below	110 km/h
4	to	3	speed below	40 km/h

Fast Forward Functionality

The Vigilance fast forward functionality advances the system to warning stage if the hand acknowledgment button or foot controls are held down and/or not released for a period of time.

If the Vigilance hand acknowledgment button is pressed down and not released before **1.5 seconds** the Vigilance System will advance to stage 2 of the warning cycle (flashing light sequence).

Holding the foot switch down and not releasing it before **3 seconds** has elapsed, will result in the Vigilance System advancing to stage 3 of the warning cycle (flashing light and bell sequence).

On V sets and Millennium trains if the Deadman footpedal is held down past the set position for a period of 3 seconds, the Vigilance System will advance to stage 3 of the warning cycle.

Vigilance Isolate Instructions

TWP 122 prescribes the required action should a failure of the Vigilance System or any of its task-linked controls be identified.

Drivers are authorised to isolate the Vigilance System as per TWP 122, but they **must inform Train Control immediately** upon doing so.

The Vigilance System is completely isolated by closing the SAI cock & then turning the Vigilance System circuit breaker off.

Once the Vigilance Circuit Breaker is switched off the System is no longer operational as there is no power to the system.

The Vigilance System circuit breaker switch **MUST NOT** be switched off unless there is a revealed electrical failure of the safety apparatus as outlined on pages 6, 11 & 12 of this booklet. The circuit breaker must not be switched off for any other reason.

Note:

Turning off the Vigilance Circuit Breaker will result in venting of the brake pipe.

Brake pipe pressure will not be restored until the Vigilance System is switched back on.

The Vigilance Circuit Breaker Switch is protected by a tamper evident lockout tag, which will need to be removed to switch off the circuit breaker.

Switching off the circuit breaker on Tangaras *may* require powering from the rear. For details, refer to page 7 of this booklet.

Amendments to TWP 122 – Failure of the Driver Safety Systems

TWP 122 will be amended and the following now applies. The changes to the Vigilance section of TWP 122 has resulted in Vigilance failures being grouped under two specific categories: revealed electrical failures and all other failures.

It should be noted that the **Vigilance Circuit Breaker** switch MUST NOT be switched off unless there is a revealed electrical failure of the Vigilance Safety System.

Examples of revealed electrical failures:

- When the Vigilance light continues to flash after an acknowledgment has occurred.
- When the Vigilance light flashes within 5 seconds of the last acknowledgment.
- Bell continues to sound after the system enters penalty.
- Bell sounds after an acknowledgment has occurred.

The circuit breaker MUST NOT be turned off for any other failure of the Vigilance System or any of its task-linked controls. Instead the SAI cock must be closed and the services of a Qualified Worker obtained to push the EMPB.

The amended TWP 122 now also includes reference to the Fast Forward functionality and its operation.

If the Vigilance Circuit Breaker is switched off the Driver must immediately notify Train Control and operate as directed.

Mechanical Control must also be notified that the Vigilance System has failed and that the tamper evident tag has been removed from the circuit breaker.

Vigilance Circuit Breaker Operation on Tangaras

On Tangara trains, switching the Vigilance circuit breaker off *may* result in the power also being removed from the Emergency Push

Button (EMPB). If this occurs, it will be necessary to have a qualified worker apply power from the rear as specified in **OMET 250 – Applying Power from the Rear.**

From the **9 January 2006** onwards the vigilance team, with MainTrain, has been modifying the Tangara fleet to enable the driver to drive, in an emergency, from the front cab, whilst the qualified worker is pressing the Emergency Push Button (EMPB). 25-30 cabs will be completed each week, until all are modified.

One of the following stickers will be placed in the cab as part of this process:

- Unmodified Tangara cabs will have the following sticker:

This is an unmodified cab
In the event of a vigilance failure please refer to OMET 250 and power from the rear

- Modified Tangara cabs will be fitted with the following sticker:

This is a modified cab
In the event of a vigilance failure please operate the EMPB as per TWP 122

Location of the Circuit Breaker Switch

In G and T sets this switch is located in the circuit breaker panel behind the driver's seat and is sealed by a tamper evident lock tag.

On C, K, L, R and S sets the switch is on the side of the equipment cupboard, on the rear wall of the driver's cab (towards the door) and is sealed by a tamper evident lock tag.

Reset After A Penalty Brake Application

Train In Motion (In-Service)

If a Vigilance penalty brake application occurs while the train is in motion, the Vigilance System will be ready for reset 2 seconds after the System detects a speed signal of 0 km/h.

If the Vigilance System fails to detect a speed signal of 0 km/h, a default period of 45 seconds will commence and reset can occur after this time has elapsed.

During Preparation (Train Stationary)

When a penalty brake application occurs during preparation, the system will be ready for reset between 2 and 45 seconds after the commencement of the penalty brake application.

Noise on the Speed Loop Affecting Vigilance Reset Period during Prep

The Vigilance System relies on a speed signal to detect the train's speed. Any electrical noise on the speed loop interferes with this signal.

When the train is stationary the speed signal should indicate 0 km/h. However, when there is noise on the speed loop the signal received may fluctuate between 0 km/h and 1 or more km/h.

This fluctuation in the signal indicates to the Vigilance System that the train has been in motion and has now come to a stop, which results in Vigilance being available for reset after two seconds. This is not a safety hazard. Drivers must be aware that if noise is present, the system may be ready for reset during preparation anytime between 2 and 45 seconds (ie. any time during this period).

Resetting Vigilance after Penalty Application

To reset the Vigilance System the driver must wait until the light in the acknowledgment button(s) 'has stopped flashing'. When a steady red light is present, operating the Vigilance hand acknowledgment button will reset the Vigilance System (if two hand acknowledgment buttons fitted either may be used).

NB: After a Vigilance penalty brake application, the system can **only** be reset using the hand acknowledgment button(s).
If a penalty application is not reset, prior to the driver cutting out, there will be a 75-second delay (after cutting in) before the penalty can be reset.

Active Cab Vigilance Functionality

An active cab is defined as a cab that the driver is occupying. The Vigilance System in the active cab is operational when the butterfly key is inserted and the reverser is out of isolate. This energises the Vigilance System via the Vigilance miniature circuit breaker and the Control Positive circuit.

While the Vigilance System is active the driver must respond to the system by specifically acknowledging the Vigilance system when a warning is received. Operation of a task-linked control (where appropriate) will reset the Vigilance timing cycle prior to a warning being received.

All Right Bell Signal and Suppressing Vigilance at Platforms

It has been identified that in some instances the All Right Bell Signal is not being delivered in accordance with **TWP 162 – Train Crew Bell Signals.** That is, a short bell is being delivered instead of one long bell.

If the All Right Bell is delivered incorrectly, a risk exists that the first 'strike' of the Vigilance Bell in Stage 3 could be mistaken as a single 'strike' of the All Right Bell.

This could result in a train departing a platform, while passengers are still boarding or alighting.

The following procedural solution was developed to treat this risk.

1. **Guards must continue to deliver the All Right Bell signal in accordance with TWP 162.**

   TWP 162 instructs the Guard to deliver the All Right Bell Signal - one long bell -'slowly and distinctly'.

2. **Drivers must maintain a minimum of 175kPa in the brake cylinders at all times whilst the train is stationary.**

   This will ensure that Vigilance remains suppressed, reducing the likelihood of a driver departing a station on the initial Vigilance bell.

Adherence to this train management procedure is essential at all times.

All Right Bell Extender

To ensure that the All Right Bell is delivered correctly (ie. such that a single 'strike' of the bell dome can't be delivered), a bell ring length extender is being fitted.

The ring length extender ensures a minimum ring length is achieved every time the bell is operated.

The extender will still allow a Guard to deliver the Stop Immediately Bell signal (two short bells) to alert the driver that an emergency stop is required.

All bell signals will be able to be delivered as per current requirements.

The bell extenders will be fitted to all V sets, Tangara and pre-Tangara trains from January – July 2005.

Vigilance Bell (C, K, L, R and S sets only)

Due to the location of the bell and the cab dynamics, the Vigilance Bell on these trains is louder then the Vigilance Bell on other train types.

As such, the Vigilance Bell on these sets will be retrofitted with a new plunger (striker) to dampen the bell sound.

The solution will be rolled out in a phased approach, with the upgrade complete by the end of July 2005.

Hauling Dead or shunting without Jumpers inserted.

When shunting or hauling a dead a set which is electrically isolated, ensure that all SAI cocks are closed on the set being hauled or shunted.

The Vigilance Penalty Solenoid is held closed by the control positive feed. As there is no electrical supply to the Vigilance Penalty Solenoid the Brake Pipe will vent through the Vigilance emergency magnet valve.

Locked Hand Acknowledgment Button(s)

If the top of the Vigilance button is rotated in either direction the button will lock. This means that the button will no longer be able to be pressed down to acknowledge Vigilance.

To unlock the button, you must gently rotate the top of the button in the reverse direction from which it is locked, until the button unlocks and is able to be easily pressed down.

If the button is locked and a Vigilance acknowledgment request occurs, another task-linked control or the foot acknowledgment control (where fitted) can be used to reset Vigilance.

The locking function results from the button being inappropriately twisted.

Vigilance System Suppression

The Vigilance Safety System is suppressed when brake cylinder pressure (as indicated on the BCP gauge) is at 175kPa or greater.

Once Vigilance is suppressed the system does not enter warning stage and will remain in active until the system is brought out of suppression.

The Vigilance Safety System comes out of suppression (ie. becomes active) when the brake cylinder pressure (as indicated on the BCP gauge) drops to 65kPa or less.

Once the brake cylinder pressure reduces to 65kPa the system becomes active and the Vigilance System will require acknowledgment.

Vigilance Warning Light dimmer switch

The Vigilance warning light is fitted with a dimmer feature.

The deadman foot-pedal warning light switch is used for this purpose on Tangara sets.

On non-Tangara trains the vigilance warning light dimmer switch is fitted to the custom made casing, mounted to the right of the brake controller handle.

In-Active Cab Vigilance Functionality on pre-Tangara Rollingstock and V Sets.

In an in active cab (any cab not cut-in) the Vigilance System becomes active if the foot switch or deadman footpedal is held down.

Holding the footswitch / pedal down will result in the Vigilance System proceeding through the timing cycle and enter the warning stage 3.

If the person holding the footswitch / pedal down does not respond to the Vigilance System when the warning stage occurs, Vigilance will go into penalty and attempt to dump air from the brake pipe.

If the SAI cock is open on the cab where this is occurring, the air will vent and the train will be brought to a stop.

To avoid this situation from occurring, Crew must remain aware of this functionality and ensure they do not place their foot on the footswitch/pedal if occupying an in-active cab.

In the event a Driver finds the brake pipe pressure reduces without warning, they must adhere to the procedures prescribed in **TWP 128 Loss of Brake Pipe Air.**

Vigilance Isolate Procedure

(C, K, L, R, S and V Sets, Tangara, Millennium Trains ONLY)
These instructions on Vigilance supersede pages 9 and 11 of TWP 122 as outlined in the Train Operations Manual (TOM

Please familiarise yourself with new procedures. An amendment to - TWP 122 will be included in the next publication of the Train Operations Manual (TOM).

When should the Vigilance Circuit Breaker be switched off?

Revealed Electrical Failures of the Vigilance System:

The only faults that require the Vigilance Circuit Breaker to be switched off are:

- ❑ Vigilance bell continuing to sound after a penalty brake application has commenced
- ❑ Vigilance light in hand acknowledgment button does not become steady (in readiness for reset) after a penalty brake application
- ❑ Vigilance light in hand acknowledgment button lights up within 5 seconds of the last acknowledgment

*Note: All of the above are faults with the **vigilance** **button or bell** components.*

They are called "revealed" electrical failures because they are all clearly evident to the Driver.

All Other Failures of the Vigilance System:

The Vigilance Circuit Breaker MUST NOT be switched off for these failures:

1. The VC system is not accepting any acknowledgment from:
   - The VC push button OR
   - Task linked controls OR
2. The Brake Pipe Pressure is not restoring after a penalty application

The Vigilance Circuit Breaker MUST NOT be switched off unless there is a "revealed electrical failure" of the hand acknowledgment button or vigilance bell components.

"Revealed Electrical Failure" of Vigilance	Action
The only faults that require the Vigilance Circuit Breaker to be switched off are: ❑ Vigilance bell continuing to sound after a penalty brake application has commenced ❑ Vigilance light in hand acknowledgment button does not become steady (in readiness for reset) after a penalty brake application ❑ Vigilance light in hand acknowledgment button lights up within 5 seconds of the last acknowledgment *Note: All of the above are faults with the **button or bell** components.* *They are called "revealed" electrical failures because they are all clearly evident to the Driver.*	1. Close the Safety Apparatus isolating cock 2. Switch off the VC System MCB ***Drivers safety systems will no longer operate.*** ***When the safety apparatus or vigilance control (VC) MCB has been isolated, the master controller handle or the deadman pedal must be in the SET position for the train to power.*** 3. Obtain the services of a Qualified Worker to push the EMPB. *IF a Qualified Worker is not available to push the EMPB, the Guard is to accompany the Driver pushing the EMPB.* 4. Notify Train Control and work as directed. **Important Note: On Tangara trains (only), when the VC System MCB is switched off, power is also removed from the EMPB.** This means that power must be applied from the rear control car to move the train. Refer to **OMET 250** for instructions on Applying Power from the Rear
Other Failures of Vigilance	**Action**
The Vigilance System MCB MUST NOT be switched off for these failures: 1. The VC system is not accepting any acknowledgment from: • The VC push button OR • Task linked controls OR 2. The Brake Pipe Pressure is not restoring after a penalty application	**New Procedure:** 1. Close the Safety Apparatus isolating cock *Drivers safety systems will no longer operate.* 2. Obtain the services of a Qualified Worker to push the EMPB *IF a Qualified Worker is not available to push the EMPB, the Guard is to accompany the Driver pushing the EMPB* 3. Notify Train Control and work as directed

	NB: DO NOT switch off the Vigilance System Circuit Breaker.